

The AppDynamics logo, featuring the word "APPDYNAMICS" in a bold, sans-serif font. The "APP" is in a lighter blue color, and "DYNAMICS" is in a darker blue color.

APPDYNAMICS

# AppDynamics End User Experience

AppDynamics Pro Documentation

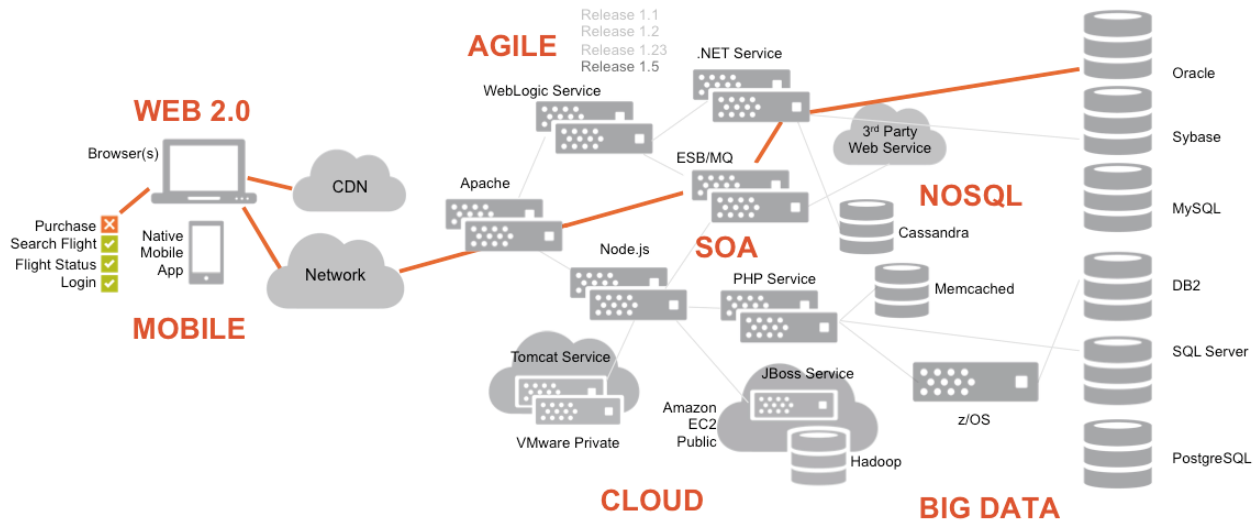
Version 3.8.x

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# AppDynamics End User Experience

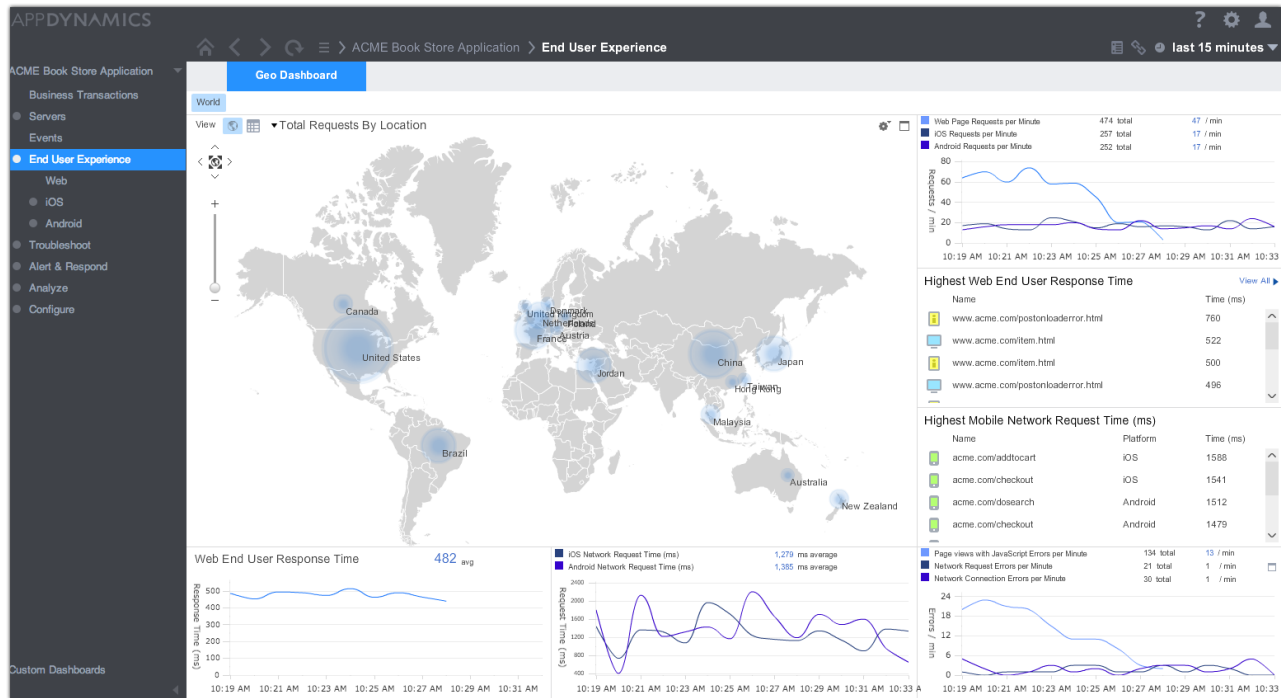
End User Experience Monitoring (EUM) provides performance information from the point of view of the client, whether that client is a web browser or a mobile native application. This is different from other types of AppDynamics monitoring, which typically begin at the application server. You can monitor web use, mobile use, or both, depending on your needs.



EUM helps you determine the extent to which poor user experience may be caused by problems in the browser or local app or in the network by showing you a breakdown of how much of the total end-user time is spent requesting service and then rendering the response data. In addition, for mobile apps, it provides crash snapshots that include stack traces of the application at the time of the crash. EUM gives you visibility into client usage on a global basis, showing you, for example:

- where your heaviest loads originate
- where your slowest end-user response times occur
- how performance varies by location
- how performance varies by client type, device, browser and browser version, network connection
- how performance varies by application and application version, operating system version, device, carrier for mobile apps
- what your slowest Web requests/Ajax requests are and what is causing the slowdown
- what your slowest mobile network requests are and what is causing the slowdown
- how application server performance impacts the performance of your web and mobile traffic

EUM produces its own data set that is separate from the data reported by AppDynamics app agents.



This EUM data is visible in various EUM dashboards, beginning with this top-level combined Web/Mobile geo dashboard, as well as in the Metric Browser. In addition, EUM can link with server-side business transaction information collected by the AppDynamics app agents to give you a complete view of your end users' experience from the client request, through the backend, and on to the client response.

To learn more about EUM, see:

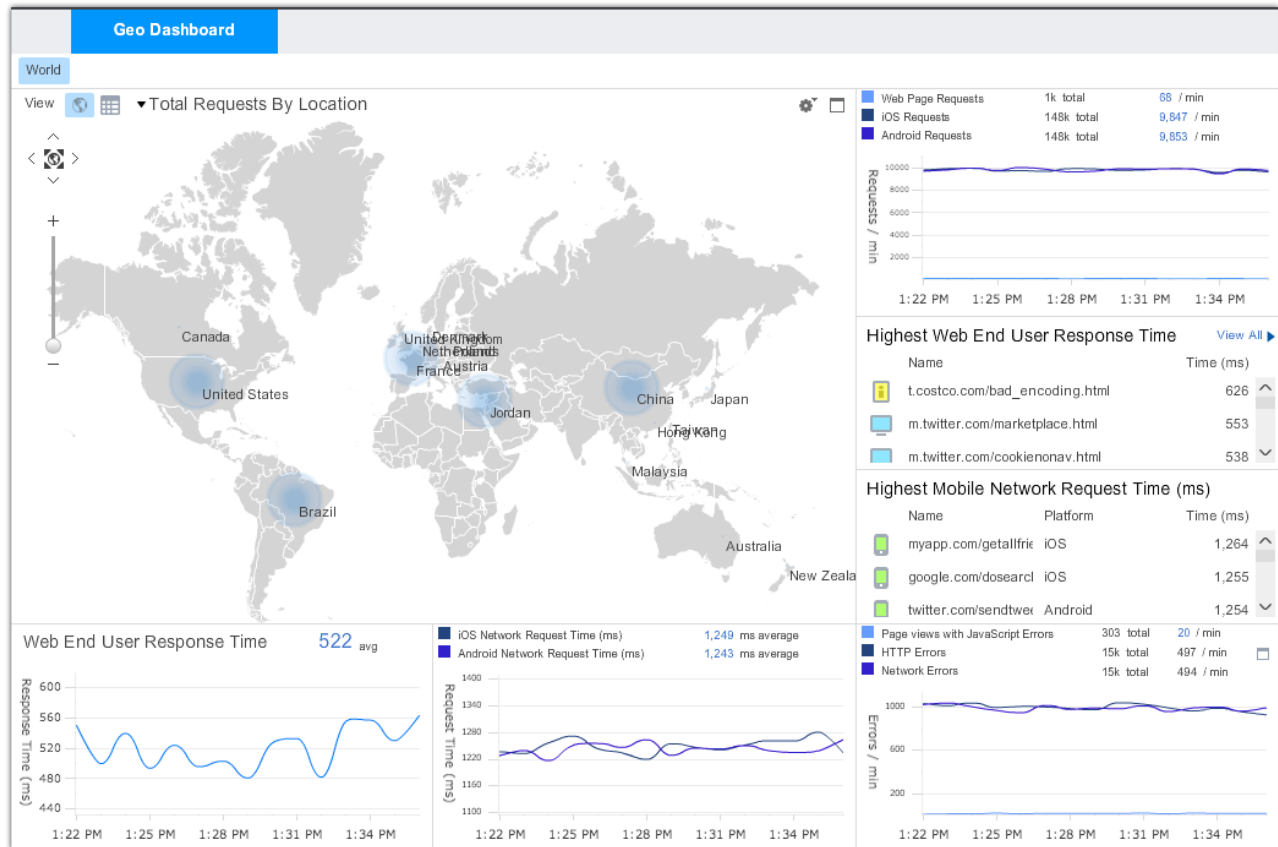
- [Additional topics](#)

Since EUM produces additional metrics, you may need to re-evaluate your current configuration's ability to handle the additional load. See [Additional Sizing Considerations](#).

## The EUM Geo Dashboard

- [EUM Geo Dashboard](#)
- [Using Map View](#)
  - [Map Actions](#)
- [Configuring Map View Options](#)
  - [To access the map view options configuration tool](#)
  - [To configure circle sizes representing load or errors](#)
  - [To display the map control widget](#)
  - [To view a dark colored or light colored map](#)
  - [To configure color ranges representing performance thresholds](#)
- [Unknown Locations in Map and Grid Views](#)
- [Learn More](#)

The EUM Geo Dashboard lets you monitor Web and Mobile EUM global performance from a single dashboard.



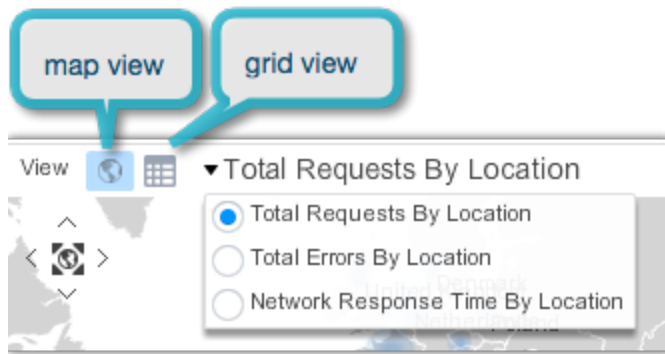
There are also separate geo dashboards for [Web](#) and [Mobile EUM](#).

## EUM Geo Dashboard

The dashboard is divided into three panels:

- A main panel in the upper left that displays geographic distribution of end users on a map, if you clicked the map view icon or on a grid if you clicked the grid view icon.
  - You can switch between map view and grid view by clicking these icons.
  - You can expand the map panel or the grid panel to fill the entire dashboard by toggling the expand icon in the upper right corner of the panel.
  - You select whether you want to view the map by total requests by location, total errors by location, or network response time by location.
 

Network response time view displays metrics by average response time and produces a color-coded map in which the color of a circle represents the relative request time experienced by users in a country: green for a fast request time, yellow for a medium request time, red for a slow request time.



- A panel on the right displaying:
  - Summary load metrics for end-user requests from Web browsers, iOS applications and Android applications.
  - Graph of the summary load for the selected time range. You can click the links to see the rates displayed in the Metric Browser.
  - Highest web end user response times. This list displays the slowest requests from Web browsers. Click **View All** if you want to view all the page and Ajax requests. See [The Pages and Ajax Requests View](#) for more information about this view.
  - Highest mobile network request times. This list displays the slowest requests from mobile applications.
- Trend graphs in the lower part of the dashboard that dynamically display:
  - Average Web browser end-user response time.
  - Average mobile network request time for each mobile platform.
  - Number and rate of page views with JavaScript errors from Web browsers and number and rate of HTTP errors and network errors from mobile applications.

The metrics displayed throughout this geo dashboard are for the country currently selected on the map or in the grid. For example, if you zoom down from World view to France in the map, the dashboard displays data for France.

## Using Map View

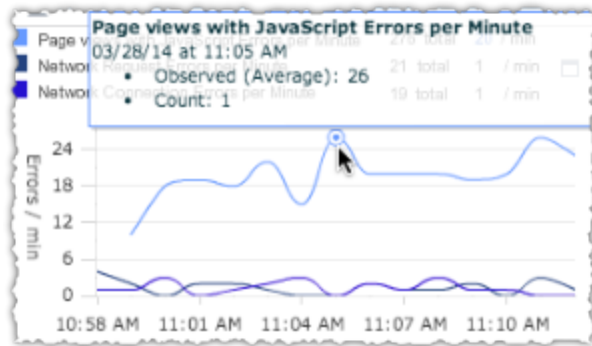
The main panel in map view displays a map superimposed with circles that represent application load or errors by country, depending on your selected view.

If your view is total requests by location, the size of a circle indicates the relative amount of traffic in a country: the larger the circle the higher the load.

If your view is total errors by location, the size of a circle indicates the relative number of errors in a country: the larger the circle the higher the error rate.

See [Configuring Map View Options](#) for information about how to adjust the size range.

You can hover over a point in time in any graph to get the precise values for the metric for that moment.



## Map Actions

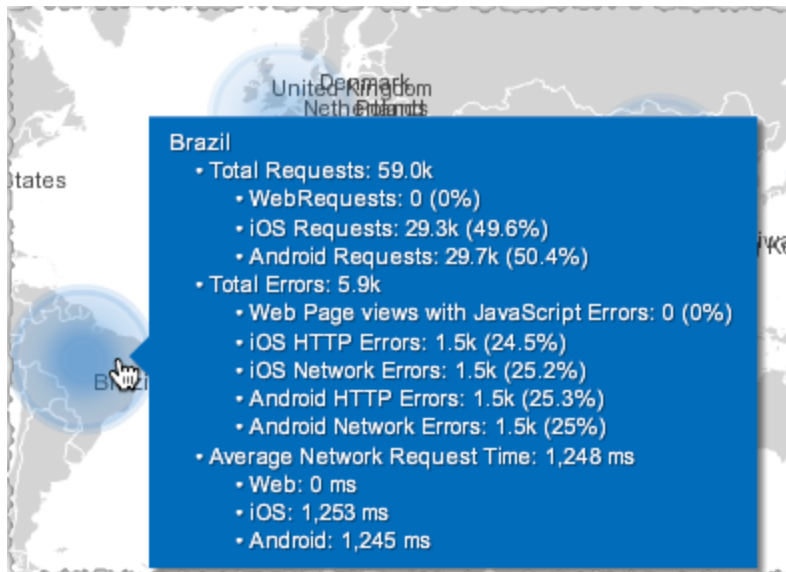
You can perform the following actions directly in the map:

- Click any country on the map to drill down into metrics for that country. The country is colored blue to indicate that it is drilled down. To return to the world view from the country view, click World in the left corner of the map.



- View summary statistics for a region by hovering over its circle.





- Zoom the entire map using the slider on the left. You can also use your mouse wheel to increase or decrease the map's zoom level.
- Reposition the map by clicking and dragging it or by clicking the directional arrows in the map control widget.

## Configuring Map View Options

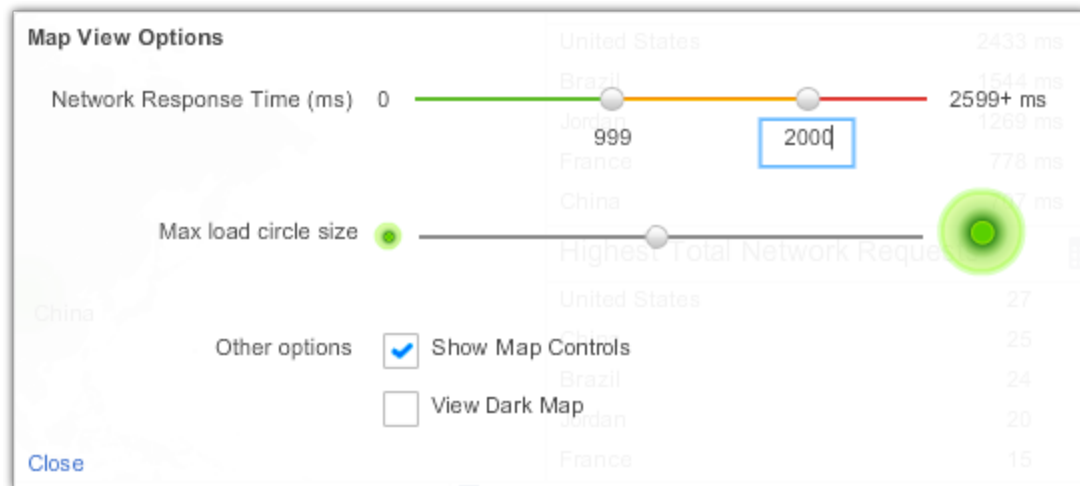
You can configure the dashboard display in a variety of ways:

- The ranges of the circle sizes that indicate relative load or errors on the map.
- The ranges of the colors that indicate normal, warning and critical performance on the map; applies only to network response time by location view
- Whether to display the zoom slider and Home button on the map.
- Whether to display a dark or light colored map.

All of these configurations are saved for the next time you log into AppDynamics.

### To access the map view options configuration tool

Click the gear icon in the upper right corner of the map or grid panel to get the configuration window.



### To configure circle sizes representing load or errors

Adjust the max load circle size slider to make the circles ranges larger or smaller.

### To display the map control widget

Check Show Map Controls. To hide them clear this check box. The map controls let you reposition the map using arrows and zoom the map using + and - buttons. After moving or zooming the map, if you want to return to the default zoomed out home view, click the globe icon in the center of the map control widget.

### To view a dark colored or light colored map

To view a dark colored map check View Dark Map. To view a light colored map clear this check box.

### To configure color ranges representing performance thresholds

This setting applies only when you view the map by network response time by location.

Do one of the following:

- Adjust the Network Response Time slider. For example, if you want circles to be red whenever the network request time is 2000 milliseconds or greater, slide the maximum value of the yellow slider value to 2000.

or

- Double-click the text field that indicates the slider threshold value to make it editable, enter the value of the threshold in the text field, and press the tab key. You can enter as large a value as you like in the field (larger than the current maximum displayed value of the slider) and the displayed range of values for the circle color ranges will adjust accordingly.

## Unknown Locations in Map and Grid Views

An unknown location is one for which the agent cannot determine the country from which the request originated.

In map view, you may also see a location named "Unknown" in the highest request times and highest loads panels to the right of the map.

In grid view, aggregated metrics for the unknown locations are displayed under the location name "Unknown".

You may also see metrics reported for a location named "Anonymous Proxy". The data for Anonymous Proxy represents the aggregated metrics from one or more private IP addresses that the agent cannot identify

## Learn More

- [The Web EUM Geo Dashboard View](#)
- [Monitor Mobile Applications by Location](#)
- [Web EUM Metrics](#)
- [Mobile APM Metrics](#)

## Web EUM

AppDynamics Web End User Experience Monitoring (Web EUM) allows you to see how your web application is performing from the point of view of your end user. You can answer questions like:

- Which 1st or 3rd party Ajax or iframe calls are slowing down page load time?
- How does server performance impact end user experience in aggregate or in individual cases?

You can drill into the data to explore how users experience your application in their Web browsers.

## Using Web EUM to Monitor your Application

Web EUM offers multiple ways to look at your data, in real time. You can:

- **Understand and improve your web page's performance**
  - Know how your pages, Ajax requests, and iframes are performing over time. See [The Pages and Ajax Requests View](#).
  - Gain insight into individual requests, with detailed charts on how your pages, Ajax requests, and iframes load and build in your end user's browsers, with links, if enabled, to reports on server-side performance. See [Browser Snapshots](#).
  - Find your worst performing pages by multiple common metrics. See [Top Pages](#).
- **Reduce errors**
  - Learn which pages are loading with JavaScript errors, and the script file and line number that are creating the problem. See [Browser Snapshots](#).
- **Learn about your users**
  - See how your web users are connecting to your application, by device/platform and browser. See [Usage Stats](#).
  - Find out where in the world your web users are and how your application is performing across countries and regions. See [The Web EUM Geo Dashboard View](#) and [Usage Stats](#).

For more information on using EUM for monitoring, see [Monitor Your Applications with Web EUM](#).

## Setting Up and Configuring Web EUM

Web EUM is easy to set up. It is also highly configurable. You can:

- instrument your application to work with Web EUM. For more information, see [Set Up Your Application for Web EUM](#).
- set up how your information appears in the AppDynamics Controller UI. For more information see [Configure the Controller UI for Web EUM](#).
- customize your deployment. For more information, see [Customize Your Web EUM Deployment](#).

For more information on setting up Web EUM, see [Set Up and Configure Web EUM](#).

## Licensing and Enabling Web EUM

Web EUM requires a separate license, and must be enabled before it is available for use. Until it is enabled it does not appear in the left navigation bar of the AppDynamics GUI.

For information about licensing, see [Web EUM License](#).

For information on enabling or disabling EUM, see [Set Up and Configure Web EUM](#).

## Learn More

- [AppDynamics End User Experience](#)

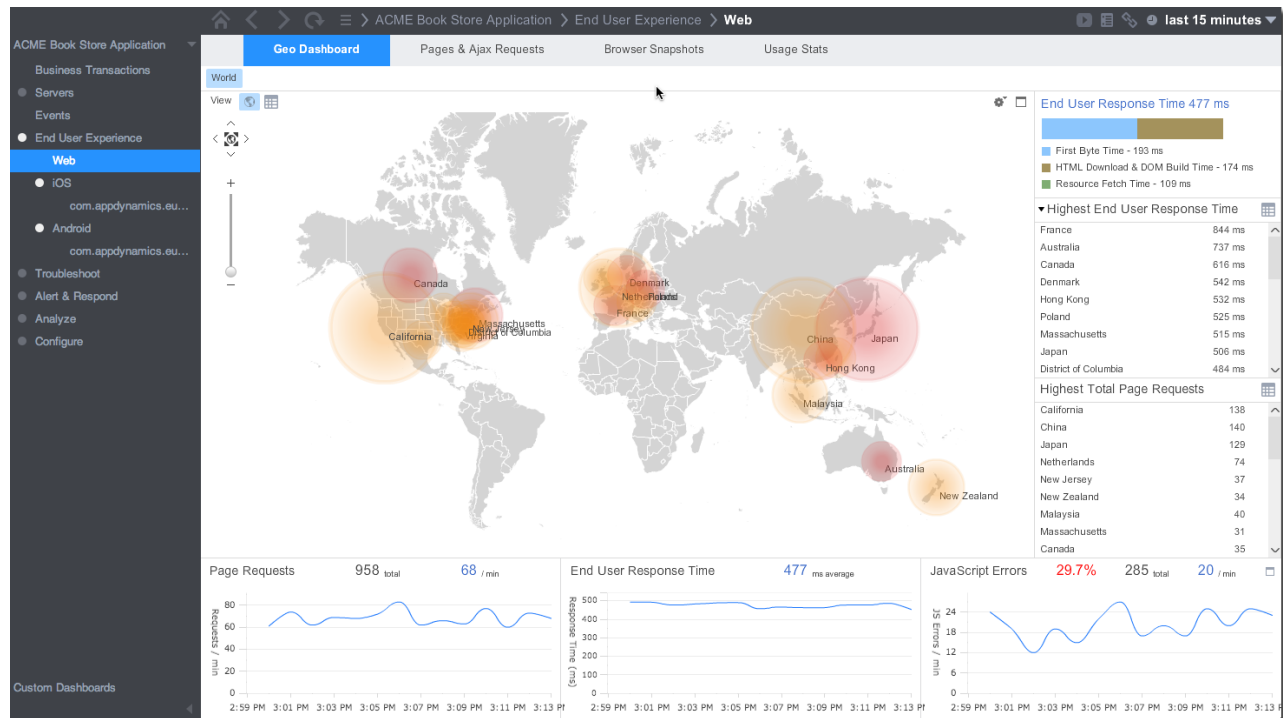
## Monitor Your Applications with Web EUM

Web EUM presents information in four ways:

- As a map-based dashboard, for overview monitoring
- As detailed lists of all page, Ajax, and iframe requests types
- As snapshots of individual requests with customizable break-outs of information for both typical and problem requests
- As overview usage statistics by browser and device/platform

## The Web EUM Geo Dashboard

The Web EUM Geo Dashboard view provides high level insight into how your application is performing across the world. The size of a dot indicates the number of page views or Ajax requests from that region, and the color indicates the average End User Response time in that region (red is slow). You can click to drill down to areas of specific interest. You can also see the same information presented in tabular form by clicking the grid icon in the upper left of the panel.



For more information, see [The Web EUM Geo Dashboard View](#).

## Pages & Ajax Requests

The Pages & Ajax Requests view shows you detailed lists of how each of your pages, Ajax requests, and iframes are performing over time. You can look at All Pages or select Top Pages to see the worst performing pages sorted by common metrics like Page views with JavaScript Errors and First Byte Time. And you can drill down to a graphical dashboard showing a wide range of charted performances characteristics for any specific request type.

Geo Dashboard

Pages & Ajax Requests

Browser Snapshots

Usage Stats

All Pages

Top Pages

View Dashboard

More Actions

View Options

FILTER

Pages

AJAX Requests

iFrames

With Load

Viewing 30 of 46

|             | Name                                  | Type         | Requests per Minute | Total Number of End | End User Response Time (ms) | Front End Time (ms) | Page views with JavaScript Errors per | AJAX Request Errors per Minute |
|-------------|---------------------------------------|--------------|---------------------|---------------------|-----------------------------|---------------------|---------------------------------------|--------------------------------|
| <div></div> | http://www.acme.com/postonload        | IFrame       | 3                   | 37                  | 513                         | 318                 | 3                                     | -                              |
| <div></div> | https://www.acme.com/logout           | AJAX Request | 4                   | 58                  | 161                         | -                   | -                                     | 1                              |
| <div></div> | https://www.acme.com/allcategories    | IFrame       | 4                   | 60                  | 528                         | 308                 | 1                                     | -                              |
| <div></div> | https://www.acme.com/checkout.html    | IFrame       | 4                   | 64                  | 475                         | 276                 | 1                                     | -                              |
| <div></div> | http://www.acme.com/index.html        | IFrame       | 4                   | 66                  | 461                         | 271                 | 2                                     | -                              |
| <div></div> | https://www.acme.com/marketplace      | IFrame       | 5                   | 68                  | 450                         | 279                 | 1                                     | -                              |
| <div></div> | http://www.acme.com/checkout/address  | AJAX Request | 5                   | 69                  | 137                         | -                   | -                                     | 2                              |
| <div></div> | http://www.acme.com/cookieonnav       | IFrame       | 5                   | 69                  | 480                         | 280                 | 1                                     | -                              |
| <div></div> | http://www.acme.com/signup/login      | AJAX Request | 5                   | 69                  | 157                         | -                   | -                                     | 1                              |
| <div></div> | http://www.acme.com/movies/netflix    | AJAX Request | 5                   | 70                  | 160                         | -                   | -                                     | 2                              |
| <div></div> | https://www.acme.com/signup/login     | AJAX Request | 5                   | 73                  | 160                         | -                   | -                                     | 2                              |
| <div></div> | http://www.acme.com/played.css        | IFrame       | 5                   | 74                  | 473                         | 286                 | 1                                     | -                              |
| <div></div> | https://www.acme.com/checkout/address | AJAX Request | 5                   | 74                  | 152                         | -                   | -                                     | 2                              |
| <div></div> | https://www.acme.com/addtocart        | AJAX Request | 5                   | 77                  | 157                         | -                   | -                                     | 2                              |
| <div></div> | http://www.acme.com/checkout.html     | IFrame       | 5                   | 78                  | 459                         | 280                 | 2                                     | -                              |
| <div></div> | https://www.acme.com/movies/netflix   | AJAX Request | 5                   | 80                  | 165                         | -                   | -                                     | 1                              |
| <div></div> | https://www.acme.com/item.html        | IFrame       | 5                   | 82                  | 462                         | 276                 | 2                                     | -                              |
| <div></div> | https://www.acme.com/nocookie.html    | IFrame       | 6                   | 83                  | -                           | 292                 | 2                                     | -                              |
| <div></div> | http://www.acme.com/logout            | AJAX Request | 6                   | 83                  | 156                         | -                   | -                                     | 2                              |
| <div></div> | http://www.acme.com/addtocart         | AJAX Request | 6                   | 85                  | 155                         | -                   | -                                     | 2                              |

For more information, see [The Pages and Ajax Requests View](#).

## Browser Snapshots

The Browser Snapshot view provides access to detailed information for individual requests. The list includes both periodic snapshots of requests operating within normal boundaries and problem snapshots of requests that have exceeded one or more configurable performance criteria.

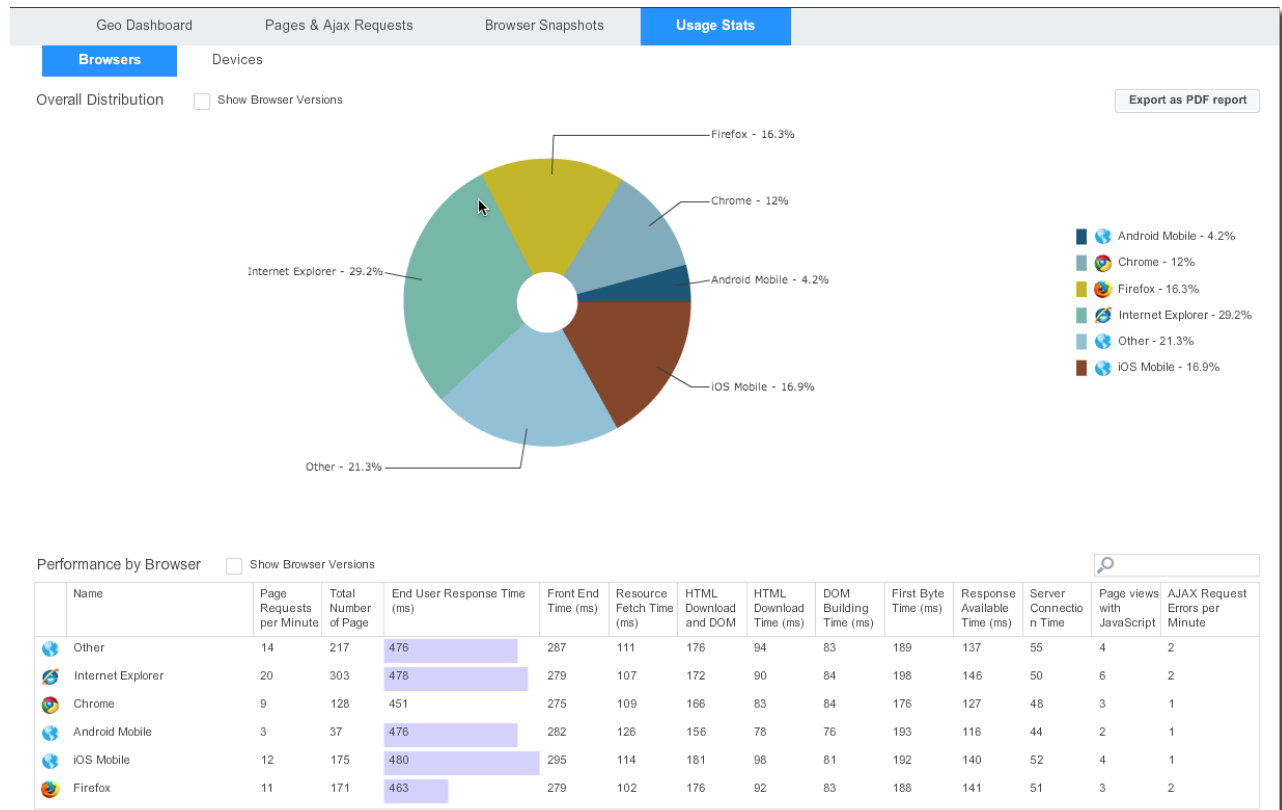
Double-clicking a specific item takes you to a detailed graphical representation of the execution flow of that request and other data associated with it.

| Geo Dashboard                                 |   |  | Pages & Ajax Requests                                  |           |                                       | Browser Snapshots   |           | Usage Stats                                   |      |          |              |       |   |  |  |  |  |
|---|---|--|--|-----------|---------------------------------------|---|-----------|---|------|----------|--------------|-------|---|--|--|--|--|
| <div><div></div><div>Show Filters</div></div> |   |  | <div><div></div><div>View Browser Snapshot</div></div> |           |                                       | <div><div></div><div>More Actions</div></div>                         |           | <div><div></div><div>View Options</div></div> |      |          |              |       | <div><div></div><div>Showing 264 of 264 snapshots</div></div> |  |  |  |  |
|   |   |  | Time   | End Use r | URL                                   | Page, AJAX Request, iFrame  | Bro wse r | Devi ce                                       | OS   | Cou ntry | Stat e / Reg | City  |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:26:57 AM                                   | 0 *       | http://www.acme.com/addToCart         | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | iOS       | Mob   | iOS  | Unit     | Virgi        | Virgi |   |  |  |  |  |
| ✓   |   |  | 03/11/14 10:26:52 AM                                   | 409       | http://www.acme.com/checkout.html     | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | iOS       | Mob   | iOS  | Unit     | New          | Pisc  |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:26:46 AM                                   | 0 *       | https://www.acme.com/logout           | <div><div></div><div>AX</div><div>https://www.acme.com...</div></div> | iOS       | Mob   | iOS  | Unit     | Virgi        | Virgi |   |  |  |  |  |
| ✓   |   |  | 03/11/14 10:26:43 AM                                   | 143       | http://www.acme.com/addToCart         | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | Fire      | Com   | Win  | Unit     | Ohic         | Col   |   |  |  |  |  |
| ✓   |   |  | 03/11/14 10:26:42 AM                                   | 356       | https://www.acme.com/marketplace.html | <div><div></div><div>AX</div><div>https://www.acme.com...</div></div> | iOS       | Mob   | iOS  | Unit     | New          | Pisc  |   |  |  |  |  |
| !   |   |  | 03/11/14 10:26:23 AM                                   | 119       | http://www.acme.com/checkout.html     | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | Chr       | Com   | Win  | Jap      | Miy          | Nat   |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:26:12 AM                                   | 131       | http://www.acme.com/addToCart         | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | Fire      | Com   | Win  | Jap      | Unk          | Unk   |   |  |  |  |  |
| ✓   |   |  | 03/11/14 10:26:07 AM                                   | 210       | https://www.acme.com/logout           | <div><div></div><div>AX</div><div>https://www.acme.com...</div></div> | Chr       | Com   | Win  | New      | Auc          | Auc   |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:25:56 AM                                   | 362       | https://www.acme.com/marketplace.html | <div><div></div><div>AX</div><div>https://www.acme.com...</div></div> | Fire      | Com   | Win  | Jap      | Unk          | Unk   |   |  |  |  |  |
| ✓   |   |  | 03/11/14 10:25:44 AM                                   | 378       | https://www.acme.com/marketplace.html | <div><div></div><div>AX</div><div>https://www.acme.com...</div></div> | Fire      | Com   | Win  | Chir     | Yun          | Zha   |   |  |  |  |  |
| ✓   |   |  | 03/11/14 10:25:39 AM                                   | 515       | http://www.acme.com/checkout.html     | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | Inte      | Com   | Win  | Unit     | Cali         | San   |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:25:36 AM                                   | 523       | https://www.acme.com/marketplace.html | <div><div></div><div>AX</div><div>https://www.acme.com...</div></div> | Inte      | Com   | Win  | Jap      | Ishil        | Non   |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:25:30 AM                                   | 249       | https://www.acme.com/marketplace.html | <div><div></div><div>AX</div><div>https://www.acme.com...</div></div> | Inte      | Com   | Win  | Unit     | Cali         | Mou   |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:25:14 AM                                   | 438       | http://www.acme.com/checkout.html     | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | Oth       | Oth   | Unk  | Unit     | Mas          | Won   |   |  |  |  |  |
| ✓   |   |  | 03/11/14 10:25:07 AM                                   | 210       | https://www.acme.com/logout           | <div><div></div><div>AX</div><div>https://www.acme.com...</div></div> | Oth       | Oth   | Unk  | Jap      | Osal         | Osal  |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:25:05 AM                                   | 626       | http://www.acme.com/checkout.html     | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | Oth       | Com   | Linu | Net      | Noor         | Ams   |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:25:04 AM                                   | 448       | https://www.acme.com/marketplace.html | <div><div></div><div>AX</div><div>https://www.acme.com...</div></div> | Oth       | Com   | Linu | Mal      | Sela         | Pet   |   |  |  |  |  |
| !   |   |  | 03/11/14 10:25:04 AM                                   | 580       | http://www.acme.com/cookieNoNav.html  | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | iOS       | Mob   | iOS  | Aus      | Wes          | Pert  |   |  |  |  |  |
| !   | ✗ |  | 03/11/14 10:25:03 AM                                   | 106       | http://www.acme.com/index.html        | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | Inte      | Com   | Win  | Unit     | Cali         | Con   |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:25:00 AM                                   | 472       | https://www.acme.com/marketplace.html | <div><div></div><div>AX</div><div>https://www.acme.com...</div></div> | Inte      | Mob   | Win  | Den      | Unk          | Unk   |   |  |  |  |  |
| ✓   | ✗ |  | 03/11/14 10:24:53 AM                                   | 207       | http://www.acme.com/index.html        | <div><div></div><div>AX</div><div>http://www.acme.com/...</div></div> | Chr       | Com   | Win  | Unit     | New          | New   |   |  |  |  |  |

For more information see [Browser Snapshots](#).

## Usage Stats

The Usage Stats view presents aggregated usage data based on the browser type and device/platform employed by your users. The view also breaks out performance by type and usage by country.



For more information, see [Usage Stats](#).

## Enabling Web EUM

Web EUM requires a separate license, and must be enabled before it is available for use. Until Web EUM is enabled it does not appear in the left navigation bar of AppDynamics GUI.

For information about licensing, see [Web EUM License](#).

For information on enabling or disabling EUM, see [Set Up and Configure Web EUM](#).

### The Web EUM Geo Dashboard View

- [The Web EUM Geo Dashboard](#)
- [How the Web EUM Geo Dashboard is Organized](#)
- [Using Map View](#)
  - [Geographic Drill-Down](#)
  - [Map Actions](#)
- [Configuring Map View Options](#)
  - [To Configure the Map](#)
- [Unknown Locations in Map and Grid Views](#)
- [Learn More](#)

There are four Geo Dashboards in EUM:

- The overall Web/Mobile Geo Dashboard
- The Web EUM Geo Dashboard
- The iOS Geo Dashboard
- The Android Geo Dashboard



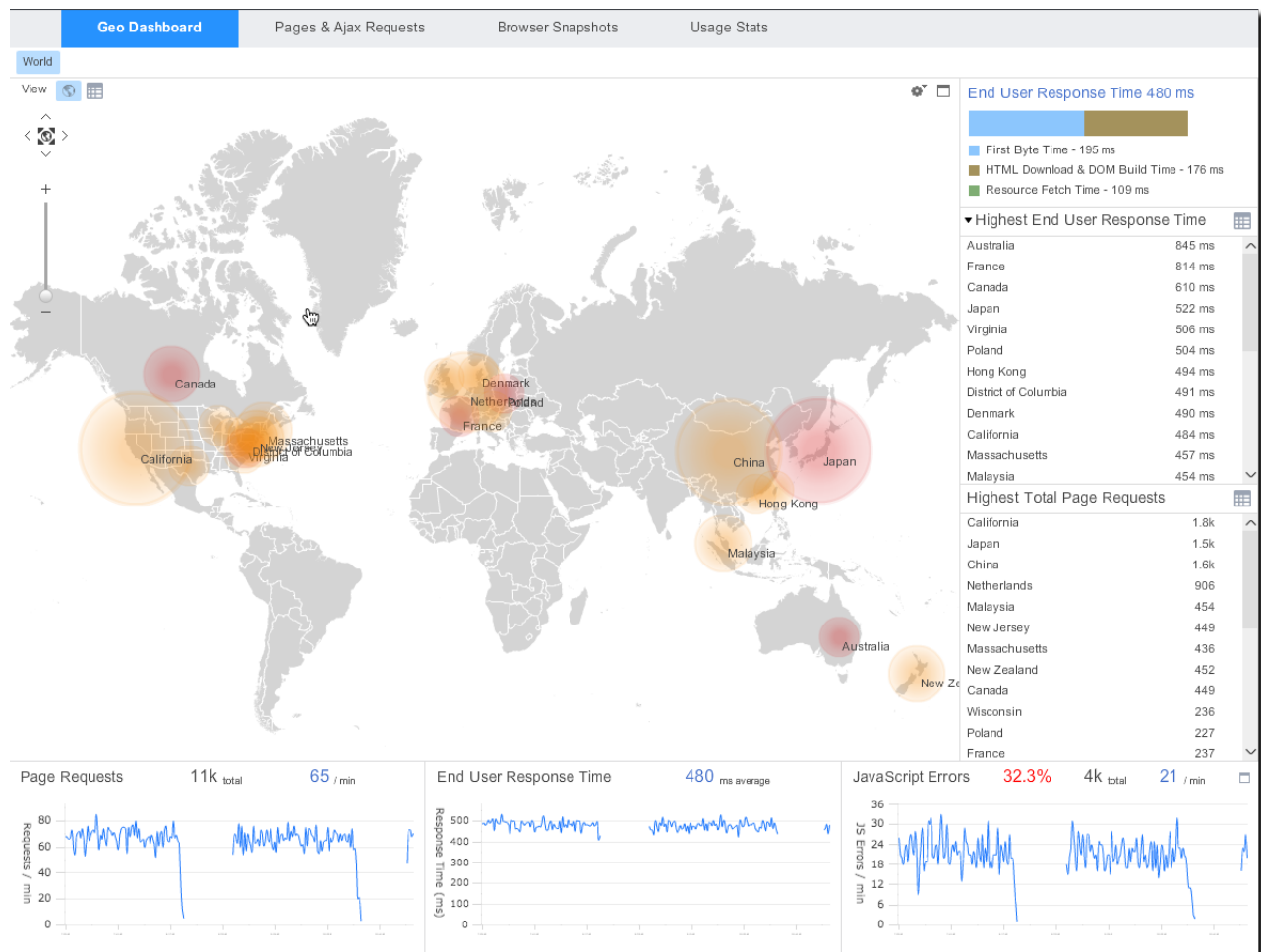
This topic discusses the Web EUM Geo Dashboard.

### The Web EUM Geo Dashboard

You access the Web EUM Geo Dashboard by selecting the application and clicking **End User Experience** -> **Web** in the left navigation bar and making sure the Geo Dashboard tab is selected.

All Geo Dashboards display key EUM performance metrics by geographic location. You can quickly see which regions have the highest loads, the longest response times, and the most errors. You can understand at a glance which locations are active and of the active locations, which are slow. Then you can use this information to drill down into more detailed information for the slowest regions. Green circles indicate normal user experience, yellow warning, and red critical.

For example, in the Dashboard below you can see that the highest end-user response time (which implies the worst end-user experience) is currently in Australia, with France second, and the highest load (number of total page requests) is in California.



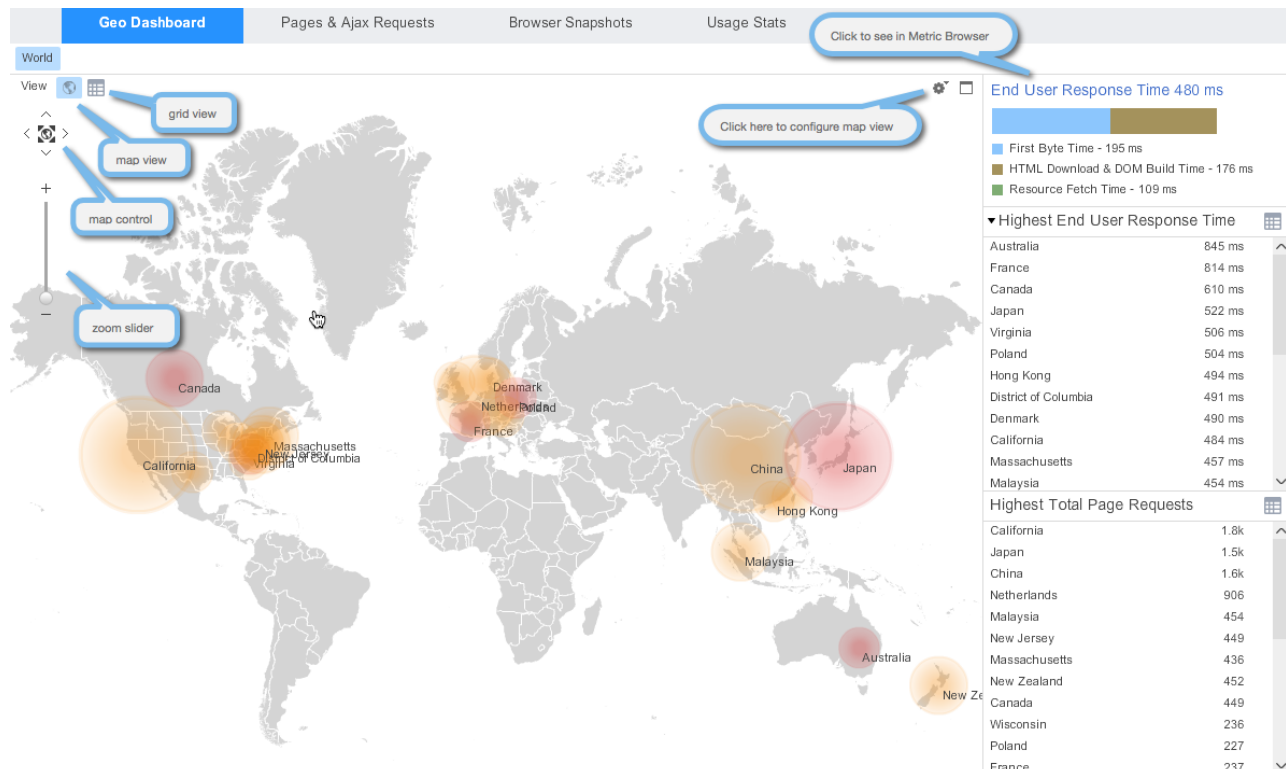
### How the Web EUM Geo Dashboard is Organized

The dashboard is divided into three panels:

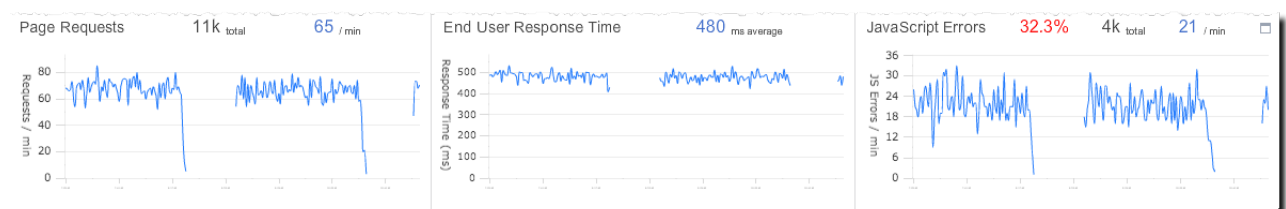
- A main panel in the upper left displaying geographic distribution of end users on a map, if

you selected clicked the map view icon, or on a grid if you clicked the grid view icon.

- You can switch between map view and grid view by clicking these icons.
- You can expand the map panel or the grid panel to fill the entire EUM Dashboard by toggling the expand icon in the upper right corner of the panel.
- A panel on the right displaying:
  - Summary metrics for the selected time range: End User Response Time, First Byte Time, HTML Download and DOM Build Time, and Resource Fetch Time. Click the **End User Response Time** link to see this metric in the Metric Browser and compare/correlate with other metrics as you wish.
  - Regions with highest end user response times.
  - Regions with the highest load (total number of requests for the selected time range)



- A lower panel dynamically displaying graphs of key performance indicators (KPI):
  - The number and rate of page requests (load)
  - Average end user response time,
  - Number and rate of page views with JavaScript errors



The metrics displayed throughout the dashboard are for the region currently selected on the map or in the grid. For example, if you zoom down from world view to France in the map, the summary panels and the trend graphs display data for France.

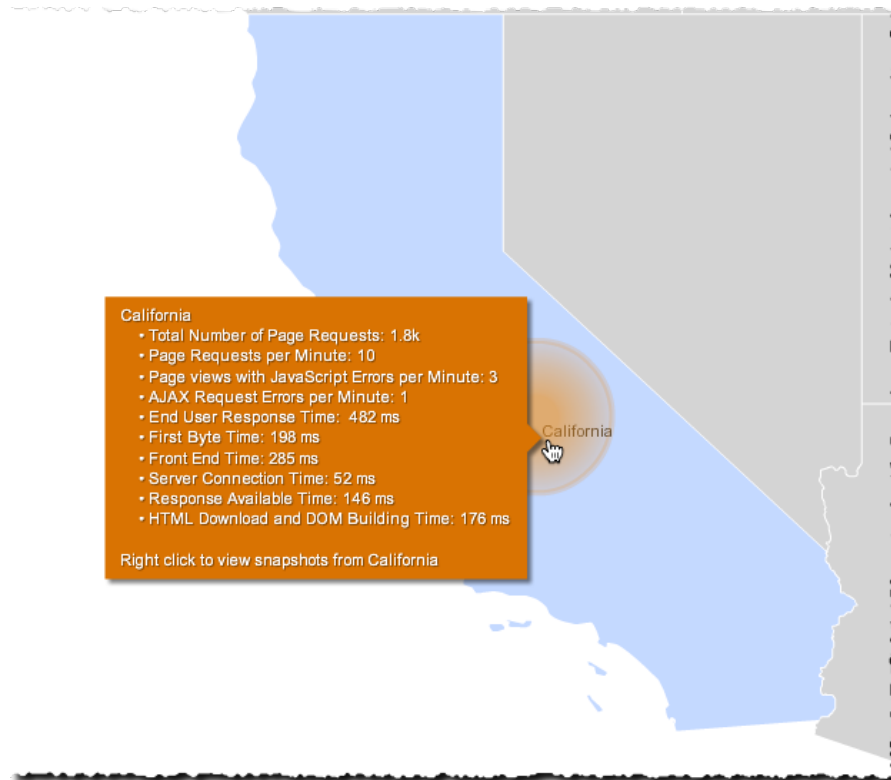
See [Web EUM Metrics](#) for definitions of the metrics.

## Using Map View

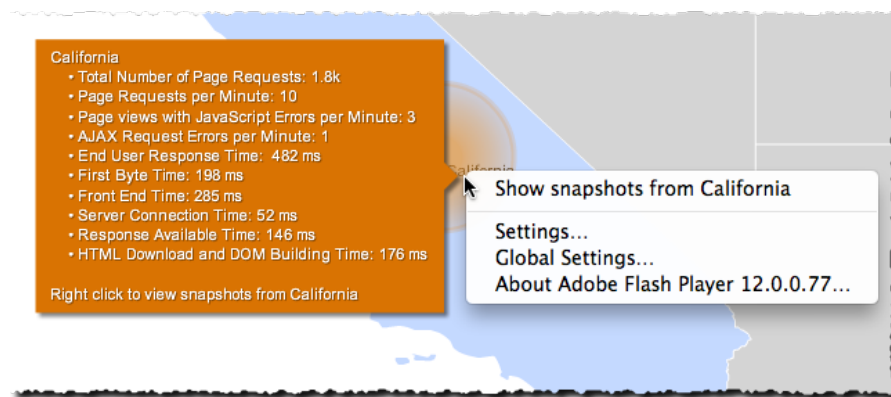
The main panel in map view displays a map superimposed with circles that represent average end user experience by region.

### Geographic Drill-Down

You can hover over any region on the map to get summary metrics for that region.



Right-clicking lets you access browser snapshots for the region. See [Browser Snapshots](#).



You can double-click any region on the map to drill down into metrics for that region.

When you drill down into the countries with the the highest levels of monitored traffic, a detailed map with the country's subregions is displayed. You can then drill down further into the

subregions.



For locations for which detailed maps are not available, the country or region is colored blue to indicate that it is drilled down. Even when detailed maps are not available for subregions, EUM metrics are still collected and reported for the supported subregions in the summary panels and trend graphs.

For a complete list of the supported regions by country see [Web EUM Countries and Regions by Geo Dashboard](#).

#### Map Actions

You can perform the following actions directly in the map:

- Zoom into and drill down to a subregion in the map by clicking on the subregion.
  - To zoom out to restore the currently selected region to the world or country, click the link in the location control in the upper left corner of the map. For example, if you have drilled down to India and then to West Bengal and now want to return to global view, select "World" in World > India > West Bengal.
- View summary statistics for a region by hovering over its circle.
- Zoom the entire map using the slider on the left. You can also use your mouse wheel to increase or decrease the map's zoom level.
- Reposition the map by clicking and dragging it or by clicking the directional arrows in the map control widget.

#### Configuring Map View Options

You can configure the dashboard display in a variety of ways:

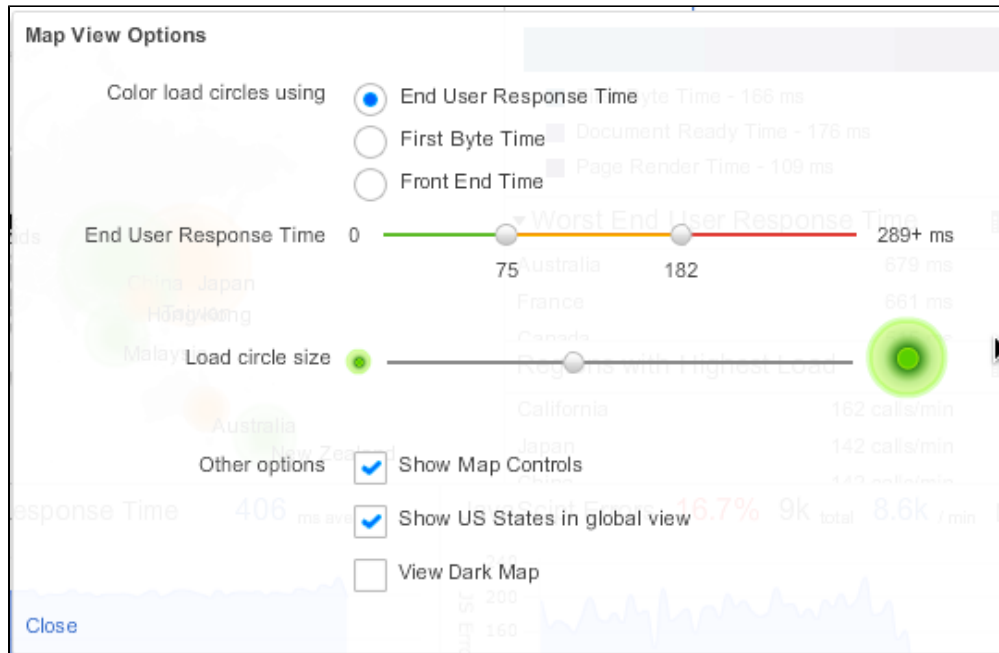
- The metric to use for creating the colored circles:
  - End user response time
  - First byte time
  - Front end time

- The ranges for values that trigger the performance indicator colors on the map
- The circle sizes that indicate relative load on the map
- Whether to show:
  - Map Controls
  - The US States in the global view
  - The Dark view of the map

All of these configurations are saved for the next time you log into AppDynamics.

### To Configure the Map

1. In the Geo Dashboard, click the gear icon in the upper right corner of the map or grid panel to get the configuration window.



2. Select the value you want the load circles to represent.

3. Adjust the color thresholds by using one of the following two methods:

- Adjust the threshold slider.  
For example, if you want circles to be red whenever the end user response time is 182 milliseconds or greater, slide the maximum value of the yellow slider value to 182.
- Edit the threshold slider to set specific values. Double-click the text field that indicates the slider threshold value to make it editable, enter the value of the threshold in the text field, and press the tab key.  
For example, the following example sets the maximum yellow slider value to 500.



You can enter as large a value as you like in the field (larger than the current maximum displayed value of the slider) and displayed range of values for the circle color ranges will adjust accordingly.

3. To configure circle sizes representing load (total number of end user requests), adjust the slider

to make the circle ranges larger or smaller.

4. To display the map control widget, check Show Map Controls. To hide them clear this check box.

The map controls let you reposition the map using arrows and zoom the map using + and - buttons. After moving or zooming the map, if you want to return to the default zoomed out home view, click the globe icon in the center of the map control widget.

5. To show the individual state boundaries in the United States in global view, check Show US States in global View.

Metrics for individual states are displayed as if they were countries. Click the state in the United States map to display EUM data for that individual state.

6. To view your map with a dark colored background, check View Dark Map.

### Unknown Locations in Map and Grid Views

Requests can originate from locations for which the JavaScript agent has no map data. These requests are labeled as Unknown.

You may see this message at the bottom of the map when you are drilled in on a country for which EUM does not have regional data:

"Geographic information for some requests is unavailable and is not displayed on the map; switch to grid view for unknown regions."

In the map view, you may also see a location named "Unknown" in the highest response times and highest loads panels to the right of the map.

In grid view, aggregated EUM metrics for Unknown locations are displayed under the location name "Unknown".

The number of Unknown entries displayed depends on the current map settings:

- If the map is set to world view and the **Show US States in global view** option is selected, you may see two Unknown entries: one for the aggregated metrics from the unknown countries and another for the unknown states.
- If the map is set to world view and the **Show US States in global view option** is clear or if the map is set to country view, there is a single Unknown entry which displays the aggregated metrics from the unknown regions in the current country. For example, if there are three unknown regions in Russia reporting metrics, the entry for Unknown represents the aggregated metrics for those three regions.

You may also see a metric reported for a location named "Anonymous Proxy". The data for Anonymous Proxy represents the aggregated metrics from one or more private IP addresses that the JavaScript agent cannot identify.

One of the effects of Unknown regions is that it possible for a country to display as slow (red circles) on the global map, but when you drill down to the country all its regions appear normal (green circles). Or a country may display as normal on the global map, but some subregions may display as slow when you drill down.

### Learn More

- [Dashboards](#)

- [Web EUM Metrics](#)
- [Browser Snapshots](#)
- [Set Up and Configure Web EUM](#)
- [Customize Your Web EUM Deployment](#)
- [Host a Geo Server](#)

## **The Pages and Ajax Requests View**

- [What is a Page?](#)
- [Types of Pages](#)
- [Using the Pages & Ajax Requests View](#)
- [Accessing the All Pages Tab](#)
- [How the All Pages List is Organized](#)
- [Accessing Top Pages](#)
- [More Actions Menu](#)
- [Page Limits](#)
- [Learn More](#)

### **What is a Page?**

In AppDynamics a page represents an individual source for the information that an end-user sees in a single browser window.

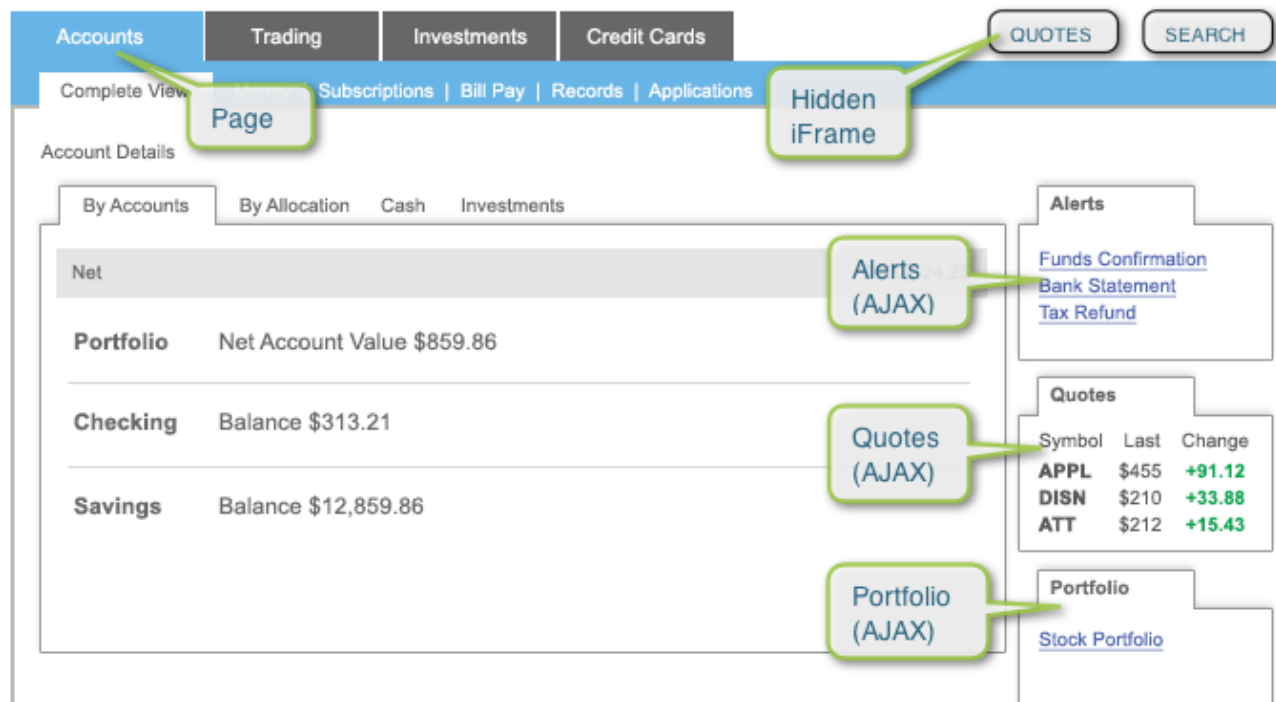
### **Types of Pages**

A base page is the core HTML page.

A base page may also include one or more iframes, which can be nested.

A base page or an iframe can also make one or more Ajax requests to fetch data to display on the Web page.

You can collect Web EUM metrics for base pages, iframes and Ajax requests.



Each base page, iframe, and Ajax request type is assigned a unique name. Each page type has a dashboard that graphically displays key metric information for that specific item, based on its type.

### Using the Pages & Ajax Requests View

The **Pages & Ajax Requests** view has two tabs: the **All Pages** tab and the **Top Pages** tab. The All Pages tab displays a list showing a high-level summary of all the monitored base pages, iframes, and Ajax requests in the application, along with their key performance indicators. The Top Pages tab displays the ten worst performing items grouped by common metrics - Requests per Minute, Page Render Time, and so forth. Use this tab for a quick start to troubleshooting.

### Accessing the All Pages Tab

To access the All Pages list:













1. In the left navigation bar, click **End User Experience -> Web**
2. Select the Pages & Ajax tab

The All Pages tab is displayed.

### How the All Pages List is Organized

Each monitored base page, iframe and Ajax request is displayed in the list.



| Geo Dashboard  |              | Pages & Ajax Requests |                     | Browser Snapshots                    |                     | Usage Stats                           |                                |
|--|--------------|-----------------------|---------------------|--------------------------------------|---------------------|---------------------------------------|--------------------------------|
| All Pages  |              | Top Pages             |                     | Click here to choose columns to show |                     |                                       |                                |
| View Dashboard   |              | More Actions          |                     | View Options                         |                     | View                                  |                                |
| FILTER   |              | Pages                 |                     | AJAX Requests                        |                     | iFrames                               |                                |
|  |              |                       |                     |                                      |                     | With Load                             |                                |
| Name   | Type         | Requests per Minute   | Total Number of End | End User Response Time (ms)          | Front End Time (ms) | Page views with JavaScript Errors per | AJAX Request Errors per Minute |
|  http://www.acme.com/postonload   | iFrame       | 3                     | 93                  | 483                                  | 293                 | 3                                     | -                              |
|  http://www.acme.com/movies/      | AJAX Request | 4                     | 130                 | 167                                  | -                   | -                                     | 2                              |
|  https://www.acme.com/signup/logi | AJAX Request | 4                     | 150                 | 159                                  | -                   | -                                     | 1                              |
|  https://www.acme.com/logout      | AJAX Request | 4                     | 152                 | 157                                  | -                   | -                                     | 2                              |
|  https://www.acme.com/checkout/a  | AJAX Request | 4                     | 152                 | 156                                  | -                   | -                                     | 1                              |
|  https://www.acme.com/marketplac  | iFrame       | 5                     | 153                 | 457                                  | 279                 | 1                                     | -                              |
|  http://www.acme.com/index.html   | iFrame       | 5                     | 154                 | 454                                  | 284                 | 2                                     | -                              |
|  https://www.acme.com/movies/     | AJAX Request | 4                     | 156                 | 164                                  | -                   | -                                     | 1                              |
|  http://www.acme.com/checkout/ad  | AJAX Request | 5                     | 158                 | 158                                  | -                   | -                                     | 2                              |
|  http://www.acme.com/cookieonon   | iFrame       | 4                     | 159                 | 470                                  | 277                 | 1                                     | -                              |
|  http://www.acme.com/played.css   | iFrame       | 4                     | 159                 | 480                                  | 291                 | 1                                     | -                              |
|  https://www.acme.com/logcookie   | iFrame       | 5                     | 159                 | -                                    | 280                 | 2                                     | -                              |

The Name column shows the name of the item as it is configured, always in lower-case. See [Configure Page Identification and Naming](#) for information on how to configure page names.

The Type column indicates whether the row represents a base page, iframe or Ajax request.

The remaining columns report EUM metrics for the items. See [Web EUM Metrics](#). You can specify which metrics to display by clicking **View Options**.

Click a column header to sort the pages based on the column's metric. For example, if you want to sort the slowest pages in terms of Page Render Time with the slowest pages at the top of the list, click the Page Render Time column header. You can toggle the column to switch between ascending and descending order.

To view the page dashboard for a specific page, select the page and click **View Dashboard** or just double-click the page. See [Page, Ajax, and IFrame Dashboards](#) for more information.

To filter the types of pages displayed in the list, select the type at the top of the list. For example, to see only Ajax requests, select **Ajax Requests** and clear **Pages** and **iFrames**. You can also specify not to display pages that have no load in the selected time frame.

### Accessing Top Pages

Click the Top Pages tab as a shortcut to troubleshooting the ten worst performing pages in terms of various metrics.

| Geo Dashboard                     |              | Pages & Ajax Requests             |           | Browser Snapshots                 | Usage Stats |
|-----------------------------------|--------------|-----------------------------------|-----------|-----------------------------------|-------------|
| All Pages                         |              | Top Pages                         |           |                                   |             |
| By Requests per Minute            |              | By End User Response Time (ms)    |           | By Resource Fetch Time (ms)       |             |
| Name                              | Requests per | Name                              | Time (ms) | Name                              | Time (ms)   |
| www.acme.com/checkout             | 14           | www.acme.com/item.html            | 489       | www.acme.com/item.html            | 111         |
| www.acme.com/allcatego            | 7            | www.acme.com/item.html            | 486       | www.acme.com/postonloa            | 110         |
| www.acme.com/index.htr            | 7            | www.acme.com/checkout.html        | 484       | www.acme.com/allcategor           | 110         |
| www.acme.com/played.cs            | 7            | www.acme.com/postonloaderro       | 484       | www.acme.com/checkout             | 110         |
| www.acme.com/item.html            | 7            | www.acme.com/postonloaderro       | 482       | www.acme.com/index.htm            | 110         |
| www.acme.com/nocookie             | 7            | www.acme.com/marketplace.ht       | 481       | www.acme.com/cookie               | 109         |
| www.acme.com/cookie               | 7            | www.acme.com/cookie               | 479       | www.acme.com/index.htm            | 109         |
| www.acme.com/marketpla            | 7            | www.acme.com/index.html           | 479       | www.acme.com/allcategor           | 109         |
| www.acme.com/checkout             | 5            | www.acme.com/played.css           | 478       | www.acme.com/nocookie             | 109         |
| www.acme.com/logout               | 5            | www.acme.com/index.html           | 476       | www.acme.com/nocookie             | 109         |
| By First Byte Time (ms)           |              | By HTML Download Time (ms)        |           | By Server Connection Time (ms)    |             |
| Name                              | Time (ms)    | Name                              | Time (ms) | Name                              | Time (ms)   |
| www.acme.com/item.html            | 201          | www.acme.com/postonloaderror.html | 97        | www.acme.com/item.html            | 54          |
| www.acme.com/item.html            | 199          | www.acme.com/index.html           | 96        | www.acme.com/postonloaderror.html | 54          |
| www.acme.com/checkout.html        | 199          | www.acme.com/allcategories.html   | 95        | www.acme.com/checkout.html        | 53          |
| www.acme.com/marketplace.html     | 196          | www.acme.com/item.html            | 95        | www.acme.com/marketplace.html     | 52          |
| www.acme.com/cookie               | 195          | www.acme.com/postonloaderror.html | 95        | www.acme.com/checkout.html        | 51          |
| www.acme.com/marketplace.html     | 195          | www.acme.com/played.css           | 95        | www.acme.com/index.html           | 51          |
| www.acme.com/postonloaderror.html | 195          | www.acme.com/item.html            | 94        | www.acme.com/item.html            | 51          |
| www.acme.com/cookie               | 194          | www.acme.com/marketplace.html     | 94        | www.acme.com/allcategories.html   | 51          |
| www.acme.com/checkout.html        | 194          | www.acme.com/checkout.html        | 94        | www.acme.com/marketplace.html     | 51          |
| www.acme.com/played.css           | 193          | www.acme.com/played.css           | 94        | www.acme.com/played.css           | 51          |

Click on an item in one of the lists to display the dashboard for the item. Click **View All** to return to the unified list of all the pages.

## More Actions Menu

In the More Actions menu in the All Pages tab, you can select a page in the list and perform the following actions on that page

- **Exclude:** Use this option to direct AppDynamics to ignore this page and stop reporting metrics for it.  
You can use the **View Excluded Pages** option to see pages that have been excluded and then you can "unexclude" them.
- **Rename:** Use this option to rename the page in the AppDynamics console.
- **Delete Item:** Use this option to remove the page from the list. If AppDynamics discovers the page again it will reappear in the list. To prevent it from re-appearing use **Exclude**.
- **View Excluded Pages:** Use this option to see pages you have previously excluded.

## Page Limits

There is a limit of 500 base pages, 500 iframes, and 500 Ajax calls that can be individually tracked per application. If your usage exceeds these limits, AppDynamics begins to drop metrics. If

your installation is approaching these limits, you can modify how your metrics are collected by:

- limiting the number of pages you instrument. If you are using manual injection, remove the JavaScript agent from pages that are less important. See [Set Up Your Application for Web EUM](#) for more on injection types. If you are using automatic injection, create request match rules and request exclude rules to restrict injection to pages that meet certain criteria. See [To Create Match Rules for Automatic Injection](#).
- using custom naming rules to group similar pages together. See [Configure Page Identification and Naming](#).

## Learn More

- [Page, Ajax, and Iframe Dashboards](#)
- [Configure Page Identification and Naming](#)
- [Dashboards](#)
- [Web EUM](#)

### Page, Ajax, and Iframe Dashboards

- [Accessing These Dashboards](#)
- [Full Dashboard Breakdowns](#)
- [Learn More](#)

Dashboards provide simple click access to a graphic representation of End User Monitoring (EUM) metrics for pages, iframes and Ajax requests. Use them to gather an understanding on how each part of your application is performing overall.

Each page, iframe, and Ajax request has its own dashboard.

#### Accessing These Dashboards

To view a dashboard for a page, iframe or Ajax request:

1. Select your business application.
2. In the left navigation bar, click **End User Experience -> Web**
3. Select the **Pages & Ajax Requests** tab.  
AppDynamics displays the request list.
4. From the list select the page, iframe or Ajax request in which you are interested.
5. Either double-click on the item or click **View Dashboard**.

#### Full Dashboard Breakdowns

- [The Page and Iframe Dashboards](#)
- [The Ajax Dashboard](#)

[Learn More](#)

- Web EUM
- Dashboards
- Web EUM Metrics
- The Pages and Ajax Requests View
- Browser Snapshots

#### The Page and Iframe Dashboards

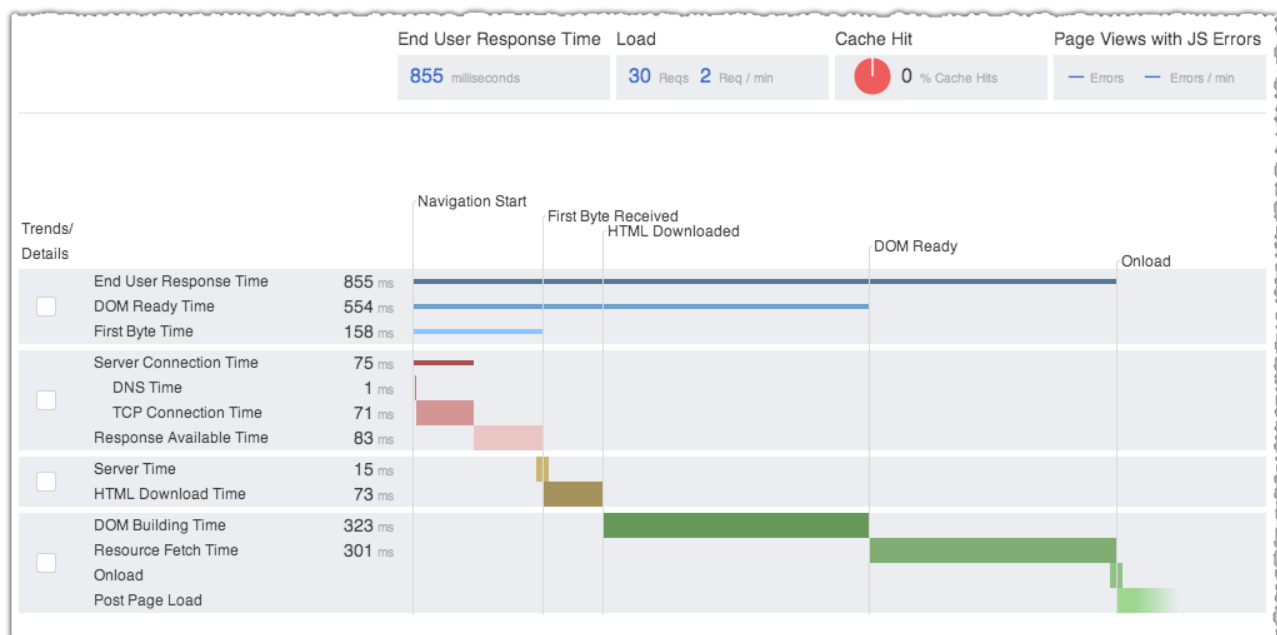
- The Summary Section
- Overall Performance
- Server Connect
- Server Time
- Browser Render Time
- Page Resources Requested
- Learn More

Page and iframe Dashboards are divided into six areas:

- A summary, with a waterfall graph of the entire load sequence. To see details for each set of data, use the Trends/Details checkboxes.
- Four sections of Trends/Details across time for the main performance categories
  - Overall performance
  - Time between the request and the first byte of the response
  - Time taken by the server to process the request through the completion of the HTML download for the item
  - Time taken to process and render the item, including any external resources, in the browser
- Detailed information on the performance of Ajax requests and iframes for this item

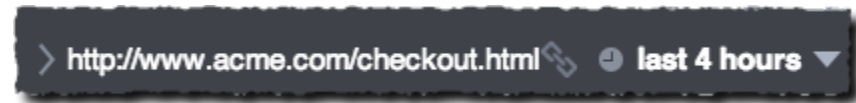
#### The Summary Section

This section gives you a quick overview of the item's performance over time.



Key performance indicators - End User Response Time, Load, Cache Hits, and Page Views with

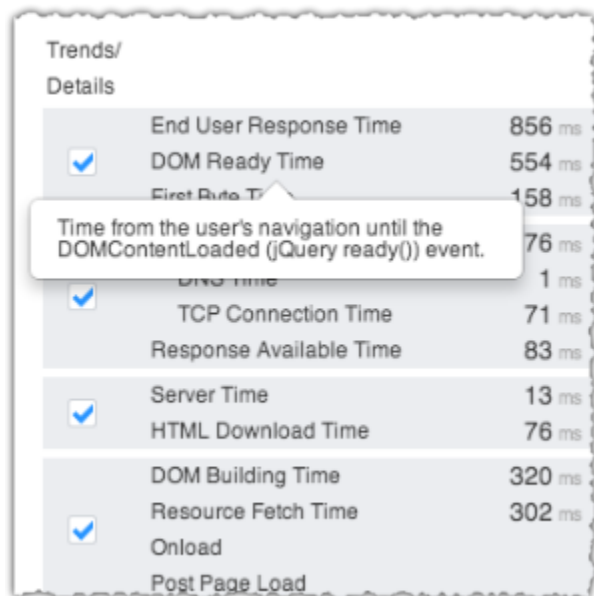
JS errors - across the time period selected in the time frame dropdown from the upper right side of the GUI -



are displayed across the top of the summary area.

A waterfall graph displays the average times needed for each aspect of the page load process.

For more information on what each of the metrics measures, hover over its name on the left. A popup appears with a definition. For more detailed information, see [Web EUM Metrics](#).



To see detailed breakouts of the data behind the graph, check the Trend/Detail box by the data group in which you are interested. To turn the details off, uncheck.

**i** Some metrics - for example, TCP Connection Time - only appear if they have a non-zero value.

### Overall Performance

This section displays detailed trend graphs of key performance metrics measured across time, based on the time period selected in the timeframe dropdown. To see detailed information for a specific moment, hover over the graph and a popup with that information appears.

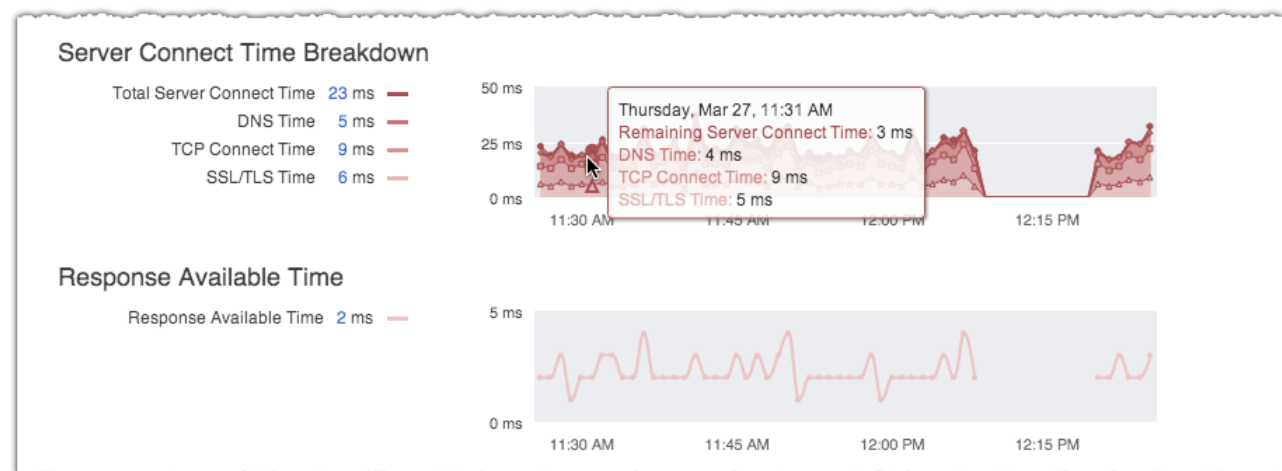


To see any of the listed total metrics in the context of the metric browser, click the desired value (shown in link blue) on the left side of the panel. The [metric browser](#) appears, with that metric displayed. You can then use the metric browser to compare other related values in a single display.

### Server Connect

This section displays detailed trend graphs of initial server connection metrics measured across time, based on the time period selected in the timeframe dropdown. To see detailed information for a specific moment, hover over the graph and a popup with that information appears. These metrics measure:

- the time the user's request takes in negotiating its initial connection with the server, which may include broken-out DNS, TCP Connect, and SSL/TLS time. The Total Server Connect value is always displayed.
- the time between that initial connection and the time the first byte of information is returned back to the user's browser



To see any of the listed total metrics in the context of the metric browser, click the desired value (shown in link blue) on the left side of the panel. The [metric browser](#) appears, with that metric

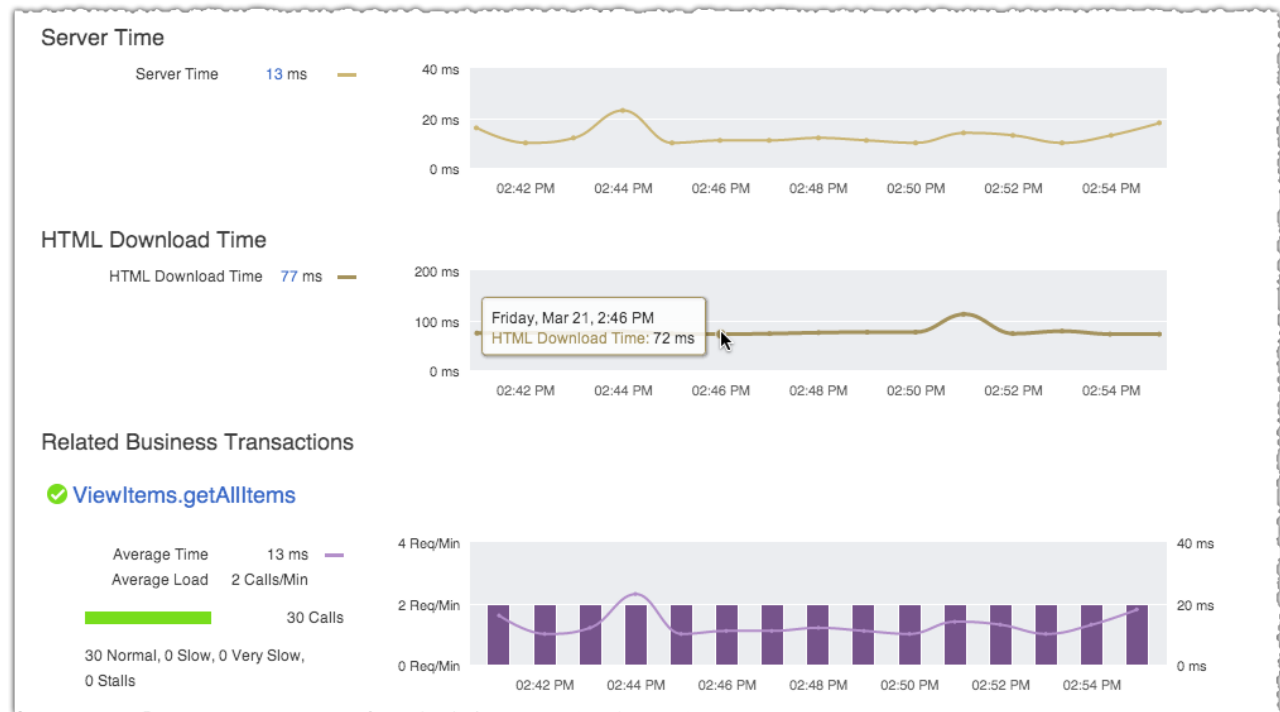
displayed. You can then use the metric browser to compare other related values in a single display.

### Server Time

This section displays detailed trend graphs of server processing and delivery time, based on the time period selected in the timeframe dropdown. To see detailed information for a specific moment, hover over the graph and a popup with that information appears. These metrics measure:

- the total time for processing all server-side business transactions for this item
- the total time for the browser to completely download all the HTML document content
- if correlated with a server-side app agent, related business transactions on the server

**i** To ensure you get the most accurate server time and related business-transaction times, upgrade your server agents to version 3.8.0 or newer. Otherwise in some cases your times will be based on averages rather than the exact time of the individual event. To get the most accurate times using pre-3.8.0 agents, you should enable JS\_FOOTER injection, either through using [Automatic Injection](#) or [Assisted Injection-Using Attribute Injection](#).



To see any of the listed total metrics in the context of the metric browser, click the desired value (shown in link blue) on the left side of the panel. The [metric browser](#) appears, with that metric displayed. You can then use the metric browser to compare other related values in a single display.

### Browser Render Time

This section displays detailed trend graphs of the time taken to render the final item, based on the time period selected in the timeframe dropdown. To see detailed information for a specific

moment, hover over the graph and a popup with that information appears. These metrics measure:

- the time taken by the browser to create the DOM from the end of the HTML download
- the time taken to fetch any external resources, for example the results of a third party Ajax request



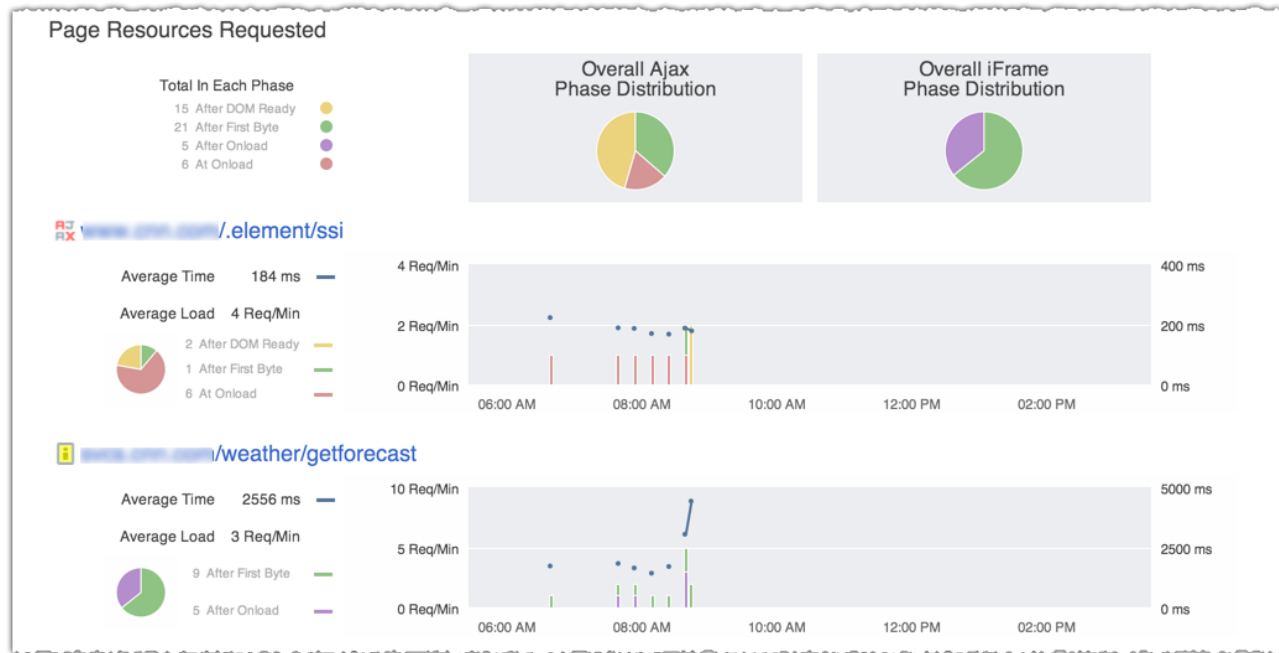
To see any of the listed total metrics in the context of the metric browser, click the desired value (shown in link blue) on the left side of the panel. The [metric browser](#) appears, with that metric displayed. You can then use the metric browser to compare other related values in a single display.

## Page Resources Requested

This section displays detailed graphs of when in the page load cycle individual external - first and third party - resources are fetched, and how much time is taken to fetch them, all based on the time period selected in the timeframe drop down. To see detailed information for a specific moment, hover over the graph and a popup with that information appears. These metrics measure:

- average time and load associated with that resource
- whether the request is blocking or non-blocking
- the request and response time per resource request
- the type - iframe or Ajax - of the resource





To see the dashboard for any of the listed resources, click the name.

#### Learn More

- [The Ajax Dashboard](#)

#### The Ajax Dashboard

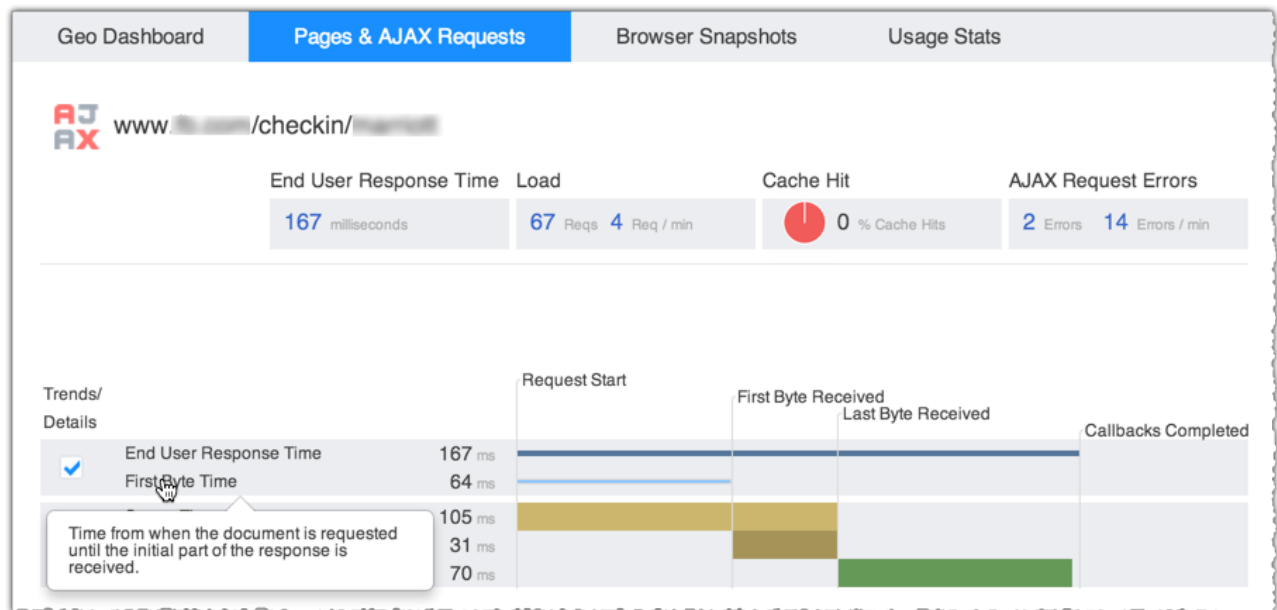
- [The Summary Section](#)
- [Overall Performance](#)
- [Server Time](#)
- [Learn More](#)

The Ajax Dashboard is divided into three areas:

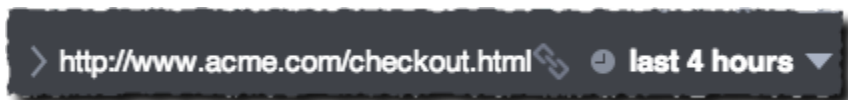
- A summary, with a waterfall graph of the entire load sequence. To see details for each set of data, use the Trends/Details checkboxes.
- Two sections of Trends/Details across time for the main performance categories
  - Overall performance
  - Time taken by the server to process the request through the browser's incorporation of the data into the HTML document

#### The Summary Section

This section gives you a quick overview of the item's performance over time.



Key performance indicators - End User Response Time, Load, Cache Hits, and Ajax Request Errors - across the time period selected in the time frame dropdown from the upper right side of the GUI -



are displayed across the top of the summary area.

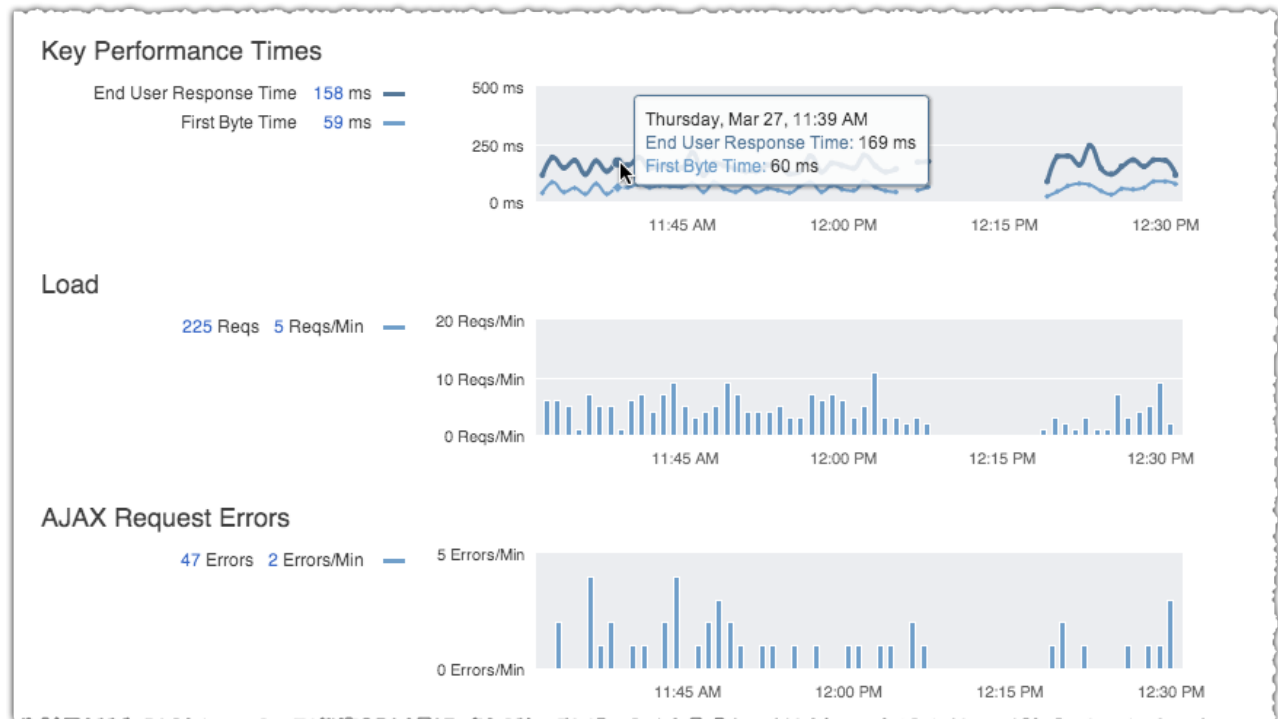
A waterfall graph displays the average times needed for each aspect of the ajax request load process.

For more information on what each of the metrics measures, hover over its name on the left side of the graph. A popup appears with a definition. See the graphic above for an illustration. For more detailed information, see [Web EUM Metrics](#).

To see detailed breakouts of the data behind the graph, check the Trend/Detail box by the data group in which you are interested.

### Overall Performance

This section displays detailed trend graphs of key performance metrics measured across time, based on the time period selected in the timeframe dropdown. To see detailed information for a specific moment, hover over the graph and a popup with that information appears.



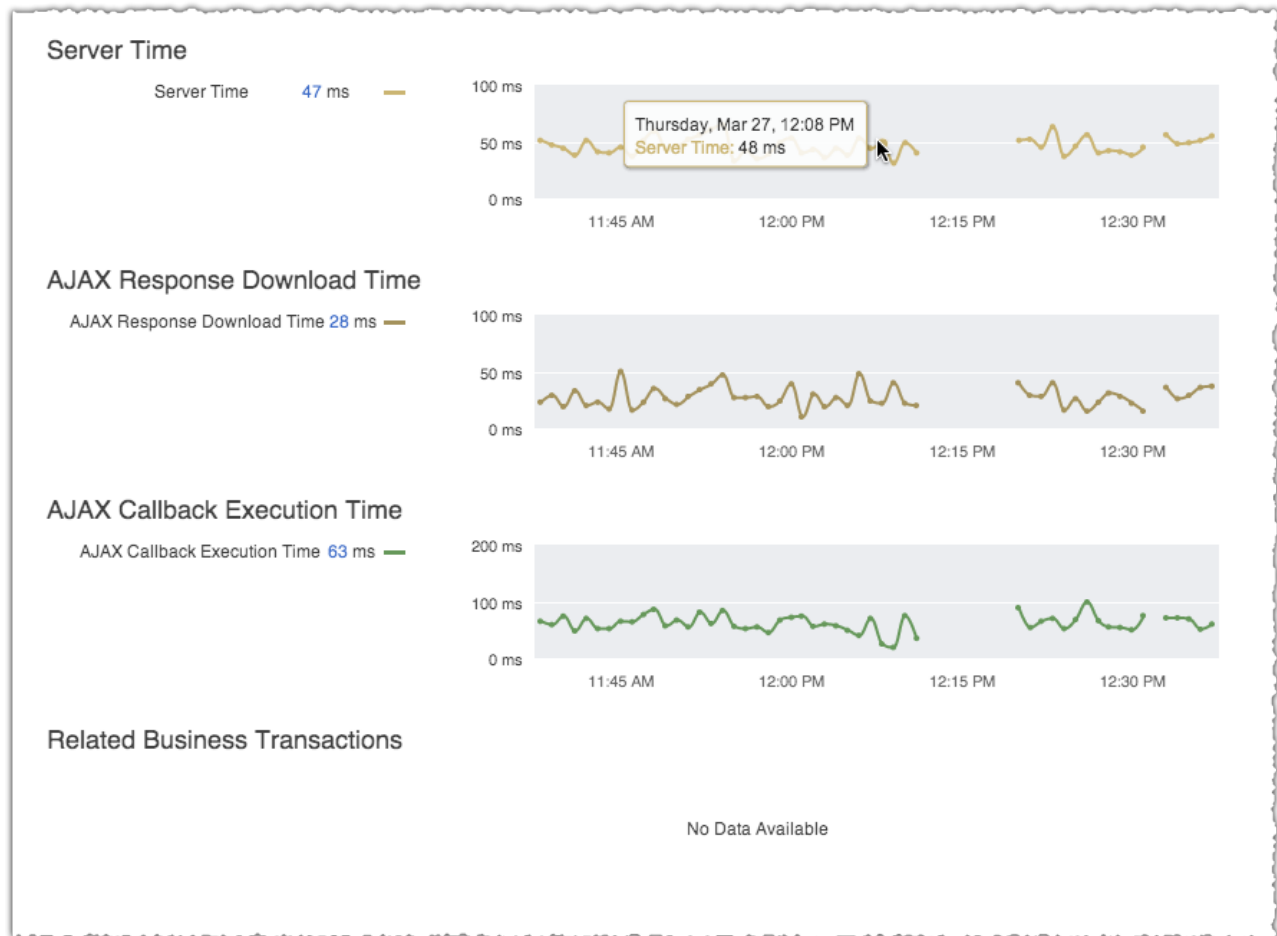
To see any of the listed total metrics in the context of the metric browser, click the desired value (shown in link blue) on the left side of the panel. The [metric browser](#) appears, with that metric displayed. You can then use the metric browser to compare other related values in a single display.

### Server Time

This section displays detailed trend graphs of server processing and delivery time, based on the time period selected in the timeframe dropdown. To see detailed information for a specific moment, hover over the graph and a popup with that information appears. These metrics measure:

- the total time for processing all server-side business transactions for this item
- the time for the browser to completely download all the Ajax response
- the total time for the browser to process the document response, including incorporating the data into the HTML document
- if correlated with a server-side app agent, related business transactions on the server

**i** To ensure you get the most accurate server time and related business-transaction times, you should enable JS\_FOOTER injection, either through using [Automatic Injection](#) or [Assisted Injection-Using Attribute Injection](#) for at least the footer. If you cannot use one of those injection types, you can get business transaction times, but in some cases your times will be based on averages rather than the exact time of the individual business transaction.



To see any of the listed total metrics in the context of the metric browser, click the desired value (shown in link blue) on the left side of the panel. The [metric browser](#) appears, with that metric displayed. You can then use the metric browser to compare other related values in a single display.

#### Learn More

- [The Page and Iframe Dashboards](#)

## Browser Snapshots

- [Access a Browser Snapshot](#)
  - [Select the Browser Snapshots tab](#)
  - [Configure the Browser Snapshot List](#)
  - [Open the Snapshot](#)
- [Browser Snapshot Types](#)
- [Learn More](#)

Browser snapshots capture and display a broad set of metrics associated with a single request. You can drill down into errors, and, if your app server is instrumented with AppDynamics app agents, see any server-side transaction snapshots associated with that request.

When EUM is enabled, AppDynamics collects browser snapshots for:

- For more information about browser snapshot collection, [Configure Browser Snapshot Collection](#).

To access the Browser Snapshots list, in the left navigation bar, click **End User Experience -> Web**.

A list of available browser snapshots appears. You can change the timeframe of your search by changing the Time Frame dropdown menu.

## Key

- Page 37

✖ JavaScript errors. To see more information on the error, hover over the icon and a popup with summary information appears.



Correlated server side transaction snapshot exists

#### Configure the Browser Snapshot List

- **Configure sorting**  
Sort the snapshots by clicking a column header. For example, click the End User Response Time (ms) column header to sort the snapshots in descending order, with the highest response times at the top of the list
- **Configure the columns to display**  
Click **View Options** to configure the columns to display in the browser snapshot list.

| Time          | End User Response | URL                             |
|---------------|-------------------|---------------------------------|
| 03/17/14 2:26 | 0 *               | http://www.acme.com/postOnL...  |
| 03/17/14 2:26 | 533               | http://www.acme.com/postOnL...  |
| 03/17/14 2:26 | 0 *               | http://www.acme.com/postOnL...  |
| 03/17/14 2:26 | 76                | http://www.acme.com/movies/m... |
| 03/17/14 2:26 | 627               | http://www.acme.com/played.c... |
| 03/17/14 2:26 | 0 *               | http://www.acme.com/postOnL...  |
| 03/17/14 2:26 | 128               | http://www.acme.com/signup/...  |
| 03/17/14 2:26 | 474               | http://www.acme.com/postOnL...  |
| 03/17/14 2:26 | 602               | http://www.acme.com/marketp...  |
| 03/17/14 2:26 | 0 *               | http://www.acme.com/postOnL...  |
| 03/17/14 2:26 | 0 *               | http://www.acme.com/postOnL...  |
| 03/17/14 2:26 | 572               | http://www.acme.com/played.c... |

- **Filter the list**  
You can filter the list to display only browser snapshots that meet certain criteria. For example, the following configuration restricts browser snapshots to JavaScript and AJAX errors that occurred on Internet Explorer

Hide Filters View Browser Snapshot More Actions View Options

Clear Criteria Search

▼ User Experience

☐ Normal ☐ Slow ☐ Very Slow ☐ Stall

▼ Errors

☒ JavaScript error occurred

☒ Error during AJAX call

▼ Execution Time

☐ End User Response Time is 

☐ First Byte Time is 

☐ Front End Time is 

☐ Download/Build DOM Time is 

☐ Resource Fetch Time is 

▼ Server Side

☐ Server Snapshot Exists

☐ Server Error Occurred

▼ Browsers

Internet Explorer

### Open the Snapshot

- Double-click the snapshot that you want to examine, or
- Select the snapshot that you want to examine and click **View Browser Snapshot**.

## Browser Snapshot Types

There are three browser snapshot types, depending on whether the original object was a page, an iframe, or an Ajax request.

- [Page Browser Snapshots](#)
- [Ajax Request Browser Snapshot](#)
- [Iframe Browser Snapshots](#)

### Learn More

- [Page, Ajax, and Iframe Dashboards](#)
- [Transaction Snapshots](#)
- [Configure Browser Snapshot Collection](#)
- [Web EUM Metrics](#)

- Configure EUM Browser Snapshot Thresholds
- Set Up and Configure Web EUM
- Set Up Your Application for Web EUM
- Add Information to a Browser Snapshot
- Configure JavaScript and Ajax Error Detection

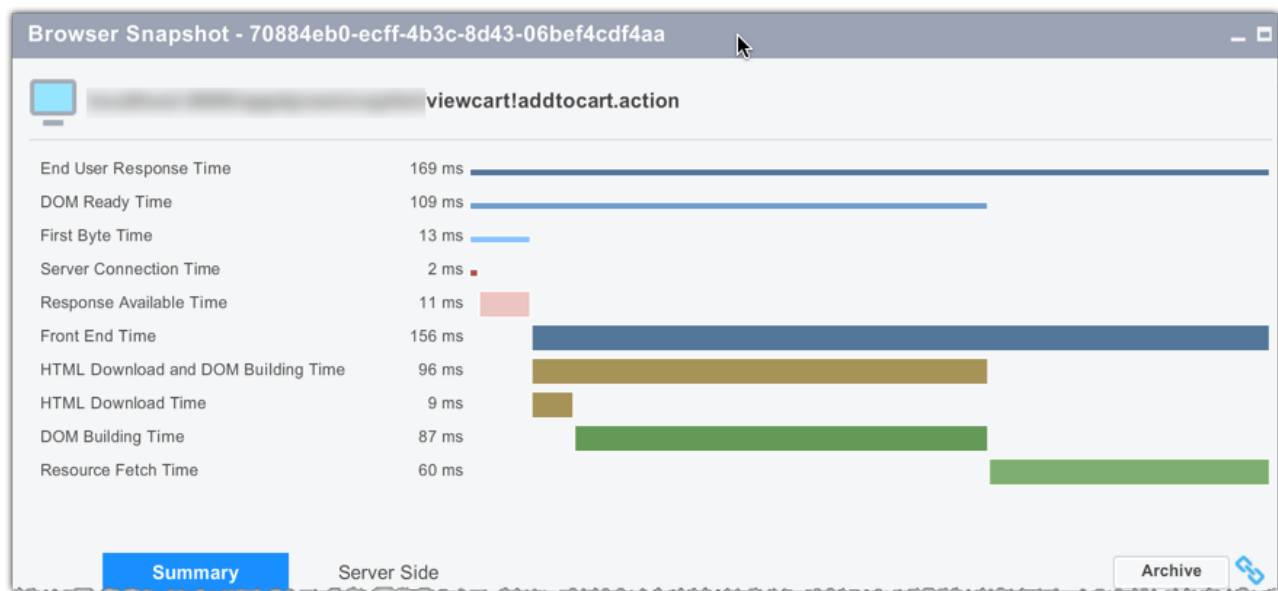
### Page Browser Snapshots

- Waterfall Graph and Summary Tab
- The Server Side Tab, for Correlated Business Transactions
- The JavaScript Errors Tab
- Unknown Metrics in Browser Snapshots
- More on Cookies and EUM Data
- Learn More

Page-based snapshots give you a detailed look at an individual page request.

### Waterfall Graph and Summary Tab

The top of the page snapshot displays a waterfall graph of the overall transaction timing for the page.



For a detailed description of what these metrics mean, see [Web EUM Metrics](#).


Below the graph text-based information is shown. The Summary tab is always available.



Summary

Server Side

Archive

|                             |   |
|-----------------------------|---|
| User Experience             | ✓ Normal  |
| Time                        | 03/24/14 10:39:16 AM  |
| End User Response Time (ms) | 169 ms  |
| Application Server Time     | 17 ms   |
| Base Page                   |  <a href="#">viewcart!addtocart.action</a> |
| URL                         | <a href="#">http://...ViewCart!addToCart.action</a>   |

---

|               |  |
|---------------|--|
| IP Address    |  |
| Page Referral | <a href="#">http://...ViewItems.action</a> |

---

|         |           |
|---------|-----------|
| Browser | Chrome 33 |
| Device  | Computer  |
| OS      | Mac       |

---

|                |  |
|----------------|--|
| Country        |  |
| State / Region |  |
| City           |  |

---

|                     |                                      |
|---------------------|--------------------------------------|
| Client Request GUID | 70884eb0-ecff-4b3c-8d43-06bef4cdf4aa |
|---------------------|--------------------------------------|

The Summary tab gives you basic information about the request:

- basic statistics about the page, including when the request was made, how much time it took, and where it was fetched from
- where on the web the request is from, including the originating IP address and any referring page
- what is being used to view the response
- where geographically the request is from
- what the request GUID is - this GUID uniquely identifies this specific request throughout the system
- if configured, any user data associated with this request. See [Add Information to a Browser Snapshot](#) for more information.

#### The Server Side Tab, for Correlated Business Transactions

If server-side correlation has been set up, the snapshot displays a Server Side tab.

The screenshot shows the 'Server Side' tab in AppDynamics. It has two main sections: 'Business Transactions' and 'Transaction Snapshots'.

**Business Transactions:**

| Name                               | Time (ms) |
|------------------------------------|-----------|
| <a href="#">ViewCart.addToCart</a> | 17        |

**Transaction Snapshots:**

|  | Time                 | Exe Time (ms) | URL | Business Transaction               | Tier             | Node      |
|--|----------------------|---------------|-----|------------------------------------|------------------|-----------|
|  | 03/24/14 10:39:16 AM | 17            |     | <a href="#">ViewCart.addToCart</a> | ECommerce Server | Node_8000 |

This Server Side tab shows you:

- the name of any business transactions
- a link (in the Business Transaction column of the Transaction Snapshots section) to any transaction snapshot that is available
- a direct link ( ) to the Flow Map of the transaction snapshot. From here you can drill down to the transaction snapshot call graph when one exists.

The screenshot shows the 'Transaction Snapshot Flow Map' for the transaction 'ViewCart.addToCart'. The top bar displays transaction details: Transaction ID (7d681c2e-20d8-4a61-ac4c-7a693fbb50ef), User Experience (NORMAL), Execution Time (17 ms), Timestamp (03/24/14 10:39:16 AM), Business Transaction (ViewCart.addToCart), Request GUID (7d681c2e-20d8-4a61-ac4c-7a693fbb50ef), and Browser Snapshot (70884eb0-ecff-4b3c-8d43-06bef4cdf4aa). The 'Flow Map' tab is selected, showing a 'Snapshot Execution - Waterfall View'.

The flow map shows the following components and their execution times:

- START** (ECommerce Server): 16 ms (94.1%)
- JDBC** (APPDY-MySQL DB-LOCALHOST): 1 ms (5.9%)

A 'Drill Down' button is available next to the 'START' component. The flow map is a horizontal line with a vertical bar on the left and a database icon on the right.

Transaction snapshots on the server are triggered when slow or stalled transactions are identified, when a diagnostic session is started, or periodically based on a configured interval. In general,

slow, very slow and stalled transactions are more likely to trigger a transaction snapshot on the server than transactions operating within normal range. For more information about when server-side transaction snapshots are captured see [Transaction Snapshots](#) and [Configure Transaction Snapshots](#).



### POJO-based business transaction snapshots

Correlating between business transaction snapshots and browser snapshots uses the request GUID and cookies. In order for the server-side agent to be able to write the cookies, it needs a servlet response object. In the case where the BT Entry Point is defined by a POJO, this object will not be available *unless* the **Configure->Instrumentation->Transaction Detection->Transaction Monitoring** option is Enabled for Servlets.

Use the Application Configuration  
☒ Use Custom Configuration for this Tier

Copy Application Configuration to this Tier    Configure all Tiers to use this Configuration

| Transaction Monitoring                              | Automatic Transaction Detection   |
|---|---|
| Servlet <input checked="" type="checkbox"/> Enabled | <input type="checkbox"/> Discover Transactions automatically for all Servlet requests<br><input type="checkbox"/> Enable Servlet Filter Detection |

Must be enabled for EUM correlation of POJO-based BTs

Not necessary for EUM correlation of POJO-based BTs

To return to the browser snapshot, click the Browser Snapshot link in the upper right, outlined in red.

### The JavaScript Errors Tab

If a JavaScript error occurs as the page is being loaded, the snapshot displays a third tab, JavaScript Errors.

| Script Origin  | Line # | Message               |
|----------------|--------|-----------------------|
| /foo.js        | 521    | Manoj's SQL Injection |
| /movie/home.js | 521    | Ido's                 |

The file in which the error occurred

The line where the error occurred

The JavaScript Errors tab shows you:

- the script file that contained the error
- the line on which the error occurred
- any information associated with the error

You can configure errors to ignore if you are seeing too many errors that are not of interest. See [Configure JavaScript and Ajax Error Detection](#).

### Unknown Metrics in Browser Snapshots

AppDynamics Web EUM captures metrics using your end-users' web browsers. Occasionally you may see Unknown data reported for one or metrics in a browser snapshot. This occurs on older or

less sophisticated browsers that do not support collection of a given metric.

See [EUM Metrics Availability](#) for details about which metrics may not be captured based on browser capabilities.

#### More on Cookies and EUM Data

EUM uses two different kinds of short-lived cookies to help it collect data and correlate events:

- The ADRUM cookie: written by the JavaScript agent, this cookie contains the referral page URL and some timing information to assist gathering First Byte Time for some browser types.  
For privacy purposes, the URL of the referral page is hashed.
- The ADRUM\_X\_Y\_Z cookies: written by the server-side agent when the page is served from an instrumented server. These cookies help correlate EUM data with related server-side performance data.

If EUM detects that the page is HTTPS, the cookies are `HttpsOnly`. None of the cookies contain any personally identifiable information (PII).

#### Learn More

- [Ajax Request Browser Snapshot](#)
- [Iframe Browser Snapshots](#)

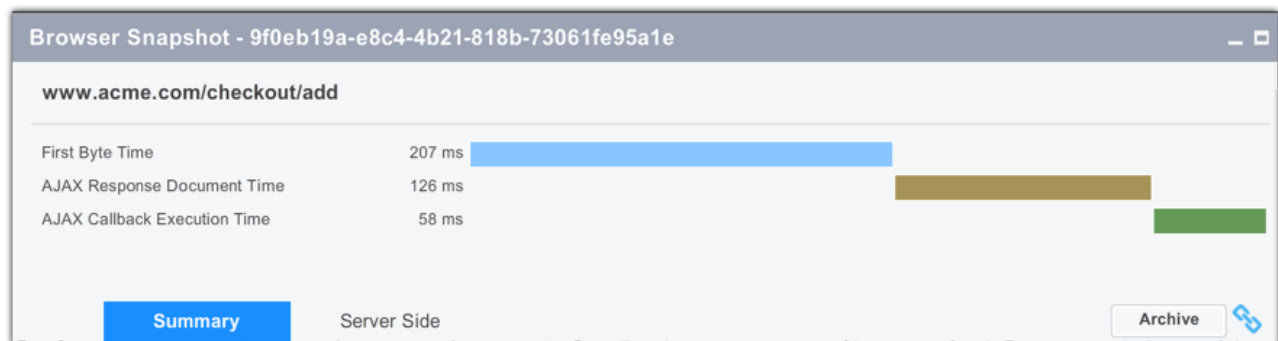
#### Ajax Request Browser Snapshot

- [Waterfall Graph and Summary Tab](#)
- [Learn More](#)

Ajax request browser-based snapshots give you a detailed look at an individual Ajax request.

#### Waterfall Graph and Summary Tab

The top of the Ajax snapshot displays a waterfall graph of the overall transaction timing for the Ajax request.



Below the graph text-based information is shown. The Summary tab is always available.

**Summary** Server Side Archive

User Experience ! Very Slow

Time 03/24/14 12:15:43 PM

End User Response Time (ms) 391 ms

Application Server Time 112 ms

AJAX AX [www.acme.com/checkout/add](http://www.acme.com/checkout/add) The Ajax call

URL <https://www.acme.com/checkout/add> The Ajax error

AJAX Error Status: 403

Parent Page i [www.acme.com/item.html](http://www.acme.com/item.html) The parent page

Parent Page URL <https://www.acme.com/item.html>

IP Address

Page Referral /referrer/checkout/add

Browser Internet Explorer 9

Device Computer

OS Windows

Country Canada

State / Region Ontario

City Toronto

Client Request GUID 9f0eb19a-e8c4-4b21-818b-73061fe95a1e

User Data

|            |            |
|------------|------------|
| lastViewed | Bestseller |
| UDID       | W#E\$@@@D  |
| lastViewed | Bestseller |

Much of the information is the same as you see for [page-based browser snapshots](#). The main differences are:

- the error code returned with the Ajax error is listed
- the parent page from which the Ajax call is listed

As in the page-based browser snapshot, if there server-side correlation has been set up, a Server Side tab is present, and has the same information.

You can configure errors to ignore if you are seeing too many errors that are not of interest. See [Configure JavaScript and Ajax Error Detection](#).

#### Learn More

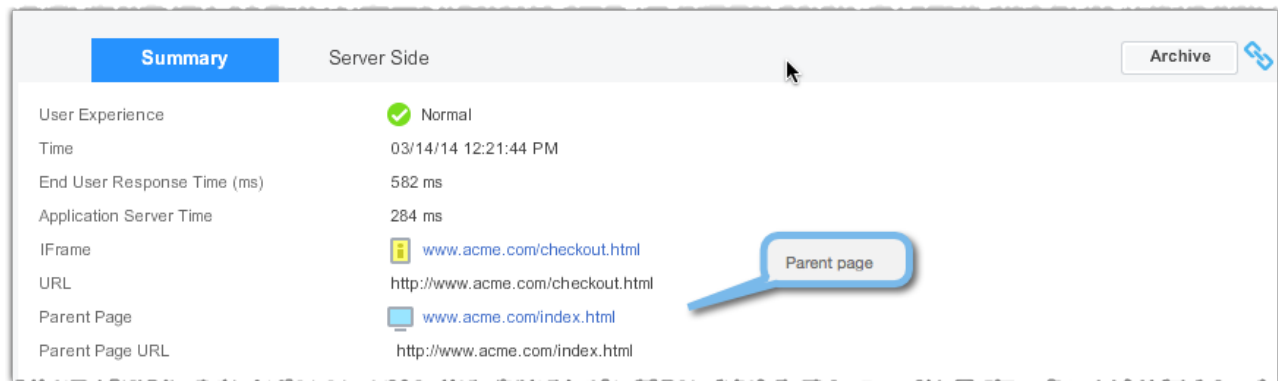
- [Page Browser Snapshots](#)
- [Iframe Browser Snapshots](#)

#### Iframe Browser Snapshots

- [Learn More](#)

Iframe-based browser snapshots give you a detailed look at an individual iframe request. The

display is identical to [Page Browser Snapshots](#) except in the Summary section, where the parent page is also displayed.



As in the page browser snapshot, a Server Side tab appears if server-side correlation has been set up and a JavaScript Error tab appears if there is a JavaScript Error. The content is the same.

#### Learn More

- [Page Browser Snapshots](#)
- [Ajax Request Browser Snapshot](#)

## Usage Stats

The Usage Stats view presents aggregated usage data based on your users'

- [browser type](#)
- [device/platform](#)

The view also breaks out performance by type and usage by country.

#### Usage Statistics by Browser

- [Accessing Usage Statistics by Browser](#)
- [Overall Browser Distribution](#)
- [Performance by Browser](#)
- [Learn More](#)

You can monitor end user experience by browser and by browser version.

The browser dashboard helps you discover:

- the slowest browsers in terms of total end-user response time.
- the slowest browsers to render the response page.
- the browsers that most of your end users use.
- the browsers that most of your end users use in a particular country or region.

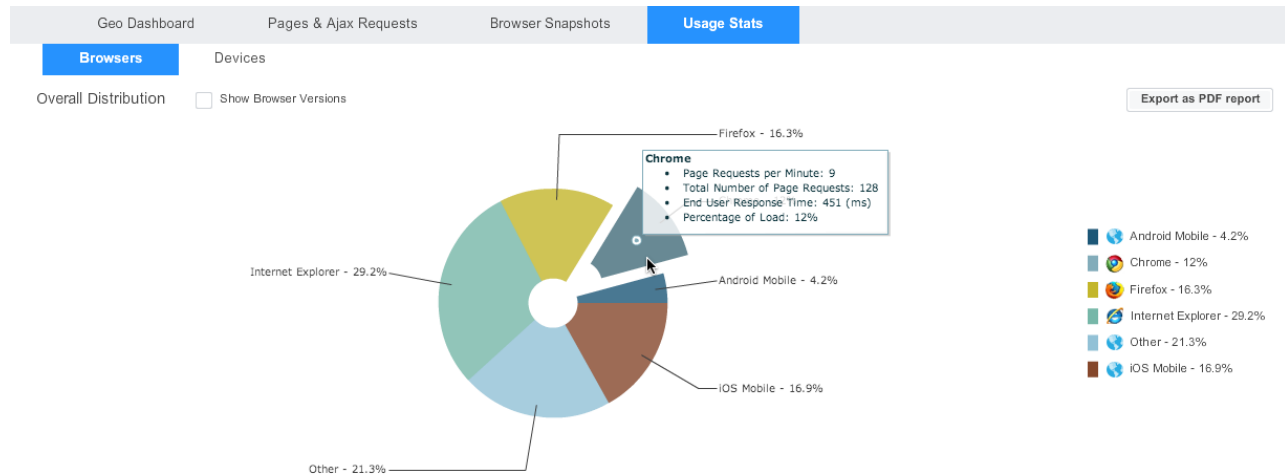
#### Accessing Usage Statistics by Browser

1. In the left navigation bar click: **End User Experience -> Web.**
2. Select the Usage Stats tab.
3. Click the Browsers tab if it is not already selected.

#### Overall Browser Distribution

The Overall Distribution chart shows the percentages of your end users using different browsers.

To see the total number of calls, average end user response time, and percentage of the total load for a particular browser, hover over the browser section in the chart.



To see the distribution by browser version, check Show Browser Versions.

### Performance by Browser

The Performance by Browser list below the chart displays a row for each browser or each browser version if Show Browser Versions is checked.

Performance by Browser ☒ Show Browser Versions

| Name                 | Page Requests per | Total Number of Page | End User Response Time (ms) | Front End Time | Resource Fetch Time | HTML Download Time | HTML Download Time | DOM Building Time | First Byte Time | Response Available | Server Connection Time | Page views with | AJAX Request Errors per |
|----------------------|-------------------|----------------------|-----------------------------|----------------|---------------------|--------------------|--------------------|-------------------|-----------------|--------------------|------------------------|-----------------|-------------------------|
| Other                | 14                | 217                  | 476                         | 287            | 111                 | 176                | 94                 | 83                | 189             | 137                | 55                     | 4               | 2                       |
| Chrome 16            | 3                 | 48                   | 443                         | 270            | 117                 | 153                | 78                 | 76                | 166             | 125                | 46                     | 2               | 1                       |
| Chrome 24            | 3                 | 43                   | 451                         | 273            | 103                 | 169                | 82                 | 91                | 184             | 126                | 53                     | 1               | 1                       |
| Firefox 12           | 3                 | 43                   | 464                         | 280            | 101                 | 179                | 98                 | 79                | 195             | 146                | 54                     | 1               | 1                       |
| Firefox 13           | 3                 | 43                   | 490                         | 284            | 98                  | 186                | 94                 | 97                | 204             | 155                | 52                     | 1               | 1                       |
| Internet Explorer 7  | 6                 | 86                   | 494                         | 280            | 111                 | 169                | 82                 | 90                | 213             | 153                | 52                     | 2               | 1                       |
| Android Mobile 4     | 3                 | 37                   | 476                         | 282            | 126                 | 156                | 78                 | 76                | 193             | 116                | 44                     | 2               | 1                       |
| Firefox 16           | 3                 | 41                   | 417                         | 254            | 102                 | 152                | 82                 | 65                | 164             | 125                | 42                     | 1               | 1                       |
| Internet Explorer 6  | 3                 | 46                   | 451                         | 272            | 107                 | 165                | 80                 | 85                | 177             | 135                | 43                     | 2               | 1                       |
| Internet Explorer 9  | 6                 | 87                   | 456                         | 272            | 105                 | 167                | 88                 | 78                | 189             | 138                | 50                     | 3               | 1                       |
| Firefox 3            | 3                 | 44                   | 480                         | 295            | 109                 | 187                | 94                 | 88                | 188             | 138                | 55                     | 1               | 1                       |
| iOS Mobile 3         | 3                 | 43                   | 448                         | 295            | 115                 | 180                | 96                 | 83                | 161             | 115                | 46                     | 2               | 1                       |
| Internet Explorer 11 | 2                 | 36                   | 490                         | 298            | 113                 | 185                | 104                | 79                | 196             | 153                | 48                     | 2               | 1                       |
| Internet Explorer 10 | 3                 | 48                   | 504                         | 286            | 100                 | 185                | 108                | 84                | 213             | 151                | 54                     | 1               | 1                       |
| iOS Mobile 6         | 4                 | 52                   | 461                         | 289            | 115                 | 174                | 88                 | 76                | 186             | 133                | 52                     | 2               | 2                       |
| Chrome 19            | 2                 | 37                   | 462                         | 284            | 104                 | 180                | 91                 | 87                | 180             | 130                | 47                     | 1               | 1                       |
| iOS Mobile 1         | 5                 | 80                   | 508                         | 300            | 113                 | 187                | 105                | 83                | 213             | 158                | 55                     | 3               | 1                       |

The columns contain EUM metrics by browser.



- Not all browsers support all metrics. See [Web EUM Metrics](#).

- The performance for all iOS browsers - Chrome, Safari, etc - is displayed under iOS Mobile because of the way all iOS browsers report themselves.

Click a column to sort the browsers based on the column's metric. For example, if you want to sort the slowest browsers in terms of Download Time with the slowest browsers at the top of the list, click the Download Time column. You can toggle the column header to switch between ascending and descending order.

To filter the list to see only rows for a particular browser, enter the browser in the filter field.

## Distribution by Country

The Distribution by Country list, below the Distribution by Browser list, breaks out the browser distribution of your end users by country. You can sort by any browser by clicking the browser's column header.

Distribution by Country

| Name ▲         | Android Mobile | Other  | Chrome | Internet Explorer | iOS Mobile | Firefox |
|----------------|----------------|--------|--------|-------------------|------------|---------|
| Australia      | 2.9 %          | 23.5 % | 2.9 %  | 29.4 %            | 23.5 %     | 17.6 %  |
| Austria        | 2.9 %          | 29.4 % | 11.8 % | 20.6 %            | 26.5 %     | 8.8 %   |
| Canada         | 3.1 %          | 20.0 % | 15.4 % | 23.1 %            | 23.1 %     | 15.4 %  |
| China          | 3.9 %          | 20.6 % | 14.2 % | 31.8 %            | 12.9 %     | 16.7 %  |
| Denmark        | 3.0 %          | 21.2 % | 30.3 % | 27.3 %            | 15.2 %     | 3.0 %   |
| France         | 2.9 %          | 20.0 % | 5.7 %  | 28.6 %            | 20.0 %     | 22.9 %  |
| Hong Kong      | 2.9 %          | 23.5 % | 8.8 %  | 29.4 %            | 23.5 %     | 11.8 %  |
| Japan          | 4.7 %          | 17.9 % | 9.4 %  | 31.5 %            | 18.7 %     | 17.9 %  |
| Malaysia       | 4.6 %          | 15.4 % | 12.3 % | 27.7 %            | 24.6 %     | 15.4 %  |
| Netherlands    | 5.9 %          | 22.2 % | 14.8 % | 25.9 %            | 17.8 %     | 13.3 %  |
| New Zealand    | 1.4 %          | 29.0 % | 14.5 % | 29.0 %            | 10.1 %     | 15.9 %  |
| Poland         | 9.1 %          | 24.2 % | 9.1 %  | 18.2 %            | 18.2 %     | 21.2 %  |
| Taiwan         | 5.9 %          | 26.5 % | 23.5 % | 32.4 %            | 8.8 %      | 2.9 %   |
| United Kingdom | 0.0 %          | 24.2 % | 15.2 % | 24.2 %            | 12.1 %     | 24.2 %  |
| United States  | 4.4 %          | 21.5 % | 10.5 % | 30.1 %            | 16.1 %     | 17.4 %  |

This list is particularly useful when viewed in conjunction with the worst performing regions panel in the geo dashboard. If a particular county is experiencing poor performance, it is possible that a significant percentage of your users in that country use a poorly-performing browser. This list can help you to determine whether the browser is a contributing factor.

### Learn More

- [Web EUM Metrics](#)
- [Time Ranges](#)
- [The Web EUM Geo Dashboard View](#)
- [Monitor Your Applications with Web EUM](#)
- [Usage Statistics by Device or Platform](#)

### Usage Statistics by Device or Platform

- [Accessing Usage Statistics by Device/Platform](#)
- [Overall Device Distribution](#)
- [Performance by Device](#)



- [Learn More](#)

You can monitor the end user experience of each type of device/platform that your end users use to access your application.

The device dashboard helps you discover:


- The slowest devices in terms of total end-user response time
- The slowest devices to connect to the server
- The devices that most of your end users use
- The devices that most of your end users use in a particular country or region

#### Accessing Usage Statistics by Device/Platform

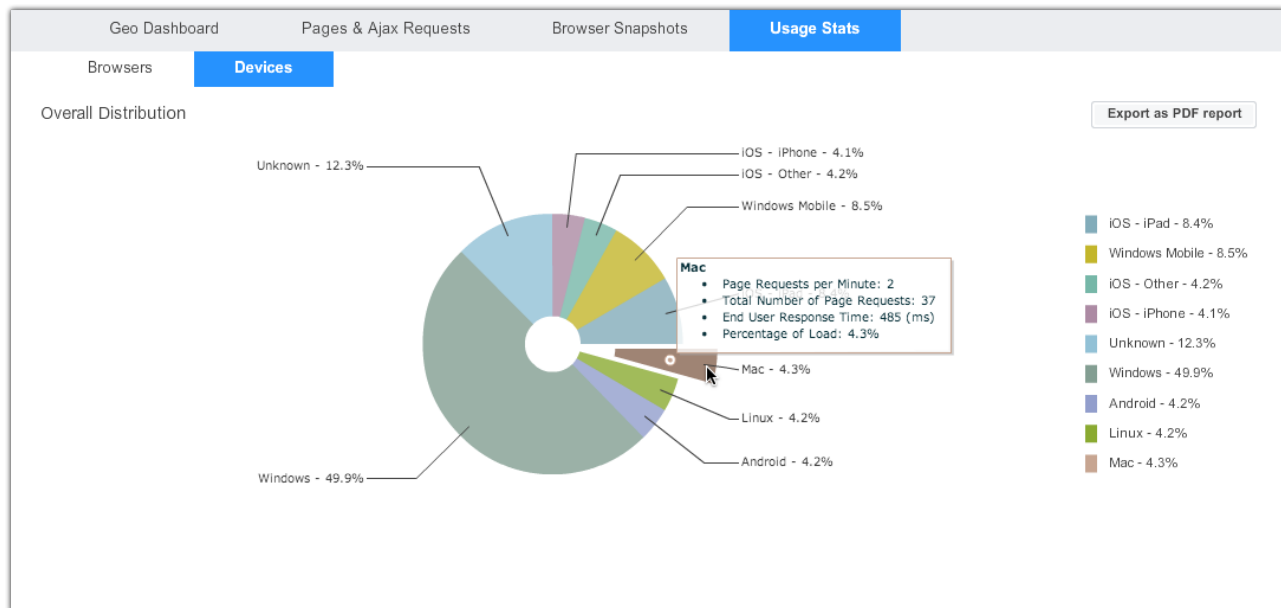
1. In the left navigation bar click: **End User Experience -> Web.**
2. Select the Usage Stats tab.
3. Click the Devices tab if it is not already selected.

#### Overall Device Distribution

The Overall Distribution chart shows the percentages of your web end users by their devices/platforms.

 This chart shows mobile access via browsers only.

To see the total number of calls, average end user response time, and percentage of the total load for a particular device, hover over the device in the chart.



#### Performance by Device

The Performance by Device list below the chart displays a row for each device.

| Name           | Page Requests per | Total Number of Page | End User Response Time (ms) | Front End Time | Resource Fetch | HTML Download and | HTML Download Time | AJAX Response | DOM Building Time | AJAX Callback | First Byte Time | Response Available | Server Connection | Page views with | AJAX Request Errors |
|----------------|-------------------|----------------------|-----------------------------|----------------|----------------|-------------------|--------------------|---------------|-------------------|---------------|-----------------|--------------------|-------------------|-----------------|---------------------|
| iOS - iPad     | 6                 | 90                   | 493                         | 295            | 119            | 176               | 88                 | -             | 83                | -             | 199             | 153                | 47                | 2               | 1                   |
| Windows Mobile | 6                 | 84                   | 498                         | 286            | 108            | 178               | 102                | -             | 80                | -             | 207             | 157                | 55                | 2               | 2                   |
| iOS - Other    | 3                 | 44                   | 454                         | 283            | 113            | 170               | 99                 | -             | 75                | -             | 171             | 123                | 47                | 2               | 1                   |
| iOS - iPhone   | 3                 | 38                   | 449                         | 280            | 116            | 165               | 88                 | -             | 74                | -             | 169             | 118                | 50                | 1               | 2                   |
| Unknown        | 9                 | 133                  | 498                         | 296            | 118            | 178               | 94                 | -             | 89                | -             | 204             | 149                | 53                | 3               | 1                   |
| Windows        | 32                | 485                  | 481                         | 287            | 111            | 176               | 95                 | -             | 80                | -             | 194             | 145                | 52                | 10              | 2                   |
| Android        | 3                 | 41                   | 499                         | 304            | 123            | 181               | 82                 | -             | 77                | -             | 204             | 132                | 54                | 1               | 1                   |
| Linux          | 3                 | 42                   | 474                         | 265            | 111            | 154               | 79                 | -             | 77                | -             | 210             | 155                | 56                | 2               | 1                   |
| Mac            | 2                 | 37                   | 485                         | 269            | 86             | 184               | 116                | -             | 83                | -             | 202             | 151                | 61                | 2               | 1                   |

The columns show the various EUM metrics by device. See [Web EUM Metrics](#).

Click a column to sort the devices based on the column's metric. For example, if you want to sort the slowest devices in terms of Download Time with the slowest devices at the top of the list, click the Download Time column. You can toggle the column header to switch between ascending and descending order.

To filter the list to see only rows for a particular device, enter the device in the filter field.

## Distribution by Country

| Name           | Windows Mobile | Windows | iOS - iPad | Unknown | iOS - Other | Mac    | Android | iOS - iPhone | Linux  |
|----------------|----------------|---------|------------|---------|-------------|--------|---------|--------------|--------|
| France         | 6.1 %          | 48.5 %  | 3.0 %      | 15.2 %  | 6.1 %       | 9.1 %  | 6.1 %   | 6.1 %        | 0.0 %  |
| Hong Kong      | 0.0 %          | 52.9 %  | 8.8 %      | 14.7 %  | 5.9 %       | 8.8 %  | 0.0 %   | 5.9 %        | 2.9 %  |
| Australia      | 8.8 %          | 50.0 %  | 5.9 %      | 5.9 %   | 5.9 %       | 5.9 %  | 2.9 %   | 2.9 %        | 11.8 % |
| China          | 9.8 %          | 48.1 %  | 8.9 %      | 9.8 %   | 3.4 %       | 4.3 %  | 7.2 %   | 6.0 %        | 2.6 %  |
| Taiwan         | 0.0 %          | 68.8 %  | 3.1 %      | 6.3 %   | 0.0 %       | 6.3 %  | 3.1 %   | 6.3 %        | 6.3 %  |
| Malaysia       | 14.5 %         | 47.8 %  | 8.7 %      | 13.0 %  | 1.4 %       | 7.2 %  | 2.9 %   | 0.0 %        | 4.3 %  |
| Netherlands    | 11.7 %         | 45.3 %  | 5.8 %      | 12.4 %  | 3.6 %       | 2.9 %  | 5.8 %   | 8.0 %        | 4.4 %  |
| Austria        | 6.1 %          | 48.5 %  | 3.0 %      | 18.2 %  | 15.2 %      | 0.0 %  | 3.0 %   | 0.0 %        | 6.1 %  |
| United States  | 8.1 %          | 47.9 %  | 10.0 %     | 13.5 %  | 4.9 %       | 4.4 %  | 4.1 %   | 3.2 %        | 3.8 %  |
| Poland         | 12.1 %         | 54.5 %  | 12.1 %     | 3.0 %   | 3.0 %       | 3.0 %  | 3.0 %   | 6.1 %        | 3.0 %  |
| Canada         | 7.4 %          | 61.8 %  | 8.8 %      | 4.4 %   | 0.0 %       | 1.5 %  | 5.9 %   | 5.9 %        | 4.4 %  |
| Denmark        | 2.9 %          | 52.9 %  | 2.9 %      | 14.7 %  | 2.9 %       | 11.8 % | 2.9 %   | 8.8 %        | 0.0 %  |
| Japan          | 7.7 %          | 53.2 %  | 7.7 %      | 15.0 %  | 3.0 %       | 2.6 %  | 2.6 %   | 2.6 %        | 5.6 %  |
| United Kingdom | 8.6 %          | 45.7 %  | 5.7 %      | 17.1 %  | 5.7 %       | 5.7 %  | 0.0 %   | 2.9 %        | 8.6 %  |
| New Zealand    | 9.4 %          | 53.1 %  | 9.4 %      | 9.4 %   | 6.3 %       | 3.1 %  | 3.1 %   | 1.6 %        | 4.7 %  |

The Distribution by Country list breaks out the device distribution of your end users by country.

This list is particularly useful in conjunction with the worst performing regions panel in the Geo Dashboard. If a particular county is experiencing poor performance, it is possible that a significant percentage of your users in that country use a poorly performing device. This list can help you to determine whether the device is a contributing factor.

## Learn More

- [Web EUM Metrics](#)

- [Time Ranges](#)
- [The Web EUM Geo Dashboard View](#)
- [Monitor Your Applications with Web EUM](#)
- [Usage Statistics by Browser](#)

## Set Up and Configure Web EUM

- [EUM License](#)
- [Accessing Web EUM Configuration](#)
- [Web EUM Prerequisites](#)
  - [Enable and Disable Web EUM](#)
  - [Inject the JavaScript Agent for Web EUM into Your Application Pages](#)
- [Configure On-Prem Controller HTTP Proxy Settings \(Optional\)](#)
- [Additional Web EUM Configurations](#)
- [Learn More](#)

You must have an EUM license to access Web EUM. See [EUM License](#).

End User Monitoring (EUM) must be enabled at the application level. Its UI is visible in the Controller GUI only if EUM is enabled. You can enable and then disable EUM if you decide not to use the feature. See [Enable and Disable EUM](#).

AppDynamics collects metrics from your end users' experience in their Web browsers using a special JavaScript for agent for Web EUM. Your web application must be configured to insert this agent into the web pages it serves in order for them to be monitored. This process is called injection. See [Set Up Your Application for Web EUM](#).

## EUM License

A special EUM license key is required. It covers both Web EUM and Mobile EUM.

For on-premise customers, the license key is set up within the Controller license file. If you added EUM after your initial AppDynamics installation, you may need to upload and install the new Controller license file. See [Controller Licenses](#). If you are a SaaS customer, AppDynamics sets up the EUM license in the SaaS Controller for you.

Each JavaScript agent for Web EUM provides a certain number of page views per year. For information on how to examine your current page view usage, see [Web EUM License](#).

## Accessing Web EUM Configuration

1. In the left navigation menu, click **Configure -> Instrumentation**.
2. Click the End User Experience tab.

 Always remember to click **Save** in the EUM configuration screens whenever you make a change.

## Web EUM Prerequisites

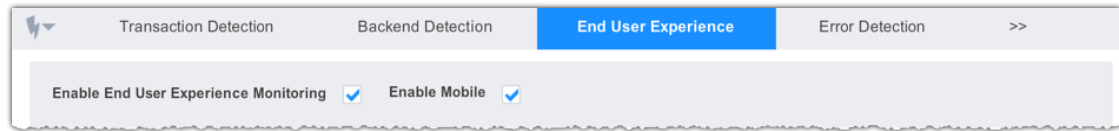
To turn on Web EUM functionality you need to:

- enable End User Monitoring

- inject the JavaScript agent into your application pages

### Enable and Disable Web EUM

1. At the top of the End User Experience configuration screen:
  - check Enable End User Experience Monitoring to enable Web EUM.
  - clear Enable End User Experience Monitoring to disable Web EUM.



2. Click **Save** in the Web EUM configuration screen after you have made your change.

### Inject the JavaScript Agent for Web EUM into Your Application Pages

The JavaScript agent for Web EUM collects EUM metrics. See [Web EUM Metrics](#).

The JavaScript agent for Web EUM must be inserted into the headers of the pages for which you want to see these metrics. There are several ways to accomplish this. See [Set Up Your Application for Web EUM](#).

### Configure On-Prem Controller HTTP Proxy Settings (Optional)

If you have an on-premise Controller that uses an HTTP proxy host and port to communicate with the Internet, you need to add the following JVM options to the Controller configuration so that the Controller can communicate with the EUM Cloud aggregator, which performs EUM data processing:

1. Set `appdynamics.controller.http.proxyHost` to the proxy host name or IP address.
2. Set `appdynamics.controller.http.proxyPort` to the proxy HTTP port.
3. *New in 3.8.2* If the proxy requires authentication, set credentials for the Controller using these options:
  - Set `appdynamics.controller.http.proxyUser` to the user name that the Controller should use to authenticate to the proxy.
  - Set `appdynamics.controller.http.proxyPasswordFile` to the plain text file that contains the password for the user.

You can use the `modifyJvmOptions` utility to do this. Then stop and restart the app server.

For example, the following commands show how to modify the HTTP proxy options for a Controller on Linux, then stop and start the Controller's app server.

```
<Controller_installation_directory>/bin/modifyJvmOptions.sh add
-Dappdynamics.controller.http.proxyHost=myhost@-Dappdynamics.controller.http.proxyPort=8888
<Controller_installation_directory>/bin/controller.sh stop-appserver
<Controller_installation_directory>/bin/controller.sh start-appserver
```

Be sure to use the @ character to separate multiple options, as shown in the example. Alternatively, run the modifyJvmOptions utility once for each option to be added.

The following commands modify the HTTP proxy options for a Controller that runs on Windows, then stops and starts the Controller's app server. The quotation marks enclosing the options string is required on Windows.

```
<Controller_installation_directory>\bin\modifyJvmOptions.bat add  
"-Dappdynamics.controller.http.proxyHost=myhost@-Dappdynamics.contro  
ller.http.proxyPort=8888"  
<Controller_installation_directory>\bin\controller.bat stop-appserver  
<Controller_installation_directory>\bin\controller.bat  
start-appserver
```

If you need to modify these properties later, first run modifyJvmOptions with the delete command to delete the old setting, then use the add command to add the new ones.

See [Modify GlassFish JVM Options](#) for more information about this utility.

To modify the Controller configuration file directly, edit the domain configuration file:

```
<Controller_installation_directory>/appserver/glassfish/domains/domain1/config/d  
omain.xml
```

Add the following JVM option to the existing java-config element:

```
<jvm-options>  
-Dappdynamics.controller.http.proxyHost=myhost  
-Dappdynamics.controller.http.proxyPort=8888  
</jvm-options>
```

## Additional Web EUM Configurations

You can also configure:

- [Page Identification and Naming](#)
- [JavaScript and Ajax Error Detection](#)
- [Browser Snapshot Thresholds](#)
- [Browser Snapshot Collection Rules](#)
- [Deployment Customization](#)

## Learn More

- [Web EUM License](#)
- [Set Up Your Application for Web EUM](#)
- [Browser Snapshots](#)
- [Modify GlassFish JVM Options](#)

## Configure the Controller UI for Web EUM

You can manage how the Web EUM information appears in the AppDynamics Controller UI, including:

- the display names for your pages, Ajax requests, and iframes
- the errors that should be shown in the UI, and the ones that should not be shown

You can also configure:

- the thresholds for slow, very slow, and stalled transactions
- when browser snapshots should be taken

In addition, you can [customize your deployment](#), including:

- using a custom geo server for geo-location
- using a custom location for the JavaScript agent
- using a custom EUM data collector location

## Configure Page Identification and Naming

- [Access Page Naming Rules](#)
- [Logic of Page Naming Rule Evaluation](#)
- [Default Page Naming Rules](#)
- [Custom Page Naming Rules](#)
- [Custom Page Exclude Rules](#)
- [Learn More](#)

You can configure the display names by which various pages, Ajax requests, and iframes are referred to in controller lists and dashboards.

You can:

- use the AppDynamics default naming rule, which you can leave as is or modify.
- create custom naming rules to override the default convention.
- disable the default naming rule and use only your own custom naming rules.
- create custom exclude rules to exclude from monitoring pages that meet certain criteria.

In this topic, the term "pages" includes iframes, Ajax requests, and base pages.

No matter how the page is named, AppDynamics always reports the page name in lower-case.

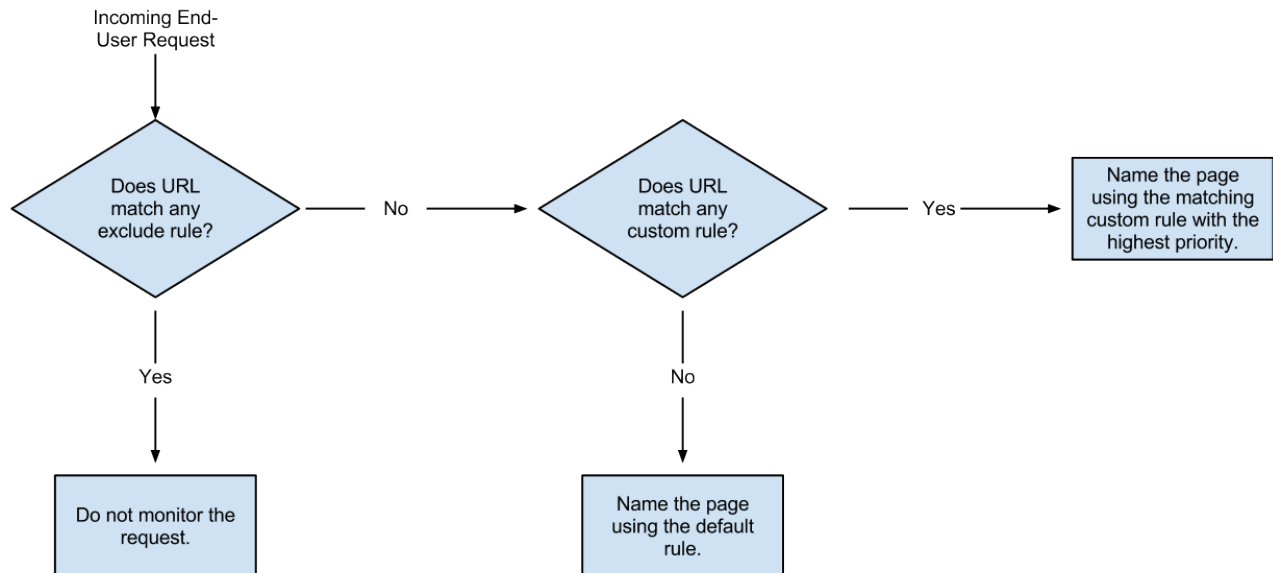
### Access Page Naming Rules

1. Access the EUM configuration screen if you are not already there. **Configure->Instrumentation**
2. Select the End User Experience tab.
3. Select the Web Page Naming, Error Detection, Thresholds, etc. sub tab
4. Expand **Configure how Pages, AJAX Requests, and Iframes will be named**.

Whenever you make any changes, click **Save** to save the configuration.

## Logic of Page Naming Rule Evaluation

This is the order in which AppDynamics evaluates the page naming rules.



## Default Page Naming Rules

If you enable the default naming configuration and do not modify it, AppDynamics identifies and names your pages using the first 2 segments of the page URL.

You can modify the default configuration in the Default Naming Configuration section. For example, you can include the protocol or domain in the name, or use different segments of the URL, or run a regular expression on the URL, or include query parameters in the name. For example, you can use the Show Domain option to identify third-party Ajax or iframe calls.

### Default Naming Configuration

Pages will be named using these configurations.

Enabled

☒

Show Protocol

☐

Show Domain

☐

☐ Show Full Domain
 ☐ Show Subdomain

What part of the URL should be used in Page Names

☒ Use first
 

segments

☐ Use last
 

segments

☐ Use segment numbers
 

(comma separated list, starts at 1) [Example](#)

☐ Run regex on URI
 

Pick indices from regex output
 

(comma separated list of indices from regex output, starting at 0.) [Example](#)

Query String Parameters to use in Page Name

Comma separated list of parameter names. The values will be used in Page Names.

If you do not want to use the default convention at all, disable it by clearing the Enabled check box. In this case you must configure at least one custom page naming rule so that AppDynamics can

identify and name pages.

### Custom Page Naming Rules

You can create custom rules for identifying and naming pages.

To create a custom page naming rule, click the plus icon in the Custom Naming Rules section. Then configure the custom rule for AppDynamics to use to identify and name the page.

This configuration screen is similar to the default configuration screen but it includes a priority field. The priority specifies which rule to apply to the naming of a page if it could be identified by more than one rule. For example, if CustomRuleA specifies **Use the first 3 segments of the URL** and has a priority of 9 and CustomRuleB specifies **Use the last 3 segments of the URL** and has a priority of 8, a page in which the URI has more than 3 segments will be named by CustomRuleA because it has a higher priority.

The default rule, if enabled, has a priority of 0.

In the example below, you might have multiple pages that include "search/r/region" in their URLs, so "search/r/region01", "search/r/region23", and so forth. You want to name all the pages from that set as a single page named "search/r/region". Using the **Run regex on URI** option, you remove the domain name and the number at the end of the URL, grouping all your "/search/r/region" URLs into a single set. Because all the URLs contain "search/r/region", AppDynamics now collects information for them all under the single page name "search/r/region". Otherwise it would use the default page naming rule, or, if another rule with a priority greater than 4 exists, that higher priority rule.

The screenshot shows the 'Custom Naming Rule' configuration window. It has a title bar with a close button. The configuration includes:

- Name:** A text field containing 'search/r/region'.
- Enabled:** A checked checkbox.
- Priority:** A numeric spinner set to 4.
- URL:** A dropdown menu set to 'Contains' and a text field containing 'search/r/region'.
- Show Protocol:** An unchecked checkbox.
- Show Domain:** An unchecked checkbox, with radio buttons for 'Show Full Domain' (selected) and 'Show Subdomain'.
- What part of the URL should be used in Page Names:** Three radio button options:
  - 'Use first 1 segments' (unselected).
  - 'Use last 1 segments' (unselected).
  - 'Use segment numbers' (unselected), with a text field for '(comma separated list, starts at 1)' and a link to 'Example'.
- Run regex on URI:** A selected radio button, with a text field containing '(.\*)(search/r/region)(.\*)' and a link to 'Example'.
- and use groups:** A text field containing '2', with a link to 'Example' below it.
- Query String Parameters to use in Page Name:** An empty text field.
- Footer:** A note 'Comma separated list of parameter names. The values will be used in Page Names.' and 'Cancel' and 'OK' buttons.

### Custom Page Exclude Rules

You can configure custom exclude rules for pages. Any page with a URL matching the



configuration is excluded from monitoring.

#### Learn More

- [Set Up and Configure Web EUM](#)
- [The Pages and Ajax Requests View](#)
- [Page, Ajax, and Iframe Dashboards](#)
- [Set Custom Page Names with JavaScript](#)

#### Configure JavaScript and Ajax Error Detection

- [Access Error Detection Rules](#)
- [Enabling and Disabling Web EUM Error Detection](#)
- [Configuring Rules to Ignore Errors based on Script or Error Message](#)
- [Configuring Rules to Ignore Errors by Page](#)
- [Configuring Rules to Ignore Errors by URL](#)
- [Learn More](#)

You can enable and disable reporting of JavaScript and Ajax request errors.

You can configure which errors are included in the error count by specifying which errors to "ignore".

**i** AppDynamics does not really ignore "ignored errors". It continues to track them but does not increment the error count for them in the places where error totals are reported on the user interface.

When enabled, JavaScript and Ajax request errors are reported throughout the Web EUM UI: in the geo page, in the user stats browser and device dashboards, in the page list, and in browser snapshots.

You can specify errors to ignore:

- by script and / or error message
- by page
- by URL

#### Access Error Detection Rules

1. Access the EUM configuration screen if you are not already there. **Configure->Instrumentation**.

2. Select End User Experience tab.
3. Select Web Page Naming, Error Detection, Thresholds, etc. sub-tab.
4. Expand **Configure Detection of JavaScript and AJAX Errors**.

When you complete your changes, remember to click **Save**.

#### Enabling and Disabling Web EUM Error Detection

In the Configure Detection of JavaScript and Ajax Errors screen:

- Check/clear the Enable JavaScript Error Capture check box to enable/disable JavaScript error display.
- Check/clear the Enable Ajax Request Error Capture check box to enable/disable Ajax error display.

If both check boxes are clear, AppDynamics will not display any JavaScript or Ajax request errors.

Even if capture is enabled globally, you can configure certain errors to be ignored so that they are not counted in the error totals.

#### Configuring Rules to Ignore Errors based on Script or Error Message

You can configure AppDynamics to ignore specific JavaScript errors that are identified by:

- a matching string pattern in the name of the script that generated the error
- line number in the script
- a matching string pattern in the error message

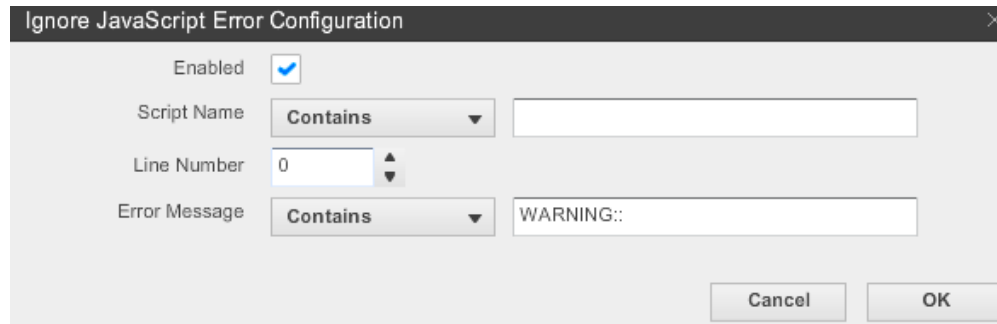
You can specify one, two or all three of these criteria. Configure more criteria to increase the granularity of which errors you ignore.

For example, the following configuration, in which all three fields are specified, means "Ignore all errors generated by line 27 of a script whose name starts with "Nightly" and whose error message contains the string "WARNING::".

If the line number was not specified (e.g. set to 0), the configuration would mean "Ignore all errors generated any line of a script whose name starts with "Nightly" and whose error message contains the string "WARNING::".

If neither the line number nor the error message field were specified, the configuration would mean "Ignore all errors generated by any line of a script whose name starts with "Nightly".

If the error message were the only field specified, the configuration would mean "Ignore all errors generated by any script when the error message contains the string "WARNING::".



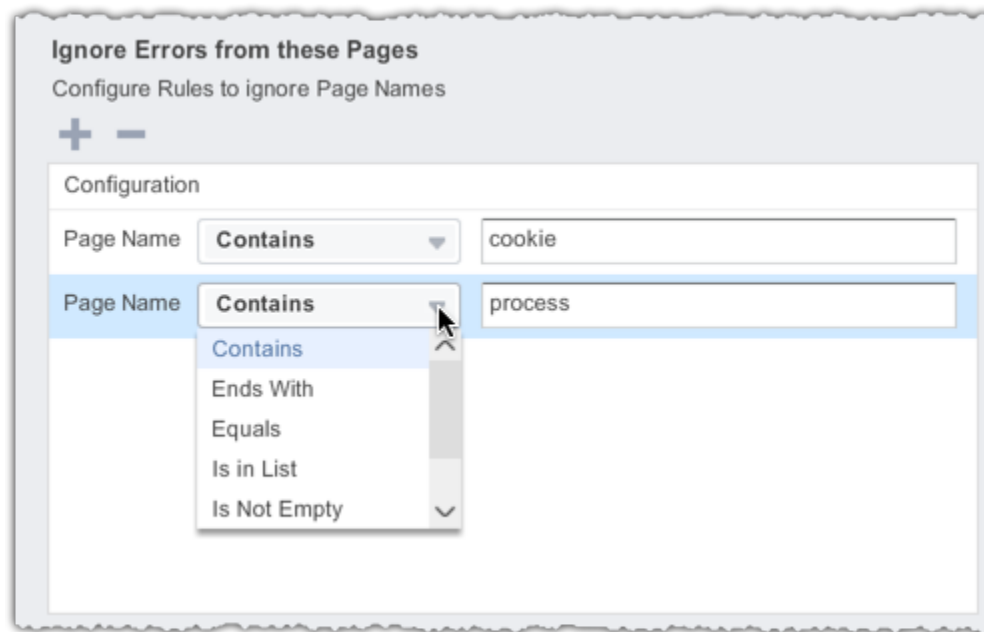
The dialog box is titled "Ignore JavaScript Error Configuration". It has a close button (X) in the top right corner. The "Enabled" checkbox is checked. The "Script Name" field has a dropdown menu set to "Contains" and an empty text input field. The "Line Number" field has a text input with "0" and up/down arrow buttons. The "Error Message" field has a dropdown menu set to "Contains" and a text input with "WARNING::". At the bottom right are "Cancel" and "OK" buttons.

To modify an existing ignore rule, select the rule in the list and click the edit icon.  
To remove an ignore rule, select the rule in the list and click the delete icon.

#### Configuring Rules to Ignore Errors by Page

You can configure AppDynamics to ignore all errors generated by a specific page, iframe, or Ajax request.

Configure one rule for every page for which you want to ignore all errors.



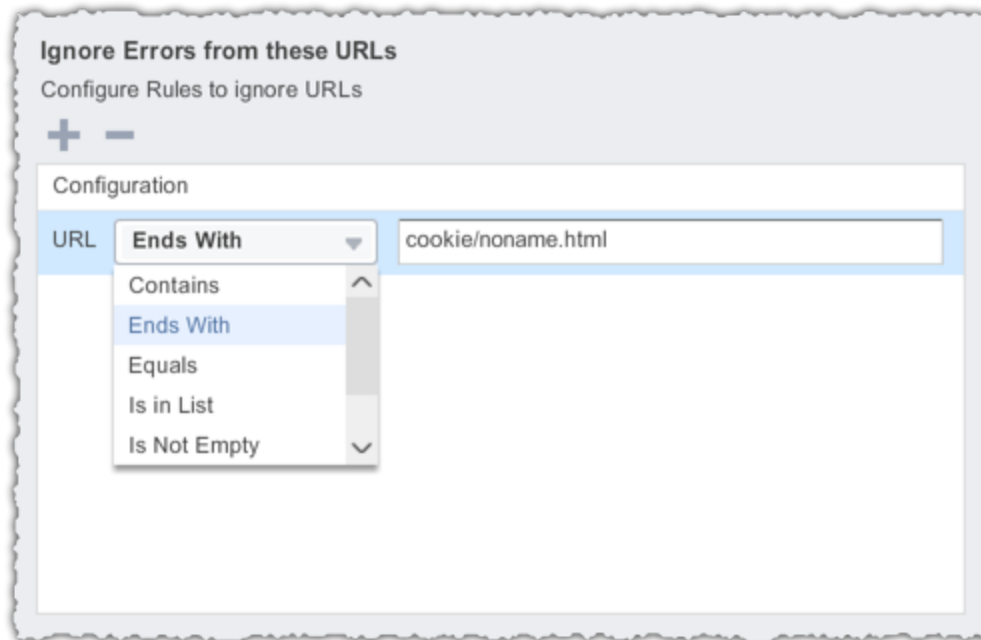
The window is titled "Ignore Errors from these Pages" and has a subtitle "Configure Rules to ignore Page Names". It features a "+" and "-" icon for adding or removing rules. Below is a "Configuration" section with a table-like structure. The first row has "Page Name" with a dropdown set to "Contains" and a text input with "cookie". The second row is highlighted in blue and has "Page Name" with a dropdown set to "Contains", a dropdown menu open showing options: "Contains", "Ends With", "Equals", "Is in List", and "Is Not Empty", and a text input with "process".

To remove an ignore rule, select it in the list and click the minus icon.

#### Configuring Rules to Ignore Errors by URL

You can configure AppDynamics to ignore all errors generated by a specific URL.

Configure one rule for every URL for which you want to ignore all errors.



To remove an ignore rule, select it in the list and click the minus icon.

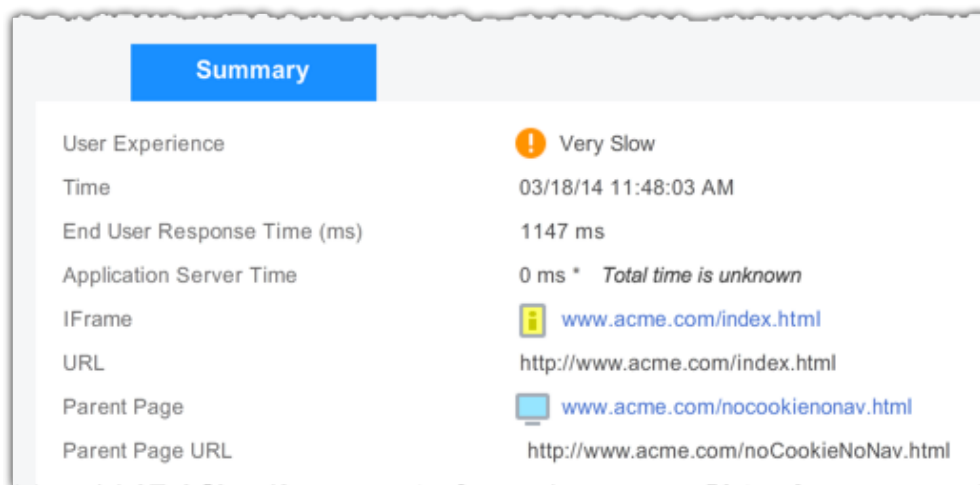
Learn More

- [Set Up and Configure Web EUM](#)
- [Browser Snapshots](#)

#### Configure EUM Browser Snapshot Thresholds

- [Access EUM Threshold Rules](#)
- [Configure EUM Threshold Rules](#)
- [Learn More](#)

You can configure the thresholds that define slow, very slow, and stalled end-user requests for browser snapshots.



You can define EUM thresholds either

- as a multiple of the standard deviation; for example, "Experience is slow if end user response time is slower than 3 X the standard deviation.
- as a static value; for example, "Experience is stalled if end user response time is slower than 30000 ms."

The default thresholds are:

- Slow = 3 x standard deviation
- Very Slow = 4 x standard deviation
- Stalled = 45000 ms

## Access EUM Threshold Rules

1. Access the EUM configuration screen if you are not already there. **Configure->Instrumentation**
2. Select End User Experience tab.
3. Select Web Page Naming, Error Detection, Thresholds, etc. sub-tab.
4. Expand **Thresholds for Slow User Experience**.

When you complete your changes, remember to click **Save**.

## Configure EUM Threshold Rules

▼ Thresholds for Slow End User Experience

Configure User Experience Thresholds for Browser Snapshots.

☐ Slow greater than 0 ms

☒ Very slow greater than 0 ms

☒ Slow greater than 3 standard deviations.

☐ Very slow greater than 4 standard deviations.

☐ Stall greater than 45000 ms

1. Select the relevant radio button to indicate whether the threshold is based on standard deviations or static values.
2. Type the values in the fields or select them using the scrollbars for one or more of the following:
  - a. the Slow Threshold.
  - b. the Very Slow Threshold.
  - c. the Stalled threshold.
3. Click **Save**.

## Learn More

- [Browser Snapshots](#)

## Configure Browser Snapshot Collection

- [Access Error Detection Rules](#)
- [Configure Snapshot Collection Rules](#)
- [Learn More](#)

By default, when Web EUM is enabled the JavaScript agent captures periodic browser snapshots (page, iframe, and Ajax) every 60 seconds and other snapshots when performance thresholds are crossed or errors are encountered.

You can:

- enable/disable slow snapshot collection, that is snapshots of requests where the End User Response Time is higher than the configured threshold.
- enable/disable periodic snapshot collection.
- enable/disable error snapshots, that is snapshots of requests for which a JavaScript error is reported or an Ajax request receives an HTTP error response. An error response is any HTTP code equal to or greater than 400.

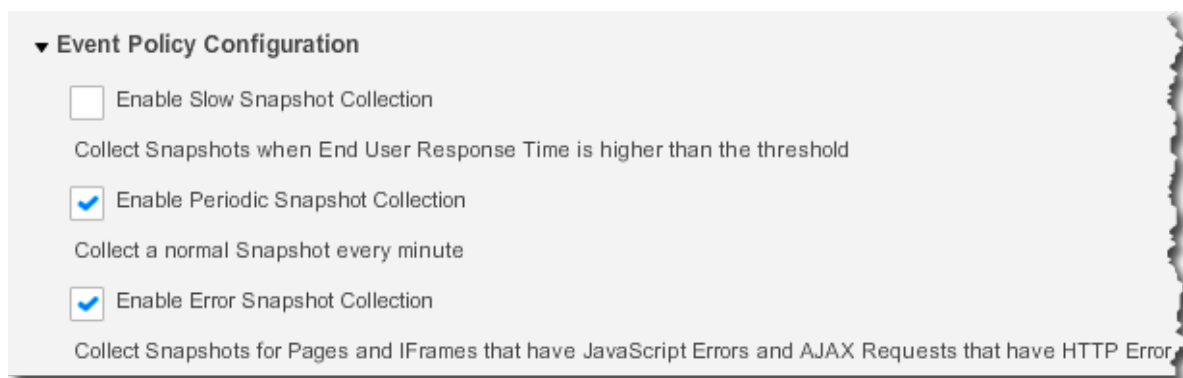
If all three kinds of browser snapshot types - periodic, error, and slow response time - are disabled, the agent does not collect any browser snapshots.

#### Access Error Detection Rules

1. Access the EUM configuration screen if you are not already there. **Configure->Instrumentation**.
2. Select End User Experience tab.
3. Select Web Page Naming, Error Detection, Thresholds, etc. sub-tab.
4. Expand **Event Policy Configuration**

When you complete your changes, remember to click **Save**.

#### Configure Snapshot Collection Rules



1. Do one or more of the following:
  - Use **Enable Slow Snapshot Collection** to enable/disable slow response time snapshot collection.
  - Use **Enable Periodic Snapshot Collection** to enable/disable periodic snapshot collection.
  - Use **Enable Error Snapshot Collection** to enable/disable error snapshot collection
2. Click **Save**.

## Learn More

- [Browser Snapshots](#)
- [Set Up and Configure Web EUM](#)

## Customize Your Web EUM Deployment

- [Access Customize Your Deployment](#)
- [Alternate Geo Server Location](#)
- [Hosting the JavaScript Extension File Yourself](#)
- [Alternate EUM Data Collector Location](#)
- [Learn More](#)

Deployment customizations include:

- setting up a custom geo server for private networks or custom location mapping.
- hosting your own JavaScript agent extension file instead of using Amazon Cloudfront.
- pointing your JavaScript agent to an alternate EUM data collector location in the Amazon cloud.

## Access Customize Your Deployment

1. Access the EUM configuration screen if you are not already there. Click **Configure->Instrumentation**.
2. Select End User Experience tab.
3. Select Web Page JavaScript Instrumentation sub-tab.
4. Expand **Advanced**.
5. Expand **Customize Your Deployment**.

When you complete your changes, remember to click **Save**.

▼ Advanced

▼ Customize your Deployment

Application Key AD-AAB-AUN

Geo Server URL (Optional)  ?

JavaScript Agent Extension URL (Optional)  ?

[Download adrum-ext.\[version\].js](#)

EUM Data Collector URL (Optional)  ?

[Additional information](#)

## Alternate Geo Server Location

By default, end-users' locations are resolved using public geographic databases. You can host an alternate geo server for your countries, regions, and cities instead of using the default geo server hosted by AppDynamics. Use the Geo Server URL field to point to your custom geo server.

See [Use a Custom Geo Server For Web EUM](#).

## Hosting the JavaScript Extension File Yourself

The JavaScript agent consists of two files, `adrum.js` and `adrum-ext.js`. The first file is inserted into the page when it is downloaded from your web application. The second is loaded asynchronously by the first. By default, the extension file is fetched the highly available Amazon

CloudFront CDN infrastructure.

To host the JavaScript agent extension yourself, click **Download the JavaScript Agent Extension**. You will get a version that is compatible with your version of the Controller.

Place the file in a Web container and enter the URL of the host in the URL field below. If you saved the agent file in a directory, for example "js", include the directory name but do **not** include the filename of the actual agent extension as this may change with subsequent versions. AppDynamics will supply the name of the file when it processes the URL.

Hosting the JavaScript Extension (Optional)
 [Download the JavaScript Agent Extension ?](#)

http(s)://  /adrum-ext.[version].js

#### Alternate EUM Data Collector Location

The AppDynamics JavaScript agent for EUM sends browser performance data to the EUM Cloud for processing before being transferred and stored on the whichever version of the controller you are using. The default EUM Cloud network has a presence in all AWS regions with centralized data processing occurring in the Amazon US-WEST Region.

If you have a need for a private EUM Cloud network, contact your AppDynamics sales representative and AppDynamics Support. Once approved you will be provided with a URL for an alternate location from which your AppDynamics controller can collect your data. Supply the URL in the EUM Data Collector URL field.

#### Learn More

- [Set Up Your Application for Web EUM](#)
- [AppDynamics Support](#)

### Set Up Your Application for Web EUM

- [Injection Overview](#)
  - [Manual Injection](#)
  - [Automatic Injection](#)
  - [Assisted Injection](#)
    - [Assisted Injection using Injection Rules \(Java only\)](#)
    - [Assisted Injection using Attribute Injection](#)
- [Choosing an Injection Method](#)
  - [Verifying Injection with Manual Injection](#)
  - [Reversing Injection](#)
- [Getting Full Timing Data for Associated Business Transactions](#)
- [Learn More](#)

#### Injection Overview

Web EUM works in the following way:

1. An end user requests a first page from your web application.
2. Your web application executes whatever business logic that the particular page requires.
3. Your web application creates the response page to return to the end user. The response page includes:
  - a. application specific information.
  - b. a copy of a small JavaScript script that knows how to collect relevant performance



- information about that page. This script is called the JavaScript agent.
4. The page, with the JavaScript agent included, is returned to the end user.
  5. As the page is being constructed in the browser, the script collects relevant information about the page's performance.
  6. At approximately the same time as the `onload` event for the page fires, a copy of a somewhat larger JavaScript file, the JavaScript agent extension, is downloaded from AWS asynchronously by the injected agent.
  7. This second script packages the collected performance information and sends it to the EUM Cloud collector for processing using a web beacon.
  8. Working together the two scripts continue to collect and send performance information as the end user navigates through the instrumented pages of your application.

To instrument your application for Web EUM you must set up your web application to insert the JavaScript agent file into the page that is returned to the end user as part of the normal process it follows. The act of inserting the agent is called *injection*.

There are several ways to inject the JavaScript agent for Web EUM into your web pages.

**i** Not all types of injection are supported on all frameworks and platforms. See the **Script Injection** columns in the [Supported Platform Matrix for Web EUM](#) matrices to find out what types are supported for your application.

#### Manual Injection

Manual injection is supported on all platforms and frameworks. To set up a manually injected page, you:

- Download the JavaScript agent to your local environment
- Manually configure each page you wish to instrument to find the script where you stored it so that it can be executed as the page is constructed by the browser.

**i** You can also choose to point your page to an AppDynamics hosted version of the JavaScript agent instead of hosting it locally. See [Options in Using Manual Injection for the EUM JavaScript Agent](#) for more information.

For detailed instructions on using manual injection in your application, see [Manual Injection](#).

#### Automatic Injection

If you are using a Java or .Net app agent on the server-side, and your application is running in an environment that supports the Apache Jasper JSP compiler (for Java) or ASP.NET or ASPX (for .NET), you *may* be able to use automatic injection, where the server-side app agent completely manages injecting the code at runtime. For detailed instructions on using automatic injection in your application, see [Automatic Injection](#).

#### Assisted Injection

Assisted injection is available in two variants. In both cases some of the work is done manually by you and some of the work is done by the server-side Java or .Net app agent.

##### ***Assisted Injection using Injection Rules (Java only)***

In this type of assisted injection you configure rules that define which app server Java classes and methods write to the output stream of your application and the writer object that is used to do that writing. AppDynamics intercepts the method and injects the JavaScript agent into the output stream. You also specify which business transactions you wish to have instrumented in this way.

For detailed information on using this form of assisted injection, see [Assisted Injection-Using Injection Rules - Java Only](#).

#### ***Assisted Injection using Attribute Injection***

In this type of assisted injection you copy small code snippets appropriate to your framework into your page templates or other code that creates your pages. This snippet contains two variables, JS\_HEADER and JS\_FOOTER, which the app agent replaces with the appropriate information in the response object at runtime.

For detailed information on using this form of assisted injection, see [Assisted Injection-Using Attribute Injection](#).

#### **Choosing an Injection Method**

If you are uncertain which procedure to use to inject the agent into your web pages, follow these guidelines, in this order:

- If you want to use Web EUM and do not have any app agents on the server side, use manual injection. See [Manual Injection](#).
- If automatic injection is available and works for your framework, use automatic injection.

Automatic injection requires the least amount of effort because you do not have to manually instrument every page. Check the matrices at [End User Monitoring \(EUM\) Compatibility](#) to see if automatic injection has been tested in your environment. Also see [Automatic Injection](#).
- If you cannot use automatic injection, and you can edit the source code **of your web pages**, use manual injection. See [Manual Injection](#).
- If you cannot use automatic injection, and you can edit the source code **of your web application**, use one of the kinds of assisted injection. See [Assisted Injection-Using Injection Rules \(Java Only\)](#) or [Assisted Injection-Using Attribute Injection](#).

#### **Verifying Injection with Manual Injection**

Once the agent is injected, it can take the AppDynamic controller a few minutes to discover and recognize the page, which must happen before data will begin to appear. If, however, you have configured your page using manual injection and are not seeing EUM metrics after running load for a while, check the web page to confirm that the JavaScript Agent for EUM is present in the page. If it is not, try injecting the script again.

If after two attempts you still do not see EUM metrics, try one of the other injection schemes if they are available for your platform, or call AppDynamics Support.

#### **Reversing Injection**

If you try one way to inject and it does not work, AppDynamics recommends that you undo the current injection configuration before implementing another one.

- To undo automatic injection, just clear the Enable Automatic Injection of JavaScript check box.
- To undo manual and assisted injection using attribute injection, manually delete the JavaScript Agent for EUM from your web pages or page templates.
- To undo assisted injection using injection rules, clear the Enable check box for each injection rule in the injection rules list.

If multiple copies of the agent exist on a page, the second copy does not execute.

### Getting Full Timing Data for Associated Business Transactions

To get the full real execution time for correlated business transactions your injection method must write the JS\_FOOTER data variable to your page. Manual injection gives the server-side agent the ability to write data only to the header of the page as it is being constructed by your web application. It is possible that complete business-transaction timing information is not available at the moment that the header data is written. Using the footer allows the server-side agent to write timing data at the footer of the page, by which time a fuller picture of business transaction timing is available.

You can write the JS\_FOOTER data variable into the footer of a web page using the following techniques:

- If you use automatic injection for the injecting into the head section, you automatically get injection into the footer as well.
- If you use manual injection for the head section, for applications built on Java platforms you can use assisted injection-using injection rules to inject into the footer. Or for applications built on Java servlet or ASP.NET platforms, you can use assisted injection-using attribute injection.

If you cannot add the JS\_FOOTER variable to your page, the timing shown for correlated business transactions is the average response time for that transaction rather than the real execution time for that specific page.

### Learn More


- [Manual Injection](#)
- [Automatic Injection](#)
- [Assisted Injection-Using Attribute Injection](#)
- [Assisted Injection-Using Injection Rules - Java Only](#)

### Manual Injection

- [Download and Include the Agent](#)
  - [To access the manual injection panel](#)
  - [To inject the JavaScript Agent for Web EUM](#)
- [Learn More](#)

For manual injection, you download the JavaScript Agent for Web EUM and include it in the

header of the web pages for which you want to collect Web EUM data.

-  To increase the success rate of correlating business transaction times with EUM data we recommend you also use assisted injection to add a footer to your pages. Manual injection gives the server-side agent the ability to write data only to the header of the page as it is being constructed by your web application. See [Getting Full Timing Data for Associated Business Transactions](#) for more information.

#### Download and Include the Agent

You configure manual injection from the JavaScript Instrumentation tab of the Web EUM configuration screen.

To use the same downloaded agent for multiple applications, **or** to use a cloud-hosted version of the main agent file, `adrum.js`, instead of downloading it, see [Options in Using Manual Injection for the EUM JavaScript Agent](#).

#### To access the manual injection panel

1. In the left navigation menu, click **Configure -> Instrumentation**.
2. Click the End User Experience tab.
3. Click the JavaScript Instrumentation subtab if it is not already selected.
4. Scroll down to the Instrument your HTML pages with the AppDynamics JavaScript Agent panel.

#### To inject the JavaScript Agent for Web EUM

1. Click **Download the JavaScript Agent**.
2. Click **Save to File** to save it.  
The name of the saved file should be "adrum.js".  
Save it where you save other assets, such as images, CSS files, for the page into which you are injecting.  
If you have a single code base hosting multiple domains, you need to host `adrum.js` in each domain.
3. To include the JavaScript Agent for EUM in your page, copy the line in the text field in the second step and paste it into the header, right after the `<head>` tag, of the pages that you want to monitor.  
You will get EUM metrics for all pages in which you include this line. If you later decide that you do not want metrics for the page, remove the line.
4. Click **Save** in the configuration screen.

Instrument your HTML pages with the AppDynamics JavaScript Agent

- 1 Download the JavaScript Agent
- 2 Include this line in your pages immediately after the `<head>` tag:

```
<script>>window["adrum-start-time"] = new Date().getTime();</script><script src="/adrum.js"></script>
```

This inclusion is highly preferable, for convenience, accuracy, and maintenance, to copying the entire JavaScript agent into your web pages inline.

**i** The JavaScript for EUM Agent is named `adrum.js`. This script asynchronously invokes another script called `adrum-ext`, which performs most of the EUM logic. The `adrum-ext` script is hosted on Amazon CDN, but you have the option of hosting it at another location. See [Alternate Location for the JavaScript for EUM Agent](#) for information about configuring this option.

#### Learn More

- [Set Up and Configure Web EUM](#)
- [Set Up Your Application for Web EUM](#)
- [Options in Using Manual Injection for the EUM JavaScript Agent](#)
- [Automatic Injection](#)
- [Assisted Injection-Using Injection Rules - Java Only](#)
- [Assisted Injection-Using Attribute Injection](#)

#### Options in Using Manual Injection for the EUM JavaScript Agent

- [Using a Single JavaScript Agent for Multiple Applications](#)
- [Using a Hosted Version of the JavaScript Agent](#)
- [Learn More](#)

Sometimes the standard manual injection scenario is not appropriate for your installation. Use the following options to customize the process for your needs.

#### ***Using a Single JavaScript Agent for Multiple Applications***

To use the same copy of the JavaScript agent for EUM (`adrum.js`) to cover multiple applications, you need to specify the app key for each application by setting up a variable in a small script that precedes the agent script. This is necessary because by default the application key is embedded in the agent script.

To set this up:

1. Download the JavaScript agent for EUM. See [Download and Include the Agent](#) for general instructions on downloading and including the JavaScript agent for EUM using manual injection.
2. For each of your apps, add a line to the "start-time" script, shown in the red box below, to the header of each page right after the `<head>` tag, **before** the entry that includes the location of the

agent (adrum.js):

```
window["adrum-app-key"] = "<app-key-for-this-app>;
```

The app key for each of your apps is displayed in the relevant EUM configuration screen under **Advanced->Customize your Deployment**.



After you include the variable line, the start-time line and the agent, the `<head>` section in your EUM-monitored web pages should resemble the following example, although your app key will naturally be different for every app:

```
<head>
<script>
window["adrum-app-key"] = "AD-AAB-AA-AFB";
window["adrum-start-time"] = new Date().getTime();
</script>
<script src="/adrum.js"></script>
. . .
. . .
</head>
```

#### Using a Hosted Version of the JavaScript Agent

AppDynamics maintains a hosted copy of the latest version of the main JavaScript agent file, `adrum.js`, on Amazon CDN. The file is located at

```
http://de8of677fyt0b.cloudfront.net/adrum/adrum-latest.js
```

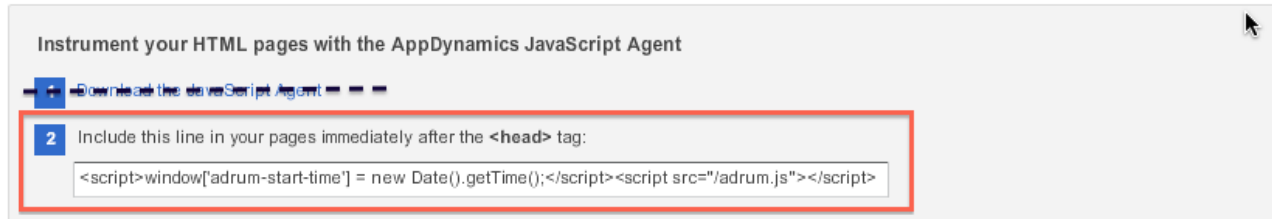
Previous versions of the agent can be found at

```
http://de8of677fyt0b.cloudfront.net/adrum/adrum-VERSION.js
```

where `VERSION` is the version number (for example, 3.7.16.0) you want to access.

To use the hosted version of the JavaScript agent instead of one located on your local system:

1. Open the JavaScript Instrumentation tab.
2. You do *not* need to download the JavaScript agent.



3. Add a line in the script, shown in the red box above, indicating your app key. The script must be in the header of the page directly after the `<head>` tag. This entry must be **before** the entry that includes the location of the agent (`adrum.js`). You **must** specify the app key if you are using the hosted script:

```
window["adrum-app-key"] = "<app-key-for-this-app>";
```

Your app key is displayed under **Advanced->Customize your Deployment**.

4. Optional: If you want to use a custom geo-server with the hosted version of the script, you also need to add a line defining the custom geo URL:

```
window["adrum-geo-resolver-url"] = "<the URL, including the context  
root, of your custom geo-server>";
```

For more information on using a custom geo-server, see [Use a Custom Geo Server For Web EUM](#).

5. Edit the path for `adrum.js` to point to the hosted location on Amazon:

```
<script  
src="http://de8of677fyt0b.cloudfront.net/adrum/adrum-latest.js">
```

After you include the app key, the start-time line, the custom geo-server URL (optional), and the agent URL, the `<head>` section in your EUM-monitored web page should resemble the following example, although your details will be somewhat different:

```
<head>
<script>
window["adrum-app-key"] = "AD-AAB-AUM";
window["adrum-start-time"] = new Date().getTime();
window["adrum-geo-resolver-url"]="https://mygeo.acme.com/geo";
</script>
<script
src="http://de8of677fyt0b.cloudfront.net/adrum/adrum-latest.js">
. . .
. . .
</head>
```

**Learn More**

- [Manual Injection](#)
- [Customizing the JavaScript Agent](#)

**Customizing the JavaScript Agent**

The JavaScript agent works correctly out of the box for most situations. If you are using manual injection, however, it is possible to customize `adrum.js` in specific situations.

- [Add Information to a Browser Snapshot](#): Use this option to add application specific user data in the form of key/value pairs to browser snapshots.
- [Set Custom Page Names with JavaScript](#): Use this option to set a page name not based on the page URL
- [Handle the window.onerror Event](#): Use this option if your pages set the JavaScript `window.onerror` event
- [Disable Web EUM Programmatically](#): Use this option to temporarily disable data collection on one or more pages
- [Set the Exact Current Domain in the JavaScript Agent Cookie](#): Use this option to have the agent use the exact current domain when it writes its one cookie.

**Add Information to a Browser Snapshot**

- [Add User Data](#)
  - [Filter by User Data](#)
- [Modify User Data Size Limit](#)

You can add user information that is specific to your application to a browser snapshot. The information is expressed as key value pairs. The information appears in the User Data section of the snapshot.



You should wrap any code you add with a test, in case the JS Agent is turned off for any reason. For example:



```

<!--Adding data to the AppDynamics snapshot -->
<script>
if (ADRUM)
    { ADRUM.command ("addUserData", <key>, <value>); }
</script>

```

## Add User Data

To add user data, add the following script to the pages for which you want the additional data to appear in the browser snapshots.

```

<script>
ADRUM.command ("addUserData", <key>, <value>);
</script>

```

The results appear in the browser snapshot in the User Data panel.

For example:

```

<script>
ADRUM.command ("addUserData", customer_id, getCustomerID());
</script>

```

might display in the User Data section:

**customer\_id 6005**

```

<script>
ADRUM.command ("addUserData", movieTitle, getMovie(customerID);
</script>

```

might display in the User Data section:

**movieTitle The Matrix**

## Filter by User Data

You can filter browser snapshots based on user data in the Advanced section of the browser snapshot filter:

▼ Advanced

|                            |            |  |
|----------------------------|------------|--|
| URL                        | Contains ▼ |  |
| Page Title                 | Contains ▼ |  |
| Page Type                  | Contains ▼ |  |
| Error                      | Contains ▼ |  |
| AJAX Error Code            | Contains ▼ |  |
| Page Referrer              | Contains ▼ |  |
| IP                         | Contains ▼ |  |
| Base Page GUID             | Contains ▼ |  |
| Parent GUID                | Contains ▼ |  |
| Client Request GUID        | Contains ▼ |  |
| Other Client Request GUIDs | Contains ▼ |  |
| User Data                  | Contains ▼ |  |

#### Modify User Data Size Limit

The maximum size of all user data in a page is 100 bytes, unless you increase the limit using `setMaxBeaconLength()`.

```
<script>
ADRUM.command ("setMaxBeaconLength", nbytes);
</script>
```

You can set the user data size as high as 2000 bytes. Some browsers will not send packets larger than this, so increasing this value may cause data to be dropped.

If you modify the user data size, the amount of space allocated to all user data fields scales uniformly relative to their default sizes.

#### Set Custom Page Names with JavaScript

In the AppDynamics console, you can configure the names of pages, iframes and Ajax requests based on various parts of the page URL. See [Configure Page Identification and Naming](#).

To use any arbitrary string, not necessarily a part of the URL, to name a page or an iframe, (but not an Ajax request) add the `setPageName` method to the page that you want to name. For example, for a page named "My Page" use:

```
<script>
ADRUM.command ("setPageName", "My Page")
</script>
```

The default page name is the DOM document title.

#### Handle the `window.onerror` Event

If any script on your monitored Web pages, including library code, sets the JavaScript `window.onerror` event, add the following method to the page immediately after setting `window.onerror`:

```
<script>
ADRUM.listenForErrors()
</script>
```

The JavaScript agent for EUM (ADRUM) sets `window.onerror` to listen for uncaught JavaScript errors. If this listener is overwritten, errors will not be reported.

ADRUM will invoke your original `onerror` handler.

#### ***Disable Web EUM Programmatically***

For pages in which the JavaScript agent was injected manually, you can disable the agent programmatically by adding a script to the header..

To disable Web EUM add the

```
window["adrum-disable"] = true
```

script before `adrum.js` agent is injected.

For example:

```
<head>
// before adrum.js
<script>window["adrum-disable"] = true</script>
// adrum.js injection
<script>window["adrum-start-time"] = new
Date().getTime();</script><script src="/adrum.js"></script>
```

Old EUM data is preserved but no new EUM data is collected while the agent is disabled.

You can re-enable Web EUM by removing the disable script.

#### ***Set the Exact Current Domain in the JavaScript Agent Cookie***

The JavaScript agent itself writes a single cookie to the page, for timing purposes. This cookie is set when the user clicks a link and the `unload` event is fired. By default the cookie is set to the broadest possible version of the originating domain (e.g. `*.domain.com`) to increase the likelihood that the next page opened in the same domain can access that cookie. For more on how EUM uses cookies, see [More on Cookies and EUM Data](#).

In some cases, however, it may be necessary to limit the cookie to the full exact domain name. To do this, add a flag in the "adrum-start-time" script to the header of each page right after the `<head>` tag and **before** the entry that includes the location of the agent (`adrum.js`). The flag should read: `window["adrum-use-strict-domain-cookies"] = true`.

After you include the start-time line, the strict domain flag, and the agent, the <head> section in your EUM-monitored web pages should look something like this:

```
<head>
<script>
window["adrum-start-time"] = new Date().getTime();
window["adrum-use-strict-domain-cookies"] = true;
</script>
<script src="/adrum.js"></script>
. . .
. . .
</head>
```

### Automatic Injection

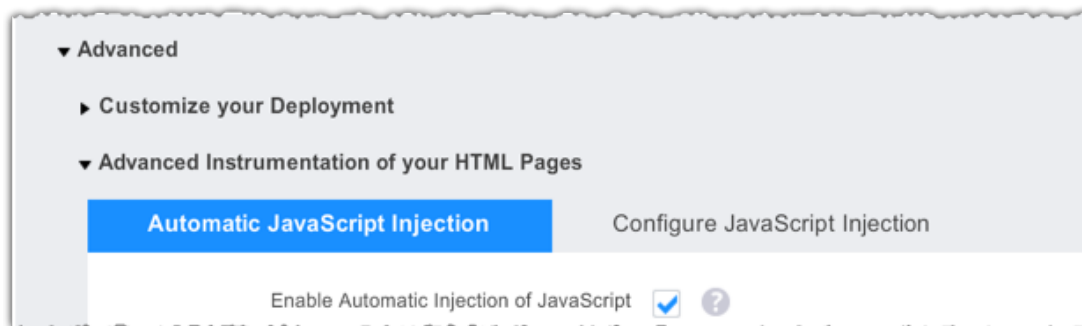
- [Access the Automatic Injection Configuration Panel](#)
- [Enable Automatic Injection](#)
  - [Set Attribute to Enable Automatic Injection for .NET](#)
- [Configure Automatic Injection](#)
  - [To Specify Business Transactions for Automatic Injection](#)
  - [To Create Match Rules for Automatic Injection](#)
- [Learn More](#)

Automatic injection uses AppDynamics server-side agents to automatically add the adrum header and footer to each of your instrumented web pages.

Automatic injection is available only for applications built on a Jasper-supported JSP (Java) or ASP.NET or ASPX (.NET) framework.

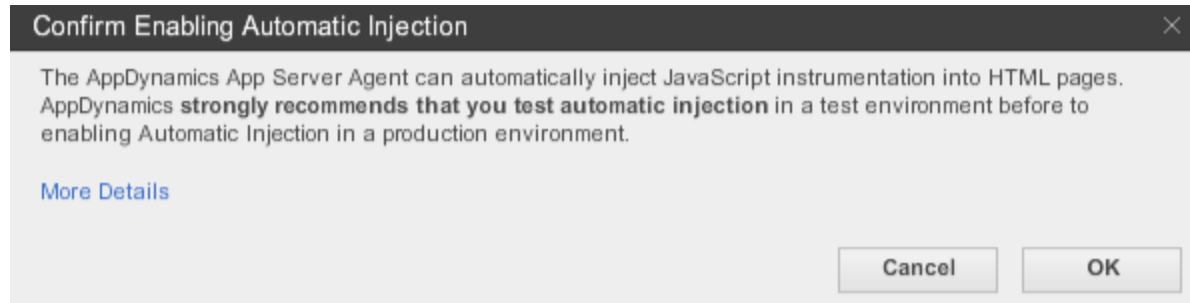
#### Access the Automatic Injection Configuration Panel

1. In the left navigation menu, click **Configure -> Instrumentation**.
2. Click the End User Experience tab.
3. Click the Web JavaScript Instrumentation tab if it is not already selected.
4. Scroll down to the Advanced panel and expand it if it is closed.
5. Expand **Advanced Instrumentation of your HTML Pages** if it is closed.
6. Click the Automatic JavaScript Injection tab if it is not already selected.



#### Enable Automatic Injection

1. In the Automatic JavaScript Injection tab, check or clear Enable Automatic Injection of JavaScript.
2. If you enabled automatic injection click **OK** to confirm your action.



#### ***Set Attribute to Enable Automatic Injection for .NET***

To perform automatic injection for .NET, the AppDynamics app agent detects the <head> element in the aspx page. This should be part of either the master page or the aspx page.

The <head> element must have the 'runat="server"' attribute set for automatic injection to work.

```
<head runat="server">
```

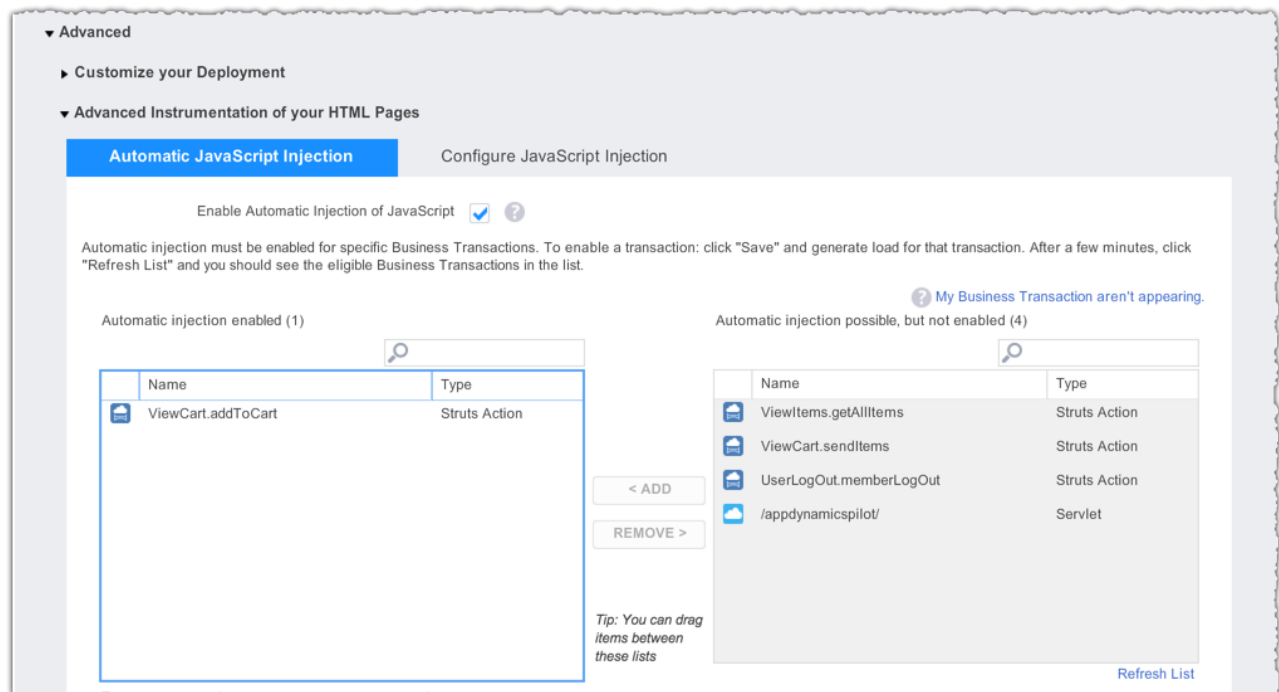
#### **Configure Automatic Injection**

After you have enabled automatic injection:

- You must specify the business transactions for which automatic JavaScript injection is enabled.
- You can limit which pages to inject, by creating custom match and exclude rules for automatic injection. If you do not configure these rules, by default AppDynamics injects all pages visited by the enabled business transactions.

Use these rules to fine-tune which business transactions to include or exclude from injection based on match criteria. For example, you can exclude all business transactions that have a certain string in their URLs or set a certain cookie. The configurations for include rules and exclude rules are similar. It depends on your situation whether it is more convenient to restrict transactions based on inclusion or exclusion.

#### ***To Specify Business Transactions for Automatic Injection***



You must select at least one business transaction for automatic injection.

1. From the list on the right, select business transaction. Not all your business transactions may appear here - the list includes only those transactions that AppDynamics can parse for automatic injection, those based on Jasper-compiled JSPs or .Net ASP or ASPX pages.
2. Click **< Add** to move the business transaction to the list on the left.
3. Repeat until all the transactions you wish to enable are on the left and those you do not wish to enable are on the right.
4. Click **Save**.

#### To Create Match Rules for Automatic Injection

You may not wish to instrument every page in your application. For example, if your application has a very large number of pages, you might want to instrument only the key ones for your business, to avoid hitting licensing limits. Or when you are in the set up and test phase, you might only want to instrument a few pages to keep your initial sample manageable.

Use match rules to include or exclude certain pages

1. Expand **Only enable Automatic Injection for certain Pages** if it is closed.

▼ Only enable Automatic Injection for certain Pages

### Request Match Rules

Only inject into these Pages (if empty, inject into all Pages)

+ / - 🔍

| Name                               |
|------------------------------------|
| Requests with: URI Equals checkout |

### Request Exclude Rules

Never inject into these pages

+ / - 🔍

| Name |
|------|
|------|

2. Click the plus icon to create a match rule or an exclude rule. The create screen appears.

### Create HTTP Request Match Rule

Match Criteria

☐ Method GET

☒ URI NOT ( Equals login )

☐ HTTP Parameter (Both GET query parameters and POST parameters can be used)

☐ Header

☐ Hostname

☐ Port

☐ Class Name

☐ Servlet Name

☐ Cookie

Check for parameter value

Parameter Name

Value Equals

Check for parameter value

Parameter Name

Value Equals

Equals

Equals

Equals

Equals

Check for cookie existence

Cookie Name

☒ NOT Condition

Selecting this will reverse the condition and return true if NOT (condition)

Cancel Save

3. Select one or more criteria to match. If you select multiple criteria, **all** must match for the rule to come into effect. Use the gear icon to set a NOT condition.

See [Match Rule Conditions](#) for general information about match rules.

c. Click **Save**.

5. Click **Save** in the outer configuration screen.

You can later edit or remove a match rule by selecting it in the list and clicking the edit or delete icon.

### Learn More

- [Set Up and Configure Web EUM](#)
- [Set Up Your Application for Web EUM](#)
- [Manual Injection](#)
- [Assisted Injection-Using Injection Rules - Java Only](#)
- [Assisted Injection-Using Attribute Injection](#)

### Assisted Injection-Using Injection Rules - Java Only

- [Access the JavaScript Injection Configuration Panel](#)
- [Create JavaScript Injection Rules](#)
  - [Define Business Transactions to Instrument](#)
  - [Create the Rule](#)
- [Learn More](#)

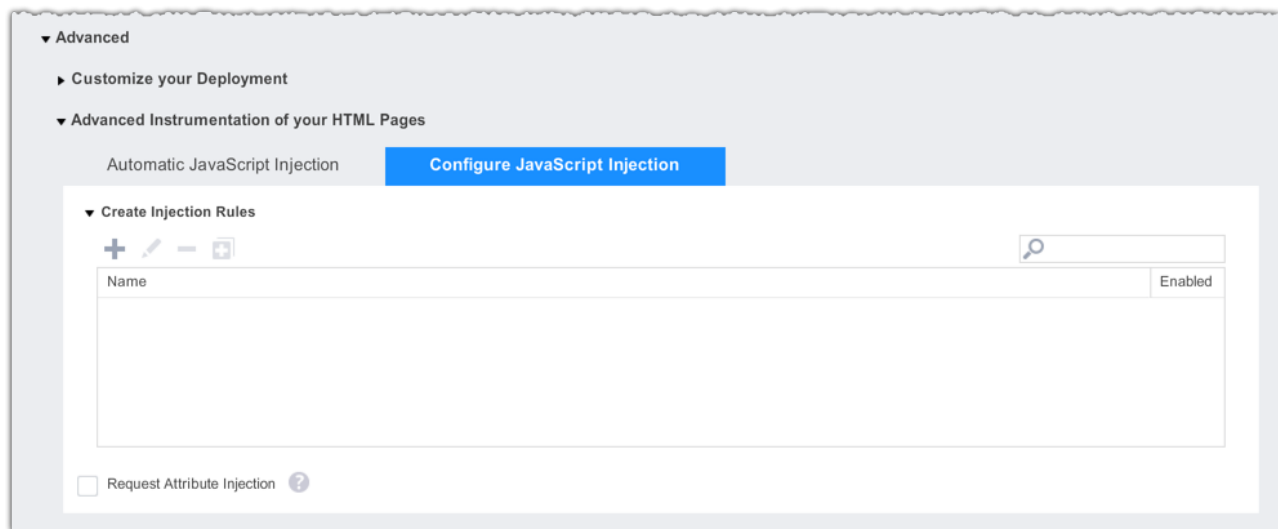
To use assisted injection of the JavaScript agent using injection rules, you define rules to configure:

- the Java classes and methods that should be intercepted
- the Java writer object and method to use to add the agent to the response object

Assisted injection is available for Java frameworks only.

### Access the JavaScript Injection Configuration Panel

1. In the left navigation menu, click **Configure -> Instrumentation**.
2. Click the End User Experience tab.
3. Click the Web JavaScript Instrumentation tab if it is not already selected.
4. Scroll down to the Advanced panel and expand it if it is closed.
5. Expand **Advanced Instrumentation of your HTML Pages** if it is closed.
6. Click the Configure JavaScript Injection tab if it is not already selected.



### Create JavaScript Injection Rules

1. In the Configure JavaScript Injection tab, expand **Create Injection Rules** if it is closed.
2. Click the plus icon.



The Create Injection Rule screen is displayed.

**Create Manual Injection Rule**

Name:

Enabled: ☒

Where to Inject JavaScript: **Inject for these Business Transaction**

Class and method to intercept ?

Class:  equals

Method Name:  ☐ Is this Method Overloaded?

Method Parameters (optional)

[Add Parameter](#)

Pointer to the writer ?

Object containing the writer: ☒ Method Parameter @ Index:

☐ Return Value

☐ Invoked Object

Use Getter Chain:   
for example: `getResponse().getWriter()`  
[more help](#)

Injection options ?

Output Stream Write Method:  ?

Inject on: ☐ method begin ☒ method end

Inject: ☐ eum header ☒ eum footer

Prefix:

[Cancel](#) [Create Injection Rule](#)

3. Click the Where to Inject JavaScript tab.

4. In the Name field, enter a name for the rule and check Enable to enable it.

6. In the Class and Method to intercept section, define match conditions for the class and method that write to the output stream in your application. This is the class that AppDynamics intercepts for injection.

7. If the write method is overloaded

- a. check the Is this Method Overloaded? check box.
- b. click **Add Parameter**.
- c. add the parameters that define the method.

8. In the Pointer to the writer section, select how to obtain a reference to the writer object from the selected method.

9. In the Injection options section, specify:

- the output stream write method AppDynamics should use to inject the agent
- when the injection should occur: when the method begins or when the method ends
- which part of the script should be injected - the header or the footer

- optional prefix to output before writing the header or footer, such as <DOCTYPE. . . >

### Define Business Transactions to Instrument

Optionally you can limit the business transactions for which the rule is enabled. By default the rule is enabled for all business transactions. To enable it for specific business transactions only:

1. Click the Inject for these Business Transactions tab.

**Create Manual Injection Rule**

Name:

Enabled: ☒

**Where to Inject JavaScript** | **Inject for these Business Transaction**

This Injection Rule will be enabled for the selected Business Transactions

☐ All Business Transactions

☒ These Business Transactions:

Selected Business Transactions (1)

| Name               | Type          |
|--------------------|---------------|
| ViewCart.addToCart | Struts Action |

< ADD

REMOVE >

Other Business Transactions (6)

| Name                      | Type          |
|---------------------------|---------------|
| ViewItems.getAllItems     | Struts Action |
| ViewCart.sendItems        | Struts Action |
| UserLogout.memberLogout   | Struts Action |
| UserLogin.memberLogin     | Struts Action |
| /appdynamicspilot/        | Servlet       |
| /appdynamicspilot/WEB-INF | Servlet       |

Tip: You can drag items between these lists

Refresh List

Cancel Create Injection Rule

2. Select These Business Transactions.
3. Specify the business transactions for which the injection rule is enabled by moving them from the Other Business Transactions list to the Selected Business Transactions list.
4. Specify the business transactions for which the injection rule is disabled by moving them to (or leaving them in) the Other Business Transactions list.

### Create the Rule

1. Click **Create Injection rule**.
2. Click **Save**

[Learn More](#)

- [Set Up and Configure Web EUM](#)
- [Set Up Your Application for Web EUM](#)
- [Manual Injection](#)
- [Automatic Injection](#)
- [Assisted Injection-Using Attribute Injection](#)

#### Assisted Injection-Using Attribute Injection

- [Copy Code Snippets into Your Page Template](#)
- [Learn More](#)

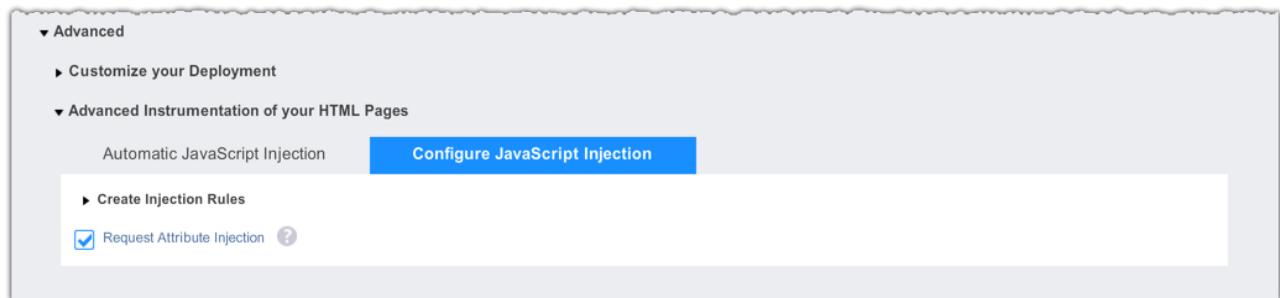
To use assisted injection of the JavaScript agent using attribute injection, you:

- Enable attribute injection in AppDynamics
- Copy code snippets into your page template

**i** Not all frameworks support attribute injection. See the **Script Injection** columns in the [Supported Platform Matrix for Web EUM](#) matrices to check if you can use this method.

### Access the JavaScript Injection Configuration Panel

1. In the left navigation menu, click **Configure -> Instrumentation**.
2. Click the End User Experience tab.
3. Click the Web JavaScript Instrumentation tab if it is not already selected.
4. Scroll down to the Advanced panel and expand it if it is closed.
5. Expand **Advanced Instrumentation of your HTML Pages** if it is closed.
6. Click the Configure JavaScript Injection tab if it is not already selected.



7. Check Request Attribute Injection.

8. Click **Save**.

#### Copy Code Snippets into Your Page Template

The following examples show code snippets that can be copied directly into your page templates or other code creating your page. These code snippets tell the app agent where to inject information. The header value must be injected at the very top of the <head> section and the footer value must be added at the very end of the code creating the page.

**i** If you have already injected the header portion of the agent using manual injection, you can use these code snippets to automatically inject the footer data portion only. In this case, add only the JS\_FOOTER values:

JSF

```
<h:outputText rendered="#{AppDynamics_JS_HEADER != null}"
value='#{request.getAttribute("AppDynamics_JS_HEADER")}' escape="false"/>
<h:outputText rendered="#{AppDynamics_JS_FOOTER != null}"
value='#{request.getAttribute("AppDynamics_JS_FOOTER")}' escape="false"/>
```

## JSP

```
<% if (request.getAttribute("AppDynamics_JS_HEADER") != null) { %>
<%=request.getAttribute("AppDynamics_JS_HEADER")%> <% } %>
<% if (request.getAttribute("AppDynamics_JS_FOOTER") != null) { %>
<%=request.getAttribute("AppDynamics_JS_FOOTER")%> <% } %>
```

## Servlet

```
if (request.getAttribute("AppDynamics_JS_HEADER") != null)
{
    out.write(request.getAttribute("AppDynamics_JS_HEADER").toString());
}
if (request.getAttribute("AppDynamics_JS_FOOTER") != null)
{
    out.write(request.getAttribute("AppDynamics_JS_FOOTER").toString());
}
```

## Groovy

```
<g:if test="${AppDynamics_JS_HEADER}">
    ${AppDynamics_JS_HEADER}
</g:if>

<g:if test="${AppDynamics_JS_FOOTER}">
    ${AppDynamics_JS_FOOTER}
</g:if>
```

## Velocity Template

```
#if ($AppDynamics_JS_HEADER)
    $AppDynamics_JS_HEADER
#end
#if ($AppDynamics_JS_FOOTER)
    $AppDynamics_JS_FOOTER
#end
```

## ASP.NET

```
<% if (Context.Items.Contains("AppDynamics_JS_HEADER"))
    Response.Write(Context.Items["AppDynamics_JS_HEADER"]); %>
<% if (Context.Items.Contains("AppDynamics_JS_FOOTER"))
    Response.Write(Context.Items["AppDynamics_JS_FOOTER"]); %>
```

## MVC Razor

```
@if(HttpContext.Current.Items.Contains("AppDynamics_JS_HEADER")
{ @Html.Raw((string)HttpContext.Current.Items["AppDynamics_JS_HEADER"]) }
@if(HttpContext.Current.Items.Contains("AppDynamics_JS_FOOTER") )
{ @Html.Raw(HttpContext.Current.Items["AppDynamics_JS_FOOTER"].ToString()) }
```

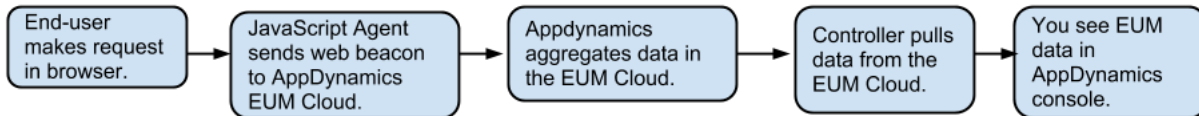
### Learn More

- [Set Up and Configure Web EUM](#)
- [Set Up Your Application for Web EUM](#)
- [Manual Injection](#)
- [Automatic Injection](#)
- [Assisted Injection-Using Injection Rules - Java Only](#)

## Check Web EUM Configuration Issues

- [License Problems](#)
  - [You do not have a EUM license key](#)
  - [EUM works correctly in test environment, but problems arise on moving to Production](#)
- [Web EUM Metrics Not Reported](#)
- [Connection Problems](#)
  - [To verify connectivity](#)
  - [Unblocking a Firewall](#)
    - [To use a forward proxy](#)
  - [Verifying the Keystore Entries](#)
    - [To verify the keystore](#)
- [Injection Problems](#)
  - [To verify that the JavaScript Agent for Web EUM was injected](#)
  - [To change an injection strategy](#)
- [Some Pages Not Monitored](#)
- [Errors Not Reported](#)
- [Browser Snapshot Problems](#)
  - [No Browser Snapshots](#)
  - [No Correlation between Browser Snapshots and Business Transactions](#)
  - [No Transaction Snapshots Associated with Browser Snapshots](#)
  - [Not Getting Full Timing Data for Business Transactions Associated with Browser Snapshots](#)

This document will guide you through troubleshooting common issues in the setup of your Web EUM product. But first it may be useful to visualize the end to end flow of data:



If you do not see the EUM data that you expect, use these suggestions to try to correct the problem.

### License Problems

**You do not have a EUM license key**

The EUM license is separate from the Controller license.

Call your AppDynamics sales representative or email [salesops@appdynamics.com](mailto:salesops@appdynamics.com) to obtain an Web EUM license key for your AppDynamics account.

The EUM license key is included as part of the overall license file, but the license itself is still a separate item that is provisioned separately.

Controllers cannot share an EUM license key, but applications can.

**EUM works correctly in test environment, but problems arise on moving to Production**

If you are running more than one Controller, each instance requires its own license. Make sure you are not trying to use the same license on more than one Controller.

### Web EUM Metrics Not Reported

These steps provide a high-level overview to checking your Web EUM setup.

1. Make sure there is load running on your app for the pages that you want to monitor for the selected time period.

**Tip:** When Web EUM discovers a new page, iframe, or Ajax call for the first time there will be a several minute delay before data for it appears in the product.

After the agent is first injected into a page by any of the injection techniques, it takes up to two or three minutes for the agent to register with the Controller. No metrics are captured during this time.

After the page is registered and traffic starts flowing, it can take an additional two or three minutes for the metrics to appear in the AppDynamics console.

In summary, the very first time the JavaScript agent accesses a page, it can take as long as 6 minutes for the metrics to appear because of the initial registration.

Subsequently, the delay between an end-user click and the appearance of Web EUM data is two to three minutes.

2. Make sure that Web EUM is enabled for the app. Enable EUM if it is disabled.

See [Enable and Disable Web EUM](#).

3. Examine the source of your web page to ensure that the pages that you want to monitor are instrumented.

See [To verify that the JavaScript Agent for WebEUM was injected.](#)

4. Make sure there is connectivity from the browser to the EUM cloud. See [Connection Problems](#) for information about troubleshooting connectivity.

5. Examine your instrumented application to verify that:

- the JavaScript agent extension (adrum.ext) is loaded and its status is OK (200).
- the EUM beacon (adrum.gif) is loaded and its status is OK (200).
- the `ky` parameter in the beacon is set to your application key.

You can use the Developer Tools for your web browser to examine your application. The Network tab shows the agent extension and status.

| Name         | Path  | Method | Status | Text | Type      | Initiator              | Size    | Content | Time | Latency |
|--------------|---|--------|--------|------|-----------|------------------------|---------|---------|------|---------|
| Button click | /appdynamicspilot/images                          | GET    | 200    | OK   | Image     | demo4.appdynamics.c... | 1007 B  | 74 ms   |      |         |
| adrum-ext    | adrum-ext.af6b4e503c0a36b4f0a6f40de80f677fyt0b... | GET    | 200    | OK   | Script    | demo4.appdynamics.c... | 15.0 KB | 301 ms  |      |         |
| adrum.gif    | adrum.gif?ky=AD-AAB-AAA-AFN&vr=2                  |        |        |      | image/gif | adrum-ext.af6b4e503... | 202 B   | 84 ms   |      |         |

**Tip:** Access to the Developer tools is different on different browsers.

On Chrome use **View->Developer->Developer Tools**.

On Safari use **Develop->Show Web Inspector**.

On Firefox use **Tools->Web Developer**.

If the adrum-ext agent extension file or the adrum-gif file from the web beacon are not present or the status is not valid, verify your EUM configuration. See [Set Up and Configure Web EUM](#).

### Connection Problems

If your browser cannot connect to the AppDynamics EUM cloud and you use an on-premise controller it is possible that:

- you have no Internet connectivity.
- a firewall is blocking the port.
- the keystore does not trust the cert.

#### To verify connectivity

Run the following command from your browser:

```
https://agg.eum-appdynamics.com/eumaggregator/ping
```

If you get a "ping" in the window, you should be able to connect to the EUM cloud.

**i** If you are using IE on a Windows system, make sure the browser itself does not have a proxy (with authentication) set up. If it does, the test link may work but not the actual connection.

Make sure you have also unblocked any firewalls and verified the keystore entries as described below. If you are still having issues, contact AppDynamics Support.

### Unblocking a Firewall

The controller needs to be able to use HTTP over SSL (HTTPS) on port 443 to reach the EUM cloud aggregator at `agg.eum-appdynamics.com`.

If your controller is behind a firewall, you can either open your controller's firewall or use a forward proxy.

To open the firewall, see the instructions specific to your firewall.

**i** You only need to open the firewall for the specific host and port (`agg.eum-appdynamics.com` on 443), not for the entire `*.eum-appdynamics.com` domain.

#### **To use a forward proxy**

1. Set up an HTTP proxy to `https://agg.eum-appdynamics.com`.

**i** This is a cleartext/pass-through proxy. Authentication is not supported on the first level. If the client network itself requires authentication you must set up an intermediate proxy between your controller and this proxy to pass on the credentials you need to get out of your network.

2. Configure the HTTP proxy host and port in the `<Controller-Installation-Directory>/appserver/glassfish/domains/domain1/config/domain.xml` file.

See [Configure Controller HTTP Proxy Settings](#) for details about configuring the proxy.

3. Restart the controller's app server.

### Verifying the Keystore Entries

You need a valid trusted cert entry for the EUM aggregator and a private key entry for the Glassfish server instance underlying the controller.

#### **To verify the keystore**

1. Open a command prompt in the controller's glassfish directory, `<AppDynamics_install_dir>/appserver/glassfish`

2. Run the keytool command:

```
keytool -list -keystore keystore.jks
```

2. Enter the keystore password.

Your keystore entries are displayed.

Your keystore should include a trusted certificate entry for "agg\_appdynamics" and private key entries for "eum\_client" and "glassfish-instance" that look something like this:



```
agg_appdynamics, Mar 18, 2013, trustedCertEntry,
Certificate fingerprint (MD5):
92:A7:19:E0:AF:07:C6:2E:91:6B:D6:47:5C:AD:B3:C7
glassfish-instance, Jul 11, 2012, PrivateKeyEntry,
Certificate fingerprint (MD5):
BE:DE:57:FF:BC:E2:32:AA:85:4C:4C:BD:6F:BC:EC:DE
```

If you do not have these entries, you need to create the certificate. Contact your System Administrator or AppDynamics Support for information on how to do this.

## Injection Problems

The JavaScript Agent for Web EUM must be injected into every page that you want to monitor for EUM data.

### *To verify that the JavaScript Agent for Web EUM was injected*

View the source of your web page. When automatic or assisted injection is used, you should see the script for the JavaScript Agent for EUM inline in the web page. The actual version details of the script may vary, but the first few lines of the agent look like this:

```
/* Version af6b4e503c0a36abfd0a6f40adfff744 #2013-05-10_21-23-25 r03d8e7dcc6774bc4dbf27184b8336764e3c4e038 229 */(function(){var
e=!0,h=null,j=!1;
if(!(window.ADRUM||window["adrum-disable"]===e)){window["adrum-start-time"]=window["adrum-start-time"]||(new Date).getTime();var
k="https:"===document.location.protocol;window.ADRUM={beaconUriHttp:"http://col.eum-appdynamics.com",beaconUriHttps:"https://col.eum-
appdynamics.com",appKey:window["adrum-app-key"]||"AD-AAB-AAA-
```

When manual injection is used, you will see:

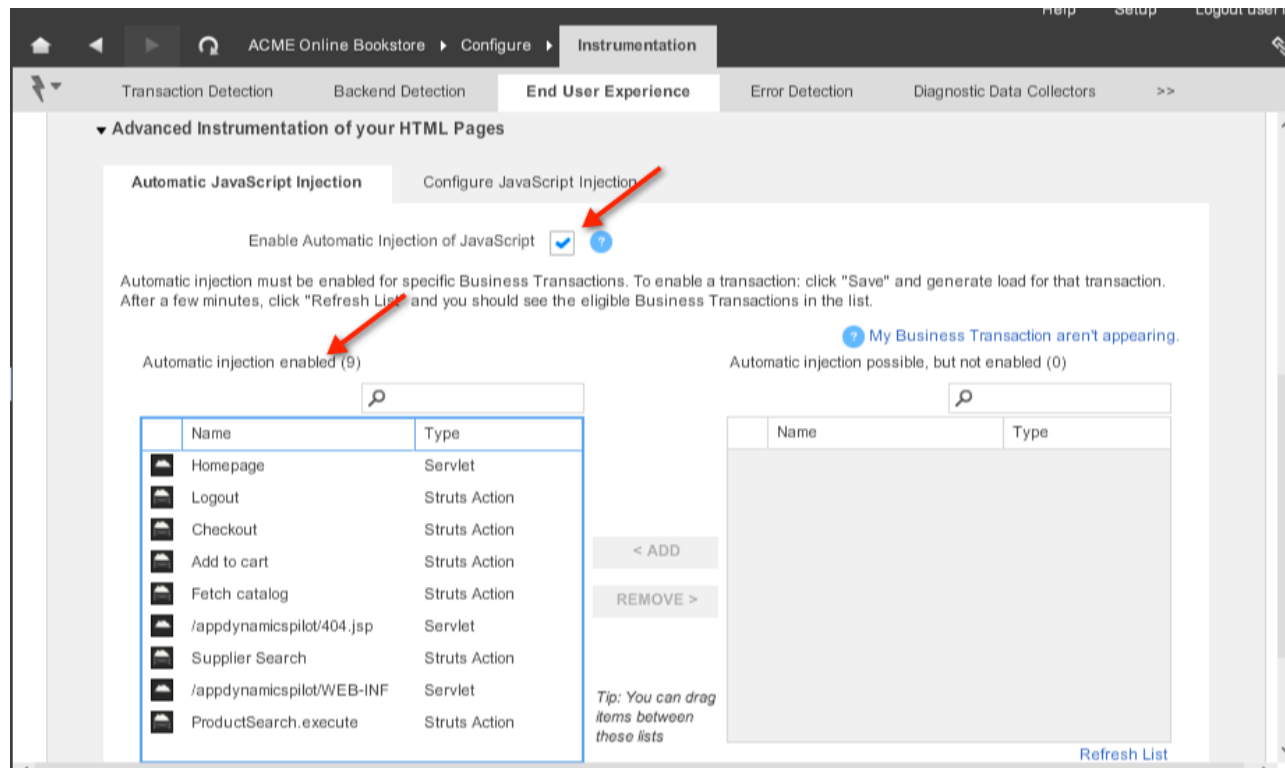
```
<script src="/path_to_adrum.js"/>
```

If the agent is not there:

1. If you used manual injection, use the normal procedures that you use to verify other types of code changes in your web pages. Keep in mind that various caches, such as the server page, CDN or browser caches, can prevent the page from actually being reloaded. If you cannot get manual injection to work, try one of the other injection schemes if they are available for your platform. See [Set Up Your Application for Web EUM](#) for information about the various injection strategies.

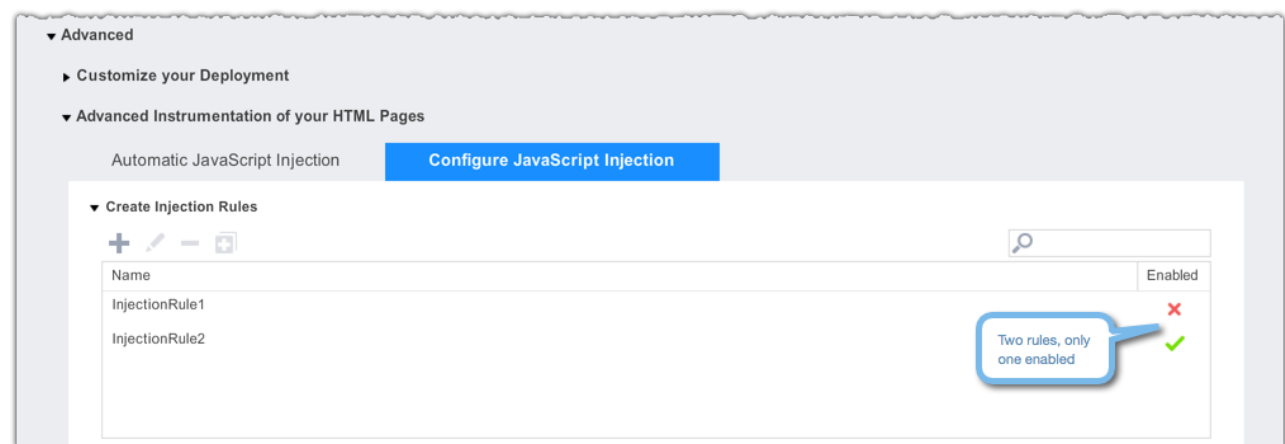
2. If you used automatic injection, verify that the Enable Automatic injection of JavaScript checkbox is checked in the configuration. Click **Configure->Instrumentation->End User Experience->Web JavaScript Instrumentation->Advanced->Advanced Instrumentation of your HTML Pages->Automatic JavaScript Injection**.

Also verify that automatic injection is enabled for all of the business transactions that you want to monitor. If some of those business transactions are in the **Automatic injection possible, but not enabled** list, move them to the **Automatic injection enabled** list. If the business transaction that you want to monitor does not appear in either list, automatic injection is not possible for that business transaction.



For applications built on .NET, automatic injection is available for ASP.NET and ASPX frameworks.

3. If you used assisted injection with injection rules for your Java application, verify that injection rules were created and that the injection rules were enabled. Click **Configure->Instrumentation->End User Experience->Web JavaScript Instrumentation->Advanced->Advanced Instrumentation of your HTML Pages->Configure JavaScript Injection** to see the list of rules and their enabled status. See [Assisted Injection-Using Injection Rules - Java Only](#) for information about creating and enabling injection rules.



### To change an injection strategy

If you try one way to inject the JavaScript Agent for Web EUM and it does not work, it is best to undo the current injection configuration before implementing another one.

- To undo automatic injection, clear the Enable Automatic Injection of JavaScript check box.
- To undo manual and assisted injection using attribute injection, manually delete the JavaScript Agent for Web EUM code from your web pages.
- To undo assisted injection using injection rules, clear the Enable check box for each injection rule in the injection rules list.

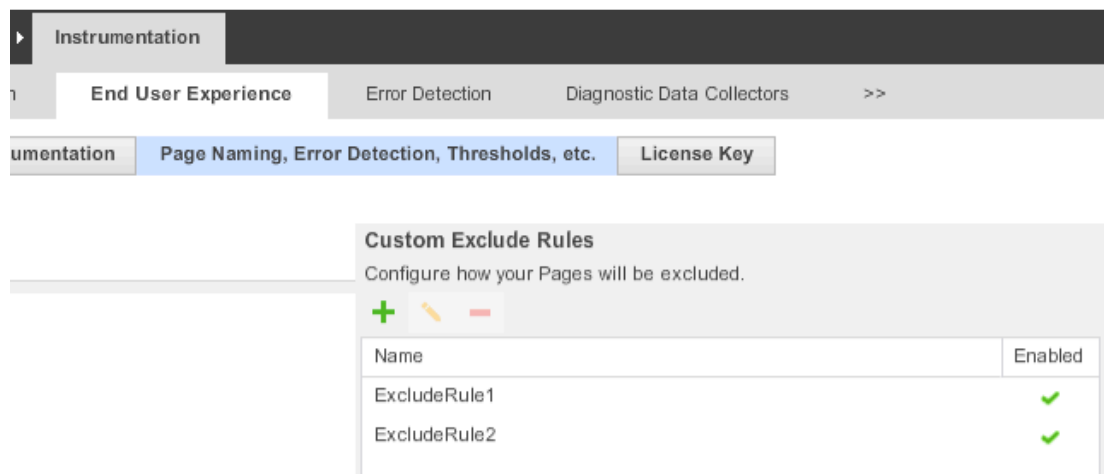
If multiple copies of the agent exist on a page, the second copy does not execute.

### Some Pages Not Monitored

If only some web pages are not reporting data, first verify that those pages have been injected with the JavaScript Agent for Web EUM. See [To verify that the JavaScript Agent for Web EUM was injected](#).

If the agent has been injected, the page may have been excluded from monitoring by custom exclude rules. You can check and modify these rules. To access custom exclude rules for pages:

1. In the left navigation pane click **Configure->Instrumentation**.
  2. Click the **End User Experience** subtab.
  3. Click the **Web Page Naming, Error Detection, Thresholds, etc.** sub-tab.
  4. Expand **Configure how Pages, Ajax Requests, and iframes will be named** if it is closed.
  5. Scroll down to the Custom Exclude Rules list.
- If there are any custom exclude rules, they are listed here.



6. To examine and/or modify a custom exclude rule select it in the list and click the Pencil icon. If you want to remove a custom exclude rule, select it in the list and click the Minus icon.

In addition, certain pages could have been excluded by the injection configuration. This can happen when automatic injection is used with a limited set of pages enabled for injection. If you used automatic injection, check your automatic injection configuration to see if the missing pages are enabled for injection. Examine the Request Match Rules and Request Exclude Rules lists under **Only enable Automatic Injection for certain Pages** in the Automatic JavaScript Injection tab. See [Automatic Injection](#). Pages can also be bypassed by assisted injection using injection rules, when an injection rule specifies only classes and methods to be injected. If you used

assisted injection with injection rules, check your injection rules. See [Assisted Injection-Using Injection Rules - Java Only](#).

### Errors Not Reported

It is possible that reporting is disabled or that certain JavaScript or Ajax errors that you would like to be reported as errors have been configured to be ignored. See [Configure JavaScript and Ajax Error Detection](#).

If another script on your monitored pages sets the JavaScript window.onerror event, this setting can interfere with EUM error capture. See [Handle the window.onerror Event](#) to learn how to catch those errors.

### Browser Snapshot Problems

#### No Browser Snapshots

If you do not see any browser snapshots, it is possible that browser snapshot collection has been disabled. If periodic collection and error collection and slow collection are all disabled, the agent does not collect any browser snapshots. See [Configure Browser Snapshot Collection](#).

Also check the thresholds for that define slow end user experience. AppDynamics collects browser snapshots only for slow-performing requests, so if the thresholds are set too high, no requests are flagged as slow. See [Configure EUM Browser Snapshot Thresholds](#).

#### No Correlation between Browser Snapshots and Business Transactions

You get server-side correlation with browser snapshots only if the business transactions associated with the browser snapshot are running on application servers instrumented with AppDynamics app agents. This could explain why you do not see any or do not see all of the business transactions that you expect to see. Check which of your servers are instrumented by app agents and which are not. You may need to get more AppDynamics app agent licenses to get correlation.

If the app servers are all instrumented with AppDynamics app agents, it is possible that the business transactions that you expect to see were not injected with the JavaScript Agent for Web EUM. This can happen when automatic injection is used with a limited set of business transactions enabled for injection. If you used automatic injection, check your automatic injection configuration to see if the missing business transactions are enabled for injection. See [To verify that the JavaScript Agent for WebEUM was injected](#) and [Automatic Injection](#). Business transactions can also be excluded with assisted injection using injection rules, when an injection rule specifies only certain business transactions to be injected. If you used assisted injection with injection rules, check your injection rules. See [Assisted Injection-Using Injection Rules - Java Only](#).

#### No Transaction Snapshots Associated with Browser Snapshots

Even if all your app servers are instrumented with AppDynamics app agents, it is possible that no associated transaction snapshots were captured at the time of the browser snapshot. For example, if no transactions were slow at the time of the browser snapshot, you probably will not see any transaction snapshots. See [Transaction Snapshots](#) for information about when transaction snapshots are captured. You can modify transaction snapshot capture. See [Configure Transaction Snapshots](#).

On the browser side, if a browser snapshot is associated with a transaction snapshot, you will see

it in the Transaction Snapshots section of the browser snapshots. See [Business Transactions in Browser Snapshots](#). On the server side, if a transaction snapshot is associated with a browser snapshot, you will see an EUM GUID in the ADDITIONAL DATA tab in the transaction snapshot. See [Transaction Snapshots](#).

#### Not Getting Full Timing Data for Business Transactions Associated with Browser Snapshots

To ensure full business transaction timing information, you need to inject the JavaScript Agent for EUM into the footer of your web pages. Manual injection of the agent does not inject into the footer so you need to use another injection method to get this functionality.

See [Getting Full Timing Data for Associated Business Transactions](#) and [Choosing Your Injection Method](#).

## Get More Information about Web EUM

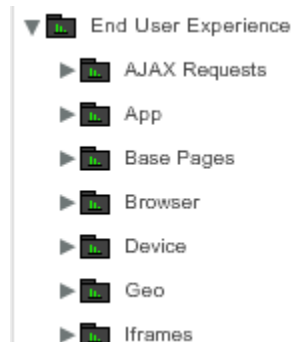
Use the following topics to learn more about Web EUM:

- [Web EUM Metrics](#) provides a detailed list of all the metrics that EUM collects
- [Web EUM License](#) explains how Web EUM is licensed
- [Host a Geo Server](#) describes the conditions under which you might want to host a custom geo server and how you set one up
- [Supported Environments and Versions - Web EUM](#) lists how and to what degree various browsers and platforms/frameworks are compatible with Web EUM
- [Web EUM Countries and Regions by Geo Dashboard](#) covers the countries and regions that Web EUM's default geo server understands

## Web EUM Metrics

- [Web EUM Metrics Defined](#)
- [EUM Metrics Availability](#)
  - [Learn More](#)

Key Web EUM metrics are displayed on the Geo, Page, Iframe, and Ajax dashboards. They can also be seen on the All Pages and Top Pages lists and in the Metric Browser. In addition, the Metric Browser gives you the ability to view these metrics in the context of Ajax requests, iframes, applications, base pages, browsers, devices, and geographic locations.



You can build custom health rules based on Web EUM Page, Ajax, and iframe metrics in the health rule builder. Use these rules to automatically monitor key metrics in your installation. For more information, see [Health Rules](#).

## Web EUM Metrics Defined

Time metrics are the average times, in milliseconds, over the time range selected in the AppDynamics UI or REST API call.

- **Ajax Callback Execution Time** is the time for the browser to process the Ajax response; this typically includes the time to apply the response data to the DOM. This metric is available in the Ajax dimension. In 3.7 this metric was called **Document Processing Time**.
- **Ajax Response Download Time** is the time for the browser to download the complete Ajax response. This metric is available in the Ajax dimension. In 3.7 this metric was called **Document Download Time**.
- **Ajax Request Errors per Minute** is the total number of Ajax requests that generate an error per minute. This metric is available in the Ajax Requests, App, Browser, Device and Geo dimensions.
- **Ajax Requests per Minute** is the total number of Ajax requests per minute. This metric is available in the App, Browser, Device, and Geo dimensions.
- **Application Server Calls per Minute** is the number of requests that actually hit the application server, rather than a cache. This metric is available in the Ajax Requests, App, Base Pages, Browser, Device, Geo, and iframe dimensions.
- **Application Server Time** is the processing time for requests on the application server. This metric is available in the Ajax Requests, App, Base Pages, Browser, Device, Geo, and iframe dimensions.
- **DOM Building Time** is the time for the browser to build the Document Object Model (DOM) and make it available for JavaScript to apply rendering logic. This metric is available in the App, Base Pages, Browser, Device, Geo, and iframe dimensions. In 3.7 this metric was called **Document Processing Time**.
- **DOM Ready Time** is the interval between the time that a user initiates a request and the time that the DOMContentLoaded event occurs. It is equivalent to the OnReady event that JQuery uses. This metric is available in the App, Base Pages, and Geo dimensions.
- **Domain Lookup Time** is the time to complete the domain lookup portion of the server connection time. This metric is available in the App, Base Pages, Browser, Device, Geo, and iframes dimensions.
- **End User Response Time** is the average interval between the time that a user initiates a request and the completion of the page load of the response in the user's browser. In the context of an Ajax request, it ends when the response has been completely processed. This metric is available in the Ajax Requests, App, Base Pages, Browser, Device, Geo, and iframe dimensions.
- **First Byte Time** is the interval between the time that a user initiates a request and the time that the browser receives the first response byte. In the context of an Ajax request, First Byte Time is the interval between the Ajax request dispatch and the time that the browser

receives the first response byte. This metric is available in the Ajax Requests, App, Base Pages, Browser, Device, Geo, and iframe dimensions.

- **Front End Time** is the interval between the arrival of the first byte of text response and the completion of the response page rendering by the browser. Includes Document Download Time, Document Ready Time, Document Processing Time and Page Render Time. This metric is available in the App, Base Pages, Browser, Device, Geo, and iframe dimensions.
- **HTML Download and DOM Building Time** is the time to make the complete HTML document (DOM) available for JavaScript to apply rendering logic. Includes the HTML Download and the DOM Building Time. This metric is available in the App, Base Pages, Browser, Device, Geo, and iframe dimensions. In 3.7 this metric was called **Document Ready Time**.
- **HTML Download Time** is the time for the browser to download the complete HTML document content. This metric is available in the App, Base Pages, Browser, Device, Geo, and iframe dimensions. In 3.7 this metric was called **Document Download Time**.
- **Iframe Requests per Minute** is the total number of Iframe requests per minute. This metric is available in the App, Browser, Device, and Geo dimensions.
- **Page Requests per Minute** is the total number of Page requests per minute. This is the metric displayed across most of the UI. In the Metric Browser it is available in the App, Browser, Device, and Geo dimensions.
- **Page views with JavaScript Errors per minute** is the total number of page views that contain JavaScript errors per minute. This metric is available in the App, Base Pages, Browser, Device, Geo, and iframes dimensions.
- **Resource Fetch Time** is the time for the browser to complete the download of remaining resources, including images, and finish rendering the page. This metric is available in the App, Base Pages, Browser, Device, Geo, and iframe dimensions. In 3.7 this metric was called **Page Render Time**.
- **Response Available Time** is the interval between the beginning of the processing of the request on the browser to the time that the browser receives the response. Includes time in the network from the user's browser to the server. This metric is available in the App, Base Pages, Browser, Device, Geo, and iframes dimensions.
- **Requests per Minute** is the total number of requests (Page + Ajax + iframe) per minute. It is available in the Metric Browser in the Ajax Requests, App, Base Pages, Browser, Device, Geo, and iframes dimensions.
- **Server Connection Time** is the interval between the time that a user initiates a request and the start of fetching the response document from the server or application task. Includes the time spent on redirects, domain lookups, TCP connects and SSL handshakes. This metric is available in the App, Base Pages, Browser, Device, Geo, and iframes dimensions.
- **Synthetic Requests per Minute** is the total number of requests from synthetic monitoring agents, like Web Page Test, per minute. This metric is available in the Ajax Requests, App,



Base Pages, Geo, and iframes dimensions.

- **TCP Connect Time** is the time to complete the TCP connect portion of the server connection time, the equivalent of one network round trip of latency. This metric is available in the App, Base Pages, Browser, Device, Geo, and iframes dimensions.

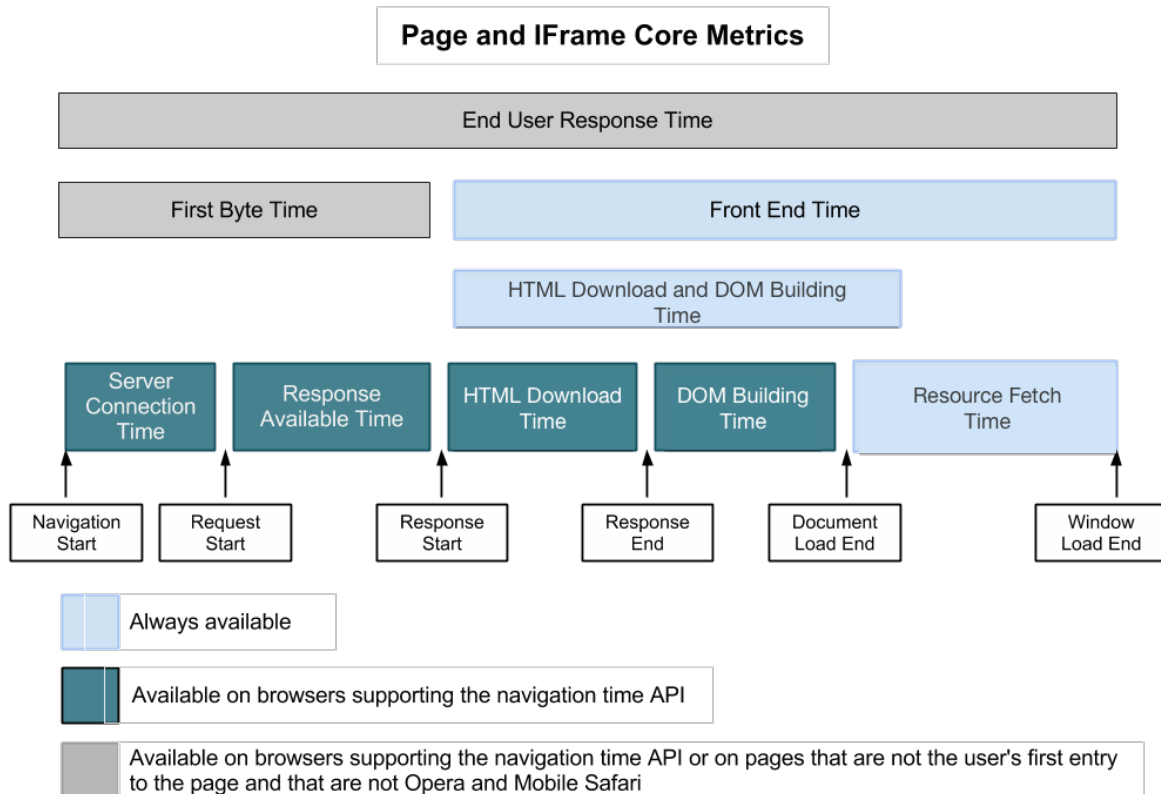
**i** If you are upgrading from controller version 3.7.x to 3.8, the data that was stored previously in the database under old names (Document Download Time, Document Ready Time, Document Processing Time, and Page Render Time) is no longer surfaced to the user interface. The data is still in the database, however, under the old name, and is visible in the metric browser.

### EUM Metrics Availability

The availability of some EUM metrics depends on the capability of the end-user's Web browser. This can lead to a value of Unknown for unavailable metrics in some browser snapshots.

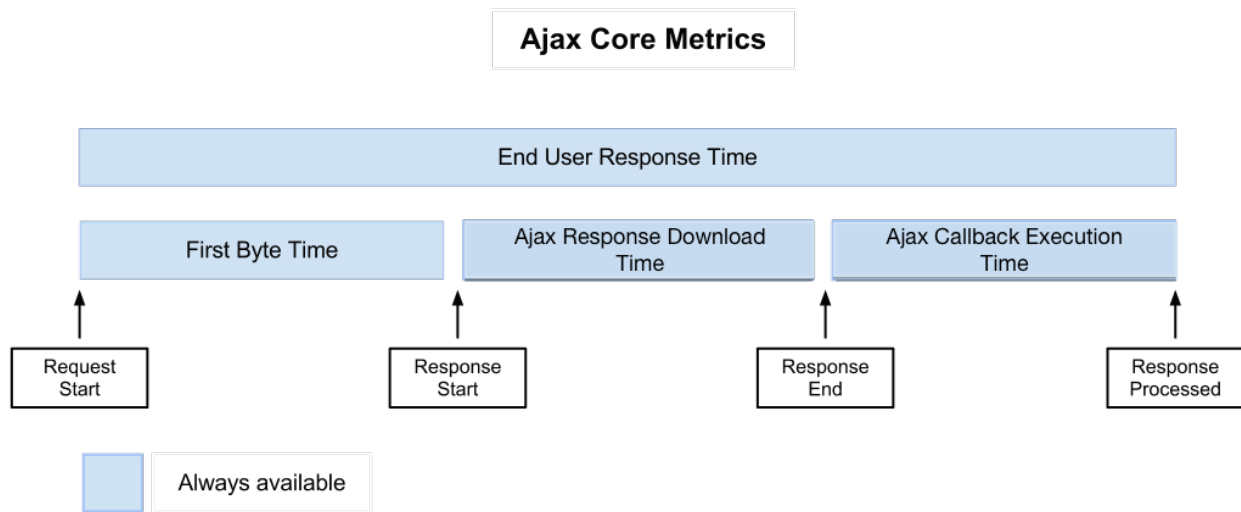
Some metrics are always available.

Some metrics for pages and IFrames are available only if the browser uses the Navigation Timing API. Some metrics are available for all pages, except the end-user's initial entry to the application, even if the browser does not use the Navigation API.





For Ajax requests, the four core metrics are always available.



For more information on which browsers support the Navigation Timing API, see the [Can I Use](#) website.

#### Learn More

- [Metric Browser](#)
- [Use the AppDynamics REST API](#)
- [The Pages and Ajax Requests View](#)
- [Page, Ajax, and Iframe Dashboards](#)
- [The Web EUM Geo Dashboard View](#)
- [Browser Snapshots](#)
- [WC3 Navigation Timing API Overview](#)

### Web EUM License

- [EUM License Information](#)
  - [To view EUM License Information](#)
- [License Type](#)
- [Usage Period](#)
- [License Key](#)
- [Web EUM Agents Licensed](#)
- [Page Views Allocated](#)
- [Page Views Consumed](#)
- [Overages](#)
- [Learn More](#)

This topic describes how to interpret the details of your Web EUM licensing information.

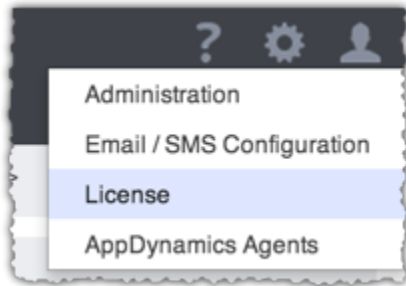
It assumes that you have purchased your Web EUM PRO license from your AppDynamics sales representative.

#### EUM License Information

Your EUM license is separate from your Controller license. It covers both Web EUM and Mobile EUM.

**To view EUM License Information**

1. In the upper right section of the Controller UI, click **Gear Icon -> License**.



2. See the End User Monitoring panel.

**License Type**

A Web EUM PRO license allows a specific number of page views per year, per agent.

A page view is an instance of a base page loaded by a Web browser. Repeated views of a single page are counted as separate page views.

AppDynamics counts a page view each time the JavaScript agent for Web EUM is executed on a base page. Only page views of pages that are instrumented by the agent are counted as page views consumed. For example, pages excluded from monitoring through EUM configuration are not counted. Views of Ajax requests and iFrames are not counted as page views consumed.

**Usage Period**

The usage period is per year, even if you have a multi-year license.

The EUM meter resets every year based on the expiration of your license agreement. For example, if your license expires on 5/15/2020, your usage period resets every year on 5/15.

**License Key**

This is the license key that AppDynamics has assigned to your EUM license.

**Web EUM Agents Licensed**

This is the number of EUM agents you have currently licensed. Each agent provides a certain number of annual page views.

**Page Views Allocated**

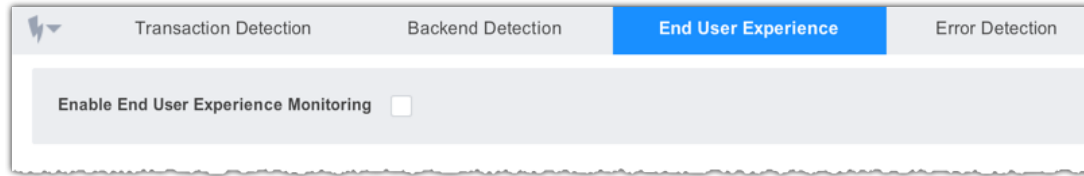
This is the number of page views allocated for the current usage period by your Web EUM license agreement.

**Page Views Consumed**

This is the number of page views consumed during the current usage period.

If this value is greater than Page Views Allocated and your license allows overages, you are incurring overage charges.

If you need to stop incurring overage charges, you can disable Web EUM by clearing the Enable End User Monitoring check box in the EUM configuration window. This will stop end user monitoring and stop page views from being charged after a delay of approximately one minute.



## Overages

How overages are handled is determined by the terms of your Web EUM license agreement.

When you reach a limit you are notified at the top of the All Pages section of the Pages & Ajax Requests tab.

FILTER

Pages

AJAX Requests

iFrames

☒ With Load

Limit of 500 Pages / iFrames reached. Limit of 500 AJAX Requests reached.

|    | Total Number of End | End User Response Time (ms) | Front End Time (ms) | Page views with JavaScript Errors per Minute |
|----|---------------------|-----------------------------|---------------------|--|
| 13 | 418                 | 395                         | 1                   |  |
| 16 | 166                 | -                           | -                   |  |
| 16 | 139                 | -                           | -                   |  |

If your license does not allow overages, AppDynamics stops reporting EUM metrics after your limit has been reached.

If your license does allow overages and your usage exceeds the limit, AppDynamics continues reporting EUM metrics and bills you for the overage at the unit rate stipulated by your license agreement pro-rated over the number of page views that exceed the limit.

## Learn More

- [The Pages and Ajax Requests View](#)
- [Set Up and Configure Web EUM](#)

## Host a Geo Server

AppDynamics hosts a geo server that resolves the user's geographic location based on the request's reported IP address. Some customers prefer to host their own geo server because:

- they have intranet applications where the public IP address does not provide meaningful location information but the user's private IP does.
- they have a hybrid application where some users access the application from a private location and some access it from a public one. If a user doesn't come from a specific private IP range mapped by the custom geo server, the system can be set to default to the public geo server.

See [Use a Custom Geo Server For Web EUM](#) for more information on setting up your own geo server and private IP mapping file.

See [Alternate Geo Server Location](#) for information on configuring your deployment to use a custom geo server.

#### Use a Custom Geo Server For Web EUM

- [Download the Geo Server File](#)
- [Configure the Geo Server Location](#)
- [Create the IP Mapping File](#)
  - [Using a Hybrid Custom-Public Geo Server Setup](#)
- [Set Properties in web.xml](#)
- [Deploy a Custom Geo Server on Windows](#)
- [Learn More](#)

By default, end-users' locations are resolved using public geographic databases. You can host an alternate geo server for your countries, regions, and cities instead of using the default geo server hosted by AppDynamics.

Some customers prefer to host their own geo server because:

- they have intranet applications where the public IP address does not provide meaningful location information but the user's private IP does.
- they have a hybrid application where some users access the application from a private location and some access it from a public one. If a user doesn't come from a specific private IP range mapped by the custom geo server, the system can be set to default to the public geo server.

To host a custom geo server:

1. [Download the Geo Server File](#)
2. [Configure the Geo Server location](#)
3. [Create the IP Mapping File](#)
4. [Set Properties in web.xml](#)

#### Download the Geo Server File

Download the GeoServer-2.0.zip file from AppDynamics at

<http://download.appdynamics.com/onpremise/public/latest/GeoServer.zip>

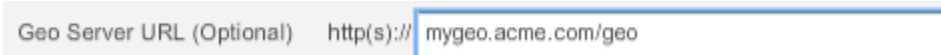
This compressed file contains:

- a geo.war file
- local-map.xml file

Deploy the geo.war in a separate Tomcat/Jetty web container. Do not deploy the geo.war file in the same container as the controller.

#### Configure the Geo Server Location

Enter the URL, including the context root, of your hosted geo server in the Geo Server URL field in the configuration screen. In the following configuration the context root is "/geo".



Geo Server URL (Optional) `http(s):// mygeo.acme.com/geo`

 If you are using manual injection for your JavaScript agent, you must make sure that the copy of the script that you use is one that you have downloaded *after* this URL is set.

#### Create the IP Mapping File

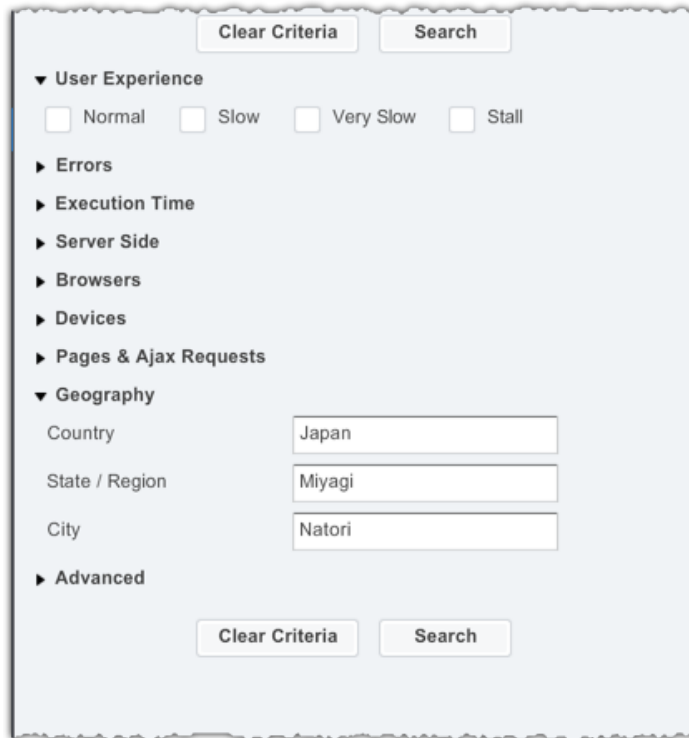
The local-map.xml IP mapping file specifies the locations for which EUM provides geographic data. It maps IP addresses to geographic locations.

Edit the local-map.xml, which was downloaded with the geo.war file, for your environment. This file contains a <location> element for every location to be monitored. The file has the following format.

```
<config>
  <location network="239.0.64.0" subnet-mask="255.255.192.0">
    <country>United States of America</country>
    <region>California</region>
    <city>Mountain View</city>
  </location>
  ... more location entries
</config>
```

The <country>, <region>, and <city> elements are required. If the values of <country> and <region> do not correspond to an actual geographic location already defined in the geographic database, map support is not available for the location in the EUM map panel, but EUM metrics are displayed for the location in the grid view of the geographic distribution, end user response time panel, trend graphs, browser distribution panel, and in the Metric Browser. The <city> element can be a string that represents the static location of the end-user. You will notice that at least one of the location elements has the `is-default=true` attribute set. If there is an IP address that is not covered by your IP mapping file this is the value that is used. To use a public geo-server for non-covered IP addresses, see [Using a Hybrid Custom-Public Geo Server Setup](#).

This data is visible in browser snapshots and can be used to filter browser snapshots and to filter browser snapshots for specific locations:



The screenshot shows a search criteria dialog box with a light blue background and a white border. At the top, there are two buttons: "Clear Criteria" and "Search". Below these, the dialog is organized into sections. The "User Experience" section is expanded, showing four radio button options: "Normal", "Slow", "Very Slow", and "Stall". Below this, there are several collapsed sections: "Errors", "Execution Time", "Server Side", "Browsers", "Devices", and "Pages & Ajax Requests". The "Geography" section is also expanded, containing three text input fields: "Country" (with "Japan" entered), "State / Region" (with "Miyagi" entered), and "City" (with "Natori" entered). At the bottom, there are two more buttons: "Clear Criteria" and "Search".

The valid names for country and region are those used in the map in the geo dashboard. You can hover over a region in the dashboard to see the exact name (including spelling and case) of the region. See [The Web EUM Geo Dashboard View](#).

#### ***Using a Hybrid Custom-Public Geo Server Setup***

If you want EUM to evaluate any non-mapped IP address using the public geo-server, remove any location elements with the `is-default=true` attribute set. In this case locating any non-mapped IP address is done in the EUM cloud, not locally.

#### **Set Properties in web.xml**

In the web.xml file, set the `ip.mapping.config` property to the path of the IP mapping file. The web.xml file is in the geo.war file.

You can also set the log directory for the geo server and the number of seconds that geo data should be cached,

Add the mapping information as follows:

```

<init-param>
    <param-name>logs.dir</param-name>
    <param-value>/opt/geo/logs</param-value>
</init-param>
<init-param>
    <param-name>ip.mapping.config</param-name>
    <param-value>/opt/geo/local-map.xml</param-value>
</init-param>
<init-param>
    <param-name>response.cache.seconds</param-name>
    <!-- Default is 1 day. Caching geo info longer than that
is bad for mobile devices. -->
    <param-value>86400</param-value>
</init-param>

```

This example assumes that you are using a modified local-map.xml file. If you created a new mapping file instead, use the name of that file in the <param-value> element instead of "local-map.xml" for the ip.mapping.config property.

#### Deploy a Custom Geo Server on Windows

If you are deploying your custom geo server on Windows, use the following additional instructions.

1. Unzip the geo.zip file you downloaded in [Download the Geo Server File](#) to D:\Appdynamics.
2. Copy D:\Appdynamics\geo\local-map-template.xml to D:\Appdynamics\geo\local-map.xml.
3. Edit the local-map.xml file as described in [Create the IP Mapping File](#) above.
4. Copy D:\Appdynamics\geo\geo.war to D:\apache-tomcat\webapps.
5. Restart the Tomcat server.
6. Stop the Tomcat server.
7. Edit the following in D:\apache-tomcat\webapps\geo\WEB-INF\web.xml:

```

<init-param>
<param-name>logs.dir</param-name>
<param-value>D:\Appdynamics\geo\log</param-value>
</init-param>
<init-param>
<param-name>ip.mapping.config</param-name>
<param-value>D:\Appdynamics\geo\local-map.xml</param-value>
</init-param>

```

8. Start the Tomcat server.
9. Test as follows on a Web browser that is not IE:

```
http://<host>:<port>/geo/resolve.js?ipdebug=true&ip=192.168.1.1
```

[Learn More](#)

- [Host a Geo Server](#)
- [The Web EUM Geo Dashboard View](#)

## Supported Environments and Versions - Web EUM

- [Supported Platform Matrix for Web EUM](#)
  - [End User Monitoring Browser Compatibility](#)
  - [Web End User Monitoring \(EUM\) Compatibility in Java Environments](#)
  - [End User Monitoring \(Web EUM\) Compatibility in .NET Environments](#)
    - [Supported Runtime Environments for .NET Web EUM](#)

### Supported Platform Matrix for Web EUM

#### End User Monitoring Browser Compatibility

The following Web browsers are certified for the JavaScript agent for Web EUM.

| Browser      | Windows | Linux | Mac | iOS (iPhone and iPad) | Android (Phone and Tablet) |
|--------------|---------|-------|-----|-----------------------|----------------------------|
| Chrome 23.x  | x       | x     | x   | x                     | x                          |
| Chrome 26.x  |         |       | x   |                       |                            |
| Chrome 27.x  | x       | x     | x   |                       |                            |
| Chrome 28.x  |         | x     | x   |                       |                            |
| Chrome 29.x  | x       |       |     |                       |                            |
| Firefox 3.0  | x       | x     | x   |                       |                            |
| Firefox 3.5  | x       | x     | x   |                       |                            |
| Firefox 3.6  | x       |       |     |                       |                            |
| Firefox 4.x  | x       | x     | x   |                       |                            |
| Firefox 5.x  | x       | x     | x   |                       |                            |
| Firefox 6.x  | x       | x     | x   |                       |                            |
| Firefox 7.x  | x       | x     | x   |                       |                            |
| Firefox 8.x  | x       | x     | x   |                       |                            |
| Firefox 9.x  | x       | x     | x   |                       |                            |
| Firefox 10.x | x       | x     | x   |                       |                            |
| Firefox 11.x | x       | x     | x   |                       |                            |
| Firefox 12.x | x       | x     | x   |                       |                            |



|                   |   |   |   |   |  |
|-------------------|---|---|---|---|--|
| Firefox 13.x      | x | x | x |   |  |
| Firefox 14.x      | x | x | x |   |  |
| Firefox 15.x      | x | x | x |   |  |
| Firefox 16.x      | x | x | x |   |  |
| Firefox 17.x      | x | x | x |   |  |
| Firefox 18.x      | x | x | x |   |  |
| Firefox 19.x      | x | x | x |   |  |
| Firefox 20.x      | x | x | x |   |  |
| Firefox 21.x      | x | x | x |   |  |
| IE 10             | x |   |   |   |  |
| IE 9.x            | x |   |   |   |  |
| IE 8.x            | x |   |   |   |  |
| IE 7.x            | x |   |   |   |  |
| IE 6.x            | x |   |   |   |  |
| Mobile Safari 5.1 |   |   |   | x |  |
| Mobile Safari 6   |   |   |   | x |  |
| Safari 5.x        | x |   | x |   |  |
| Safari 6.x        |   |   | x | x |  |
| Opera 11          | x |   | x |   |  |
| Opera 12          | x | x |   |   |  |

#### Web End User Monitoring (EUM) Compatibility in Java Environments

Manual injection for the JavaScript agent is available for **all** Java web application environments.

In addition, the following frameworks are certified for the following Web EUM instrumentation strategies.

- **All** these frameworks support manual injection of the JavaScript agent for Web EUM.
- **Additional** supported script injection strategies are listed in the Script Injection column. See [Set Up Your Application for Web EUM](#) for details.

| Web Application/<br>AJAX Frameworks | Version | Certified App Server | Script Injection |
|-------------------------------------|---------|----------------------|------------------|
|-------------------------------------|---------|----------------------|------------------|

|                    |                              |   |                      |
|--------------------|------------------------------|---|----------------------|
| JSP                | Servlet 2.3                  | Tomcat 7x ,<br>GlassFish v3,<br>Weblogic (Assisted<br>only) | Automatic / Assisted |
| JSF                | MyFaces,<br>ICEFaces,<br>ADF | Tomcat 7x , Glassfish<br>v3                                 | Manual               |
| Tapestry           | 5.0                          |   | Manual               |
| Struts             | 2                            | Tomcat 7x, GlassFish<br>v3                                  | Automatic / Assisted |
| Spring MVC         |                              | Tomcat 7x   | Automatic / Assisted |
| Grails             |                              | Tomcat 7x, Glassfish<br>v3, Weblogic 12c                    | Manual               |
| Wicket             |                              | Tomcat 7  | Automatic / Assisted |
| Web Objects        |                              |   | Manual               |
| Liferay            |                              |   | Manual               |
| ZK                 |                              |   | Manual               |
| JQuery             |                              | Tomcat 7  | Automatic / Assisted |
| MooTools           |                              | Tomcat 7  | Automatic / Assisted |
| DWR                |                              | Tomcat 7, Glassfish<br>V3, Weblogic 12c                     | Automatic / Assisted |
| YUI                |                              | Tomcat 7  | Automatic / Assisted |
| EXT JS             |                              | Tomcat 7  | Automatic / Assisted |
| Dojo Web tool kits |                              | Tomcat 7, Glassfish<br>V3, Weblogic 12c                     | Automatic / Assisted |
| GWT                |                              |   | Manual               |
| angular JS         |                              |   | Manual               |
| backbone           |                              |   | Manual               |

#### End User Monitoring (Web EUM) Compatibility in .NET Environments

AppDynamics certifies Web EUM instrumentation for the following .NET frameworks.

- **All** listed frameworks support [manual injection of the JavaScript agent for Web EUM](#).
- **Additional** supported script injection strategies are listed in the Script Injection column. See [Set Up Your Application for Web EUM](#) for details.

| Web Application/ AJAX Frameworks | Versions   | Additional Supported Script Injection Methods           |
|----------------------------------|------------|---|
| ASP.NET Web Forms (.aspx)        | 3, 4       | Automatic, Assisted Injection-Using Attribute Injection |
| ASP.NET MVC Web Forms (.aspx)    | 3, 4       | Automatic, Assisted Injection-Using Attribute Injection |
| ASP.NET MVC Razor                | 3, 4       | Assisted Injection-Using Attribute Injection            |
| Microsoft SharePoint             | 2007, 2010 | Automatic   |

 AppDynamics does not support Web EUM instrumentation of legacy ASP (.asp) pages.

#### **Supported Runtime Environments for .NET Web EUM**

- Microsoft IIS versions 6.0, 7.0, 7.5, 8.0

#### **Web EUM Countries and Regions by Geo Dashboard**

- [Countries](#)
- [Regions](#)

AppDynamics displays the following countries and regions in the geographic dashboard. Each of these countries and regions also display their own aggregate EUM data. Data can be collected from areas not in the following list, but it will not be displayed in these parts of the interface.

#### **Countries**

The following countries are displayed in the geo dashboard.

#### **A - D**

Afghanistan  
 Aland Islands  
 Albania  
 Algeria  
 American Samoa  
 Andorra  
 Angola  
 Anguilla  
 Antarctica  
 Antigua and Barbuda  
 Argentina  
 Armenia  
 Aruba  
 Asia/Pacific

Region  
Australia  
Austria  
Azerbaijan  
Bahamas  
Bahrain  
Bangladesh  
Barbados  
Belarus  
Belgium  
Belize  
Benin  
Bermuda  
Bhutan  
Bolivia  
Bonaire, Saint  
Eustatius and  
Saba  
Bosnia and  
Herzegovina  
Botswana  
Bouvet Island  
Brazil  
British Indian  
Ocean  
Territory  
Brunei  
Darussalam  
Bulgaria  
Burkina Faso  
Burundi  
Cambodia  
Cameroon  
Canada  
Cape Verde  
Cayman  
Islands  
Central  
African  
Republic  
Chad  
Chile  
China  
Christmas  
Island  
Cocos  
(Keeling)  
Islands  
Colombia

Comoros  
Congo  
Congo, The  
Democratic  
Republic of  
the  
Cook Islands  
Costa Rica  
Cote d'Ivoire  
Croatia  
Cuba  
Curacao  
Cyprus  
Czech  
Republic  
Denmark  
Djibouti  
Dominica  
Dominican  
Republic

## E - K

Ecuador  
Egypt  
El Salvador  
Equatorial  
Guinea  
Eritrea  
Estonia  
Ethiopia  
Europe  
Falkland  
Islands  
(Malvinas)  
Faroe Islands  
Fiji  
Finland  
France  
French  
Guiana  
French  
Polynesia  
French  
Southern  
Territories  
Gabon  
Gambia  
Georgia  
Germany

Ghana  
 Gibraltar  
 Greece  
 Greenland  
 Grenada  
 Guadeloupe  
 Guam  
 Guatemala  
 Guernsey  
 Guinea  
 Guinea-Bissau  
 Guyana  
 Haiti  
 Heard Island  
 and McDonald  
 Islands  
 Holy See  
 (Vatican City  
 State)  
 Honduras  
 Hong Kong  
 Hungary  
 Iceland  
 India  
 Indonesia  
 Iran, Islamic  
 Republic of  
 Iraq  
 Ireland  
 Isle of Man  
 Israel  
 Italy  
 Jamaica  
 Japan  
 Jersey  
 Jordan  
 Kazakhstan  
 Kenya  
 Kiribati  
 Korea,  
 Democratic  
 People's  
 Republic of  
 Korea,  
 Republic of  
 Kuwait  
 Kyrgyzstan

L - Q

Lao People's  
Democratic  
Republic  
Latvia  
Lebanon  
Lesotho  
Liberia  
Libyan Arab  
Jamahiriya  
Liechtenstein  
Lithuania  
Luxembourg  
Macao  
Macedonia  
Madagascar  
Malawi  
Malaysia  
Maldives  
Mali  
Malta  
Marshall  
Islands  
Martinique  
Mauritania  
Mauritius  
Mayotte  
Mexico  
Micronesia,  
Federated  
States of  
Moldova,  
Republic of  
Monaco  
Mongolia  
Montenegro  
Montserrat  
Morocco  
Mozambique  
Myanmar  
Namibia  
Nauru  
Nepal  
Netherlands  
New  
Caledonia  
New Zealand  
Nicaragua  
Niger  
Nigeria

Niue  
Norfolk Island  
Northern  
Mariana  
Islands  
Norway  
Oman  
Pakistan  
Palau  
Palestinian  
Territory  
Panama  
Papua New  
Guinea  
Paraguay  
Peru  
Philippines  
Pitcairn  
Poland  
Portugal  
Puerto Rico  
Qatar

## R - Z

Reunion  
Romania  
Russian  
Federation  
Rwanda  
Saint  
Barthelemy  
Saint Helena  
Saint Kitts and  
Nevis  
Saint Lucia  
Saint Martin  
Saint Pierre  
and Miquelon  
Saint Vincent  
and the  
Grenadines  
Samoa  
San Marino  
Sao Tome  
and Principe  
Saudi Arabia  
Senegal  
Serbia  
Seychelles



Sierra Leone  
Singapore  
Sint Maarten  
Slovakia  
Slovenia  
Solomon  
Islands  
Somalia  
South Africa  
South Georgia  
and the South  
Sandwich  
Islands  
Spain  
Sri Lanka  
Sudan  
Suriname  
Svalbard and  
Jan Mayen  
Swaziland  
Sweden  
Switzerland  
Syrian Arab  
Republic  
Taiwan  
Tajikistan  
Tanzania,  
United  
Republic of  
Thailand  
Timor-Leste  
Togo  
Tokelau  
Tonga  
Trinidad and  
Tobago  
Tunisia  
Turkey  
Turkmenistan  
Turks and  
Caicos Islands  
Tuvalu  
Uganda  
Ukraine  
United Arab  
Emirates  
United  
Kingdom  
United States

United States  
 Minor Outlying  
 Islands  
 Uruguay  
 Uzbekistan  
 Vanuatu  
 Venezuela  
 Vietnam  
 Virgin Islands,  
 British  
 Virgin Islands,  
 U.S.  
 Wallis and  
 Futuna  
 Western  
 Sahara  
 Yemen  
 Zambia  
 Zimbabwe

#### Regions

The following countries displayed in the geo dashboard also report data by region.

#### A - G

Afghanistan,  
 Badakhshan  
 Afghanistan,  
 Badghis  
 Afghanistan,  
 Baghlan  
 Afghanistan,  
 Balkh  
 Afghanistan,  
 Bamian  
 Afghanistan,  
 Daykondi  
 Afghanistan,  
 Farah  
 Afghanistan,  
 Faryab  
 Afghanistan,  
 Ghazni  
 Afghanistan,  
 Ghowr  
 Afghanistan,  
 Helmand  
 Afghanistan,  
 Herat  
 Afghanistan,

Jowzjan  
Afghanistan,  
Kabol  
Afghanistan,  
Kandahar  
Afghanistan,  
Kapisa  
Afghanistan,  
Khowst  
Afghanistan,  
Konar  
Afghanistan,  
Kondoz  
Afghanistan,  
Laghman  
Afghanistan,  
Lowgar  
Afghanistan,  
Nangarhar  
Afghanistan,  
Nimruz  
Afghanistan,  
Nurestan  
Afghanistan,  
Oruzgan  
Afghanistan,  
Paktia  
Afghanistan,  
Paktika  
Afghanistan,  
Panjshir  
Afghanistan,  
Parvan  
Afghanistan,  
Samangan  
Afghanistan,  
Sar-e Pol  
Afghanistan,  
Takhar  
Afghanistan,  
Vardak  
Afghanistan,  
Zabol  
Albania, Berat  
Albania, Diber  
Albania,  
Durres  
Albania,  
Elbasan

Albania, Fier  
Albania,  
Gjirokaster  
Albania, Korce  
Albania,  
Kukes  
Albania,  
Lezhe  
Albania,  
Shkoder  
Albania,  
Tirane  
Albania, Vlore  
Algeria, Adrar  
Algeria, Ain  
Defla  
Algeria, Ain  
Temouchent  
Algeria, Alger  
Algeria,  
Annaba  
Algeria, Batna  
Algeria,  
Bechar  
Algeria, Bejaia  
Algeria, Biskra  
Algeria, Blida  
Algeria, Bordj  
Bou Arreridj  
Algeria,  
Bouira  
Algeria,  
Boumerdes  
Algeria, Chlef  
Algeria,  
Constantine  
Algeria, Djelfa  
Algeria, El  
Bayadh  
Algeria, El  
Oued  
Algeria, El  
Tarf  
Algeria,  
Ghardaia  
Algeria,  
Guelma  
Algeria, Illizi  
Algeria, Jijel

Algeria,  
 Khenchela  
 Algeria,  
 Laghouat  
 Algeria, M'sila  
 Algeria,  
 Mascara  
 Algeria,  
 Medea  
 Algeria, Mila  
 Algeria,  
 Mostaganem  
 Algeria,  
 Naama  
 Algeria, Oran  
 Algeria,  
 Ouargla  
 Algeria, Oum  
 el Bouaghi  
 Algeria,  
 Relizane  
 Algeria, Saida  
 Algeria, Setif  
 Algeria, Sidi  
 Bel Abbes  
 Algeria,  
 Skikda  
 Algeria, Souk  
 Ahras  
 Algeria,  
 Tamanghasse  
 t  
 Algeria,  
 Tebessa  
 Algeria, Tiaret  
 Algeria,  
 Tindouf  
 Algeria,  
 Tipaza  
 Algeria,  
 Tissemsilt  
 Algeria, Tizi  
 Ouzou  
 Algeria,  
 Tlemcen  
 Andorra,  
 Andorra la  
 Vella  
 Andorra,

Canillo  
 Andorra,  
 Encamp  
 Andorra,  
 Escaldes-Eng  
 ordany  
 Andorra, La  
 Massana  
 Andorra,  
 Ordino  
 Andorra, Sant  
 Julia de Loria  
 Angola,  
 Bengo  
 Angola,  
 Benguela  
 Angola, Bie  
 Angola,  
 Cabinda  
 Angola,  
 Cuando  
 Cubango  
 Angola,  
 Cuanza Norte  
 Angola,  
 Cuanza Sul  
 Angola,  
 Cunene  
 Angola,  
 Huambo  
 Angola, Huila  
 Angola,  
 Luanda  
 Angola, Lunda  
 Norte  
 Angola, Lunda  
 Sul  
 Angola,  
 Malanje  
 Angola,  
 Moxico  
 Angola,  
 Namibe  
 Angola, Uige  
 Angola, Zaire  
 Antigua and  
 Barbuda,  
 Barbuda  
 Antigua and

Barbuda,  
 Redonda  
 Antigua and  
 Barbuda,  
 Saint George  
 Antigua and  
 Barbuda,  
 Saint John  
 Antigua and  
 Barbuda,  
 Saint Mary  
 Antigua and  
 Barbuda,  
 Saint Paul  
 Antigua and  
 Barbuda,  
 Saint Peter  
 Antigua and  
 Barbuda,  
 Saint Philip  
 Argentina,  
 Buenos Aires  
 Argentina,  
 Catamarca  
 Argentina,  
 Chaco  
 Argentina,  
 Chubut  
 Argentina,  
 Cordoba  
 Argentina,  
 Corrientes  
 Argentina,  
 Distrito  
 Federal  
 Argentina,  
 Entre Rios  
 Argentina,  
 Formosa  
 Argentina,  
 Jujuy  
 Argentina, La  
 Pampa  
 Argentina, La  
 Rioja  
 Argentina,  
 Mendoza  
 Argentina,  
 Misiones

Argentina,  
 Neuquen  
 Argentina, Rio  
 Negro  
 Argentina,  
 Salta  
 Argentina,  
 San Juan  
 Argentina,  
 San Luis  
 Argentina,  
 Santa Cruz  
 Argentina,  
 Santa Fe  
 Argentina,  
 Santiago del  
 Estero  
 Argentina,  
 Tierra del  
 Fuego  
 Argentina,  
 Tucuman  
 Armenia,  
 Aragatsotn  
 Armenia,  
 Ararat  
 Armenia,  
 Armavir  
 Armenia,  
 Geghark'unik'  
 Armenia,  
 Kotayk'  
 Armenia, Lorri  
 Armenia,  
 Shirak  
 Armenia,  
 Syunik'  
 Armenia,  
 Tavush  
 Armenia,  
 Vayots' Dzor  
 Armenia,  
 Yerevan  
 Australia,  
 Australian  
 Capital  
 Territory  
 Australia, New  
 South Wales



Australia,  
 Northern  
 Territory  
 Australia,  
 Queensland  
 Australia,  
 South  
 Australia  
 Australia,  
 Tasmania  
 Australia,  
 Victoria  
 Australia,  
 Western  
 Australia  
 Austria,  
 Burgenland  
 Austria,  
 Karnten  
 Austria,  
 Niederosterrei  
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 Oberosterreic  
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 Salzburg  
 Austria,  
 Steiermark  
 Austria, Tirol  
 Austria,  
 Vorarlberg  
 Austria, Wien  
 Azerbaijan,  
 Abseron  
 Azerbaijan,  
 Agcabadi  
 Azerbaijan,  
 Agdam  
 Azerbaijan,  
 Agdas  
 Azerbaijan,  
 Agstafa  
 Azerbaijan,  
 Agsu  
 Azerbaijan, Ali  
 Bayramli  
 Azerbaijan,  
 Astara

Azerbaijan,  
Baki  
Azerbaijan,  
Balakan  
Azerbaijan,  
Barda  
Azerbaijan,  
Beylaqan  
Azerbaijan,  
Bilasuvur  
Azerbaijan,  
Cabrayil  
Azerbaijan,  
Calilabad  
Azerbaijan,  
Daskasan  
Azerbaijan,  
Davaci  
Azerbaijan,  
Fuzuli  
Azerbaijan,  
Gadabay  
Azerbaijan,  
Ganca  
Azerbaijan,  
Goranboy  
Azerbaijan,  
Goycay  
Azerbaijan,  
Haciqabul  
Azerbaijan,  
Imisli  
Azerbaijan,  
Ismayilli  
Azerbaijan,  
Kalbacar  
Azerbaijan,  
Kurdamir  
Azerbaijan,  
Lacin  
Azerbaijan,  
Lankaran  
Azerbaijan,  
Lankaran  
Azerbaijan,  
Lerik  
Azerbaijan,  
Masalli  
Azerbaijan,

Mingacevir  
Azerbaijan,  
Naftalan  
Azerbaijan,  
Naxcivan  
Azerbaijan,  
Neftcala  
Azerbaijan,  
Oguz  
Azerbaijan,  
Qabala  
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Qax  
Azerbaijan,  
Qazax  
Azerbaijan,  
Qobustan  
Azerbaijan,  
Quba  
Azerbaijan,  
Qubadli  
Azerbaijan,  
Qusar  
Azerbaijan,  
Saatli  
Azerbaijan,  
Sabirabad  
Azerbaijan,  
Saki  
Azerbaijan,  
Saki  
Azerbaijan,  
Salyan  
Azerbaijan,  
Samaxi  
Azerbaijan,  
Samkir  
Azerbaijan,  
Samux  
Azerbaijan,  
Siyazan  
Azerbaijan,  
Sumqayit  
Azerbaijan,  
Susa  
Azerbaijan,  
Susa  
Azerbaijan,  
Tartar

Azerbaijan,  
Tovuz  
Azerbaijan,  
Ucar  
Azerbaijan,  
Xacmaz  
Azerbaijan,  
Xankandi  
Azerbaijan,  
Xanlar  
Azerbaijan,  
Xizi  
Azerbaijan,  
Xocali  
Azerbaijan,  
Xocavand  
Azerbaijan,  
Yardimli  
Azerbaijan,  
Yevlax  
Azerbaijan,  
Yevlax  
Azerbaijan,  
Zangilan  
Azerbaijan,  
Zaqatala  
Azerbaijan,  
Zardab  
Bahrain, Al  
Asimah  
Bahrain, Al  
Hadd  
Bahrain, Al  
Janubiyah  
Bahrain, Al  
Manamah  
Bahrain, Al  
Mintaqah al  
Gharbiyah  
Bahrain, Al  
Mintaqah al  
Wusta  
Bahrain, Al  
Mintaqah ash  
Shamaliyah  
Bahrain, Al  
Muharraq  
Bahrain, Al  
Wusta

Bahrain, Ar  
 Rifa  
 Bahrain, Ash  
 Shamaliyah  
 Bahrain, Jidd  
 Hafs  
 Bahrain,  
 Madinat  
 Bahrain,  
 Madinat  
 Hamad  
 Bahrain,  
 Mintaqat  
 Juzur Hawar  
 Bahrain,  
 Sitrah  
 Bangladesh,  
 Barisal  
 Bangladesh,  
 Chittagong  
 Bangladesh,  
 Dhaka  
 Bangladesh,  
 Khulna  
 Bangladesh,  
 Rajshahi  
 Bangladesh,  
 Sylhet  
 Barbados,  
 Christ Church  
 Barbados,  
 Saint Andrew  
 Barbados,  
 Saint George  
 Barbados,  
 Saint James  
 Barbados,  
 Saint John  
 Barbados,  
 Saint Joseph  
 Barbados,  
 Saint Lucy  
 Barbados,  
 Saint Michael  
 Barbados,  
 Saint Peter  
 Barbados,  
 Saint Philip  
 Barbados,

Saint Thomas  
 Belarus,  
 Brestskaya  
 Voblasts'  
 Belarus,  
 Homyel'skaya  
 Voblasts'  
 Belarus,  
 Hrodzyenskay  
 a Voblasts'  
 Belarus,  
 Mahilyowskay  
 a Voblasts'  
 Belarus,  
 Minsk  
 Belarus,  
 Minskaya  
 Voblasts'  
 Belarus,  
 Vitsyebskaya  
 Voblasts'  
 Belgium,  
 Antwerpen  
 Belgium,  
 Brabant  
 Wallon  
 Belgium,  
 Brussels  
 Hoofdstedelijk  
 Gewest  
 Belgium,  
 Hainaut  
 Belgium,  
 Liege  
 Belgium,  
 Limburg  
 Belgium,  
 Luxembourg  
 Belgium,  
 Namur  
 Belgium,  
 Oost-Vlaander  
 en  
 Belgium,  
 Vlaams-Braba  
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 Belgium,  
 West-Vlaande  
 ren

Belize, Belize  
 Belize, Cayo  
 Belize,  
 Corozal  
 Belize,  
 Orange Walk  
 Belize, Stann  
 Creek  
 Belize, Toledo  
 Benin, Alibori  
 Benin,  
 Atakora  
 Benin,  
 Atlanyique  
 Benin, Borgou  
 Benin,  
 Collines  
 Benin, Donga  
 Benin, Kouffo  
 Benin, Littoral  
 Benin, Mono  
 Benin, Oueme  
 Benin, Plateau  
 Benin, Zou  
 Bermuda,  
 Devonshire  
 Bermuda,  
 Hamilton  
 Bermuda,  
 Hamilton  
 Bermuda,  
 Paget  
 Bermuda,  
 Pembroke  
 Bermuda,  
 Saint George  
 Bermuda,  
 Saint  
 George's  
 Bermuda,  
 Sandys  
 Bermuda,  
 Smiths  
 Bermuda,  
 Southampton  
 Bermuda,  
 Warwick  
 Bhutan,  
 Bumthang

Bhutan,  
 Chhukha  
 Bhutan,  
 Chirang  
 Bhutan, Daga  
 Bhutan,  
 Geylegphug  
 Bhutan, Ha  
 Bhutan,  
 Lhuntshi  
 Bhutan,  
 Mongar  
 Bhutan, Paro  
 Bhutan,  
 Pemagatsel  
 Bhutan,  
 Punakha  
 Bhutan,  
 Samchi  
 Bhutan,  
 Samdrup  
 Bhutan,  
 Shemgang  
 Bhutan,  
 Tashigang  
 Bhutan,  
 Thimphu  
 Bhutan,  
 Tongsa  
 Bhutan,  
 Wangdi  
 Phodrang  
 Bolivia,  
 Chuquisaca  
 Bolivia,  
 Cochabamba  
 Bolivia, El  
 Beni  
 Bolivia, La  
 Paz  
 Bolivia, Oruro  
 Bolivia, Pando  
 Bolivia, Potosi  
 Bolivia, Santa  
 Cruz  
 Bolivia, Tarija  
 Bosnia and  
 Herzegovina,  
 Federation of



Bosnia and  
 Herzegovina  
 Bosnia and  
 Herzegovina,  
 Republika  
 Srpska  
 Botswana,  
 Central  
 Botswana,  
 Ghanzi  
 Botswana,  
 Kgalagadi  
 Botswana,  
 Kgatleng  
 Botswana,  
 Kweneng  
 Botswana,  
 North-East  
 Botswana,  
 North-West  
 Botswana,  
 South-East  
 Botswana,  
 Southern  
 Brazil, Acre  
 Brazil,  
 Alagoas  
 Brazil, Amapa  
 Brazil,  
 Amazonas  
 Brazil, Bahia  
 Brazil, Ceara  
 Brazil, Distrito  
 Federal  
 Brazil, Espirito  
 Santo  
 Brazil, Goias  
 Brazil,  
 Maranhao  
 Brazil, Mato  
 Grosso  
 Brazil, Mato  
 Grosso do Sul  
 Brazil, Minas  
 Gerais  
 Brazil, Para  
 Brazil, Paraiba  
 Brazil, Parana  
 Brazil,

Pernambuco  
 Brazil, Piaui  
 Brazil, Rio de  
 Janeiro  
 Brazil, Rio  
 Grande do  
 Norte  
 Brazil, Rio  
 Grande do Sul  
 Brazil,  
 Rondonia  
 Brazil,  
 Roraima  
 Brazil, Santa  
 Catarina  
 Brazil, Sao  
 Paulo  
 Brazil, Sergipe  
 Brazil,  
 Tocantins  
 Brunei  
 Darussalam,  
 Alibori  
 Brunei  
 Darussalam,  
 Belait  
 Brunei  
 Darussalam,  
 Brunei and  
 Muara  
 Brunei  
 Darussalam,  
 Collines  
 Brunei  
 Darussalam,  
 Donga  
 Brunei  
 Darussalam,  
 Kouffo  
 Brunei  
 Darussalam,  
 Littoral  
 Brunei  
 Darussalam,  
 Oueme  
 Brunei  
 Darussalam,  
 Plateau  
 Brunei

Darussalam,  
 Temburong  
 Brunei  
 Darussalam,  
 Tutong  
 Brunei  
 Darussalam,  
 Zou  
 Bulgaria,  
 Blagoevgrad  
 Bulgaria,  
 Burgas  
 Bulgaria,  
 Dobrich  
 Bulgaria,  
 Gabrovo  
 Bulgaria, Grad  
 Sofiya  
 Bulgaria,  
 Khaskovo  
 Bulgaria,  
 Kurdzhali  
 Bulgaria,  
 Kyustendil  
 Bulgaria,  
 Lovech  
 Bulgaria,  
 Mikhaylovgrad  
 Bulgaria,  
 Montana  
 Bulgaria,  
 Pazardzhik  
 Bulgaria,  
 Pernik  
 Bulgaria,  
 Pleven  
 Bulgaria,  
 Plovdiv  
 Bulgaria,  
 Razgrad  
 Bulgaria,  
 Ruse  
 Bulgaria,  
 Shumen  
 Bulgaria,  
 Silistra  
 Bulgaria,  
 Sliven  
 Bulgaria,

Smolyan  
 Bulgaria,  
 Sofiya  
 Bulgaria,  
 Stara Zagora  
 Bulgaria,  
 Turgovishte  
 Bulgaria,  
 Varna  
 Bulgaria,  
 Veliko  
 Turnovo  
 Bulgaria, Vidin  
 Bulgaria,  
 Vratsa  
 Bulgaria,  
 Yambol  
 Burkina Faso,  
 Bale  
 Burkina Faso,  
 Bam  
 Burkina Faso,  
 Banwa  
 Burkina Faso,  
 Bazega  
 Burkina Faso,  
 Bougouriba  
 Burkina Faso,  
 Boulgou  
 Burkina Faso,  
 Boulkiemde  
 Burkina Faso,  
 Ganzourgou  
 Burkina Faso,  
 Gnagna  
 Burkina Faso,  
 Gourma  
 Burkina Faso,  
 Houet  
 Burkina Faso,  
 Ioba  
 Burkina Faso,  
 Kadiogo  
 Burkina Faso,  
 Kenedougou  
 Burkina Faso,  
 Komoe  
 Burkina Faso,  
 Komondjari

Burkina Faso,  
 Kompienga  
 Burkina Faso,  
 Kossi  
 Burkina Faso,  
 Koulpelogo  
 Burkina Faso,  
 Kouritenga  
 Burkina Faso,  
 Kourweogo  
 Burkina Faso,  
 Leraba  
 Burkina Faso,  
 Loroum  
 Burkina Faso,  
 Mouhoun  
 Burkina Faso,  
 Namentenga  
 Burkina Faso,  
 Naouri  
 Burkina Faso,  
 Nayala  
 Burkina Faso,  
 Noumbiel  
 Burkina Faso,  
 Oubritenga  
 Burkina Faso,  
 Oudalan  
 Burkina Faso,  
 Passore  
 Burkina Faso,  
 Poni  
 Burkina Faso,  
 Sanguie  
 Burkina Faso,  
 Sanmatenga  
 Burkina Faso,  
 Seno  
 Burkina Faso,  
 Sissili  
 Burkina Faso,  
 Soum  
 Burkina Faso,  
 Sourou  
 Burkina Faso,  
 Tapoa  
 Burkina Faso,  
 Tuy  
 Burkina Faso,

Yagha  
 Burkina Faso,  
 Yatenga  
 Burkina Faso,  
 Ziro  
 Burkina Faso,  
 Zondoma  
 Burkina Faso,  
 Zoundweogo  
 Burundi,  
 Bubanza  
 Burundi,  
 Bujumbura  
 Burundi,  
 Bururi  
 Burundi,  
 Cankuzo  
 Burundi,  
 Cibitoke  
 Burundi,  
 Gitega  
 Burundi,  
 Karuzi  
 Burundi,  
 Kayanza  
 Burundi,  
 Kirundo  
 Burundi,  
 Makamba  
 Burundi,  
 Muramvya  
 Burundi,  
 Muyinga  
 Burundi,  
 Mwaro  
 Burundi,  
 Ngozi  
 Burundi,  
 Rutana  
 Burundi,  
 Ruyigi  
 Cambodia,  
 Banteay  
 Meanchey  
 Cambodia,  
 Batdambang  
 Cambodia,  
 Batdambang  
 Cambodia,

Kampong  
 Cham  
 Cambodia,  
 Kampong  
 Chhnang  
 Cambodia,  
 Kampong  
 Speu  
 Cambodia,  
 Kampong  
 Thum  
 Cambodia,  
 Kampot  
 Cambodia,  
 Kandal  
 Cambodia,  
 Koh Kong  
 Cambodia,  
 Kracheh  
 Cambodia,  
 Mondulkiri  
 Cambodia,  
 Pailin  
 Cambodia,  
 Phnum Penh  
 Cambodia,  
 Preah Vihear  
 Cambodia,  
 Prey Veng  
 Cambodia,  
 Pursat  
 Cambodia,  
 Ratanakiri Kiri  
 Cambodia,  
 Siem Reap  
 Cambodia,  
 Stung Treng  
 Cambodia,  
 Svay Rieng  
 Cambodia,  
 Takeo  
 Cameroon,  
 Adamaoua  
 Cameroon,  
 Centre  
 Cameroon,  
 Est  
 Cameroon,  
 Extreme-Nord

Cameroon,  
 Littoral  
 Cameroon,  
 Nord  
 Cameroon,  
 Nord-Ouest  
 Cameroon,  
 Ouest  
 Cameroon,  
 Sud  
 Cameroon,  
 Sud-Ouest  
 Canada,  
 Alberta  
 Canada,  
 British  
 Columbia  
 Canada,  
 Manitoba  
 Canada, New  
 Brunswick  
 Canada,  
 Newfoundland  
 Canada,  
 Northwest  
 Territories  
 Canada, Nova  
 Scotia  
 Canada,  
 Nunavut  
 Canada,  
 Ontario  
 Canada,  
 Prince Edward  
 Island  
 Canada,  
 Quebec  
 Canada,  
 Saskatchewan  
 Canada,  
 Yukon  
 Territory  
 Cape Verde,  
 Boa Vista  
 Cape Verde,  
 Brava  
 Cape Verde,  
 Maio  
 Cape Verde,



Mosteiros  
 Cape Verde,  
 Paul  
 Cape Verde,  
 Praia  
 Cape Verde,  
 Ribeira  
 Grande  
 Cape Verde,  
 Sal  
 Cape Verde,  
 Santa  
 Catarina  
 Cape Verde,  
 Santa Cruz  
 Cape Verde,  
 Sao  
 Domingos  
 Cape Verde,  
 Sao Filipe  
 Cape Verde,  
 Sao Miguel  
 Cape Verde,  
 Sao Nicolau  
 Cape Verde,  
 Sao Vicente  
 Cape Verde,  
 Tarrafal  
 Cayman  
 Islands, Creek  
 Cayman  
 Islands,  
 Eastern  
 Cayman  
 Islands,  
 Midland  
 Cayman  
 Islands, South  
 Town  
 Cayman  
 Islands, Spot  
 Bay  
 Cayman  
 Islands, Stake  
 Bay  
 Cayman  
 Islands, West  
 End  
 Cayman

Islands,  
 Western  
 Central  
 African  
 Republic,  
 Bamingui-Ban  
 goran  
 Central  
 African  
 Republic,  
 Bangui  
 Central  
 African  
 Republic,  
 Basse-Kotto  
 Central  
 African  
 Republic,  
 Cuvette-Ouest  
 Central  
 African  
 Republic,  
 Haut-Mbomou  
 Central  
 African  
 Republic,  
 Haute-Kotto  
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 African  
 Republic,  
 Kemo  
 Central  
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 Republic,  
 Lobaye  
 Central  
 African  
 Republic,  
 Mambere-Kad  
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 African  
 Republic,  
 Mbomou  
 Central  
 African  
 Republic,  
 Nana-Grebizi  
 Central

African  
 Republic,  
 Nana-Mamber  
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 African  
 Republic,  
 Ombella-Mpok  
 o  
 Central  
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trandarsysla

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 Nichola Town  
 Saint Kitts and  
 Nevis, Saint  
 Anne Sandy  
 Point

Saint Kitts and  
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 George  
 Basseterre  
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 James  
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 John Figtree  
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 Nevis, Saint  
 Mary Cayon  
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 Paul  
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 Nevis, Saint  
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 Middle Island  
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 Nevis, Trinity  
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 Islands, Isabel  
 Solomon  
 Islands,  
 Makira  
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 Islands,  
 Malaita  
 Solomon  
 Islands,  
 Rennell and  
 Bellona  
 Solomon  
 Islands,  
 Temotu  
 Solomon  
 Islands,  
 Western  
 Somalia,  
 Awdal

Somalia,  
 Bakool  
 Somalia,  
 Banaadir  
 Somalia, Bari  
 Somalia, Bay  
 Somalia,  
 Galguduud  
 Somalia,  
 Gedo  
 Somalia,  
 Hiiraan  
 Somalia,  
 Jubbada  
 Dhexe  
 Somalia,  
 Jubbada  
 Hoose  
 Somalia,  
 Mudug  
 Somalia,  
 Nugaal  
 Somalia,  
 Nugaal  
 Somalia,  
 Sanaag  
 Somalia,  
 Shabeellaha  
 Dhexe  
 Somalia,  
 Shabeellaha  
 Hoose  
 Somalia, Sool  
 Somalia,  
 Togdheer  
 Somalia,  
 Woqooyi  
 Galbeed  
 Somalia,  
 Woqooyi  
 Galbeed  
 South Africa,  
 Eastern Cape  
 South Africa,  
 Free State  
 South Africa,  
 Gauteng  
 South Africa,  
 KwaZulu-Nata

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South Africa,  
 Limpopo  
 South Africa,  
 Mpumalanga  
 South Africa,  
 North-West  
 South Africa,  
 North-Western  
 Province  
 South Africa,  
 Northern  
 Cape  
 South Africa,  
 Western Cape  
 Spain,  
 Andalucia  
 Spain, Aragon  
 Spain,  
 Asturias  
 Spain,  
 Canarias  
 Spain,  
 Cantabria  
 Spain, Castilla  
 y Leon  
 Spain,  
 Castilla-La  
 Mancha  
 Spain,  
 Catalonia  
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 Comunidad  
 Valenciana  
 Spain,  
 Extremadura  
 Spain, Galicia  
 Spain, Islas  
 Baleares  
 Spain, La  
 Rioja  
 Spain, Madrid  
 Spain, Murcia  
 Spain,  
 Navarra  
 Spain, Pais  
 Vasco  
 Sri Lanka,  
 Amparai

Sri Lanka,  
 Anuradhapura  
 Sri Lanka,  
 Badulla  
 Sri Lanka,  
 Batticaloa  
 Sri Lanka,  
 Central  
 Sri Lanka,  
 Colombo  
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 Galle  
 Sri Lanka,  
 Gampaha  
 Sri Lanka,  
 Hambantota  
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 Jaffna  
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 Kalutara  
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 Kandy  
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 Kegalla  
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 Kurunegala  
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 Mannar  
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 Matale  
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 Matara  
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 Moneragala  
 Sri Lanka,  
 Mullaittivu  
 Sri Lanka,  
 North Central  
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 North Western  
 Sri Lanka,  
 Northern  
 Sri Lanka,  
 Nuwara Eliya  
 Sri Lanka,  
 Polonnaruwa  
 Sri Lanka,  
 Puttalam  
 Sri Lanka,

Ratnapura  
 Sri Lanka,  
 Sabaragamuwa  
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 Sri Lanka,  
 Southern  
 Sri Lanka,  
 Trincomalee  
 Sri Lanka,  
 Uva  
 Sri Lanka,  
 Vavuniya  
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 Western  
 Sudan, Al  
 Istiwa'iyah  
 Sudan, Al  
 Khartoum  
 Sudan, Al  
 Wahadah  
 State  
 Sudan, Al  
 Wusta  
 Sudan, Ash  
 Shamaliyah  
 Sudan, Ash  
 Sharqiyah  
 Sudan, Bahr  
 al Ghazal  
 Sudan,  
 Central  
 Equatoria  
 State  
 Sudan, Darfur  
 Sudan,  
 Kurdufan  
 Sudan, Upper  
 Nile  
 Suriname,  
 Brokopondo  
 Suriname,  
 Commewijne  
 Suriname,  
 Coronie  
 Suriname,  
 Marowijne  
 Suriname,  
 Nickerie  
 Suriname,

Para  
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 Paramaribo  
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 Saramacca  
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 Sipaliwini  
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 Wanica  
 Swaziland,  
 Hhohho  
 Swaziland,  
 Lubombo  
 Swaziland,  
 Manzini  
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 Praslin  
 Swaziland,  
 Shiselweni  
 Sweden,  
 Blekinge Lan  
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 Dalarnas Lan  
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 Gavleborgs  
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 Gotlands Lan  
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 Hallands Lan  
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 Jamtlands Lan  
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 Jonkopings  
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 Norrbottens  
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 Vaud  
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 Zug  
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 Zurich  
 Syrian Arab  
 Republic, Al  
 Hasakah  
 Syrian Arab  
 Republic, Al  
 Ladhqiyyah  
 Syrian Arab  
 Republic, Al  
 Qunaytirah  
 Syrian Arab  
 Republic, Ar  
 Raqqah  
 Syrian Arab  
 Republic, As  
 Suwayda'  
 Syrian Arab  
 Republic, Dar  
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 Republic,  
 Dayr az Zawr



Syrian Arab  
 Republic,  
 Dimashq  
 Syrian Arab  
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 Halab  
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 Hamah  
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 Syrian Arab  
 Republic, Idlib  
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 Republic, Rif  
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T - Z

Taiwan,  
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 Tajikistan,  
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 Hong Son  
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 Thailand, Nan  
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 Nong Khai  
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 Nonthaburi  
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 Pathum Thani  
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 Phetchaburi  
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 Phichit  
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 Phitsanulok  
 Thailand, Phra  
 Nakhon Si  
 Ayutthaya  
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Phrae  
Thailand,  
Phuket  
Thailand,  
Prachin Buri  
Thailand,  
Prachuap  
Khiri Khan  
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Ranong  
Thailand,  
Ratchaburi  
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Rayong  
Thailand, Roi  
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Thailand, Sa  
Kaeo  
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Sakon  
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Samut Prakan  
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Sakhon  
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Samut  
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Thailand,  
Saraburi  
Thailand,  
Satun  
Thailand, Sing  
Buri  
Thailand,  
Sisaket  
Thailand,  
Songkhla  
Thailand,  
Sukhothai  
Thailand,  
Suphan Buri  
Thailand,  
Surat Thani  
Thailand,  
Surin  
Thailand, Tak  
Thailand,

Trang  
 Thailand, Trat  
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 Ubon  
 Ratchathani  
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 Ratchathani  
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 Udon Thani  
 Thailand,  
 Uthai Thani  
 Thailand,  
 Uttaradit  
 Thailand, Yala  
 Thailand,  
 Yasothon  
 The Bahamas,  
 Acklins and  
 Crooked  
 Islands  
 The Bahamas,  
 Bimini  
 The Bahamas,  
 Cat Island  
 The Bahamas,  
 Exuma  
 The Bahamas,  
 Freeport  
 The Bahamas,  
 Fresh Creek  
 The Bahamas,  
 Governor's  
 Harbour  
 The Bahamas,  
 Green Turtle  
 Cay  
 The Bahamas,  
 Harbour  
 Island  
 The Bahamas,  
 High Rock  
 The Bahamas,  
 Inagua  
 The Bahamas,  
 Kemps Bay  
 The Bahamas,  
 Long Island  
 The Bahamas,

Marsh  
 Harbour  
 The Bahamas,  
 Mayaguana  
 The Bahamas,  
 New  
 Providence  
 The Bahamas,  
 Nichollstown  
 and Berry  
 Islands  
 The Bahamas,  
 Ragged Island  
 The Bahamas,  
 Rock Sound  
 The Bahamas,  
 San Salvador  
 and Rum Cay  
 The Bahamas,  
 Sandy Point  
 Togo,  
 Centrale  
 Togo, Kara  
 Togo,  
 Maritime  
 Togo,  
 Plateaux  
 Togo,  
 Savanes  
 Tonga, Ha  
 Tonga,  
 Tongatapu  
 Tonga, Vava  
 Trinidad and  
 Tobago,  
 Arima  
 Trinidad and  
 Tobago,  
 Caroni  
 Trinidad and  
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 Mayaro  
 Trinidad and  
 Tobago,  
 Nariva  
 Trinidad and  
 Tobago,  
 Port-of-Spain  
 Trinidad and

Tobago, Saint  
 Andrew  
 Trinidad and  
 Tobago, Saint  
 David  
 Trinidad and  
 Tobago, Saint  
 George  
 Trinidad and  
 Tobago, Saint  
 Patrick  
 Trinidad and  
 Tobago, San  
 Fernando  
 Trinidad and  
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 Trinidad and  
 Tobago,  
 Victoria  
 Tunisia, Aiana  
 Tunisia, Al  
 Mahdia  
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 Munastir  
 Tunisia, Bajah  
 Tunisia, Ben  
 Arous  
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 Bizerte  
 Tunisia, El Kef  
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 Jendouba  
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 Kasserine  
 Tunisia, Kebili  
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 Nabeul  
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 Qafsah  
 Tunisia, Sfax



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 Bou Zid  
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 Siliana  
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 Turkey, Adana  
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 Adiyaman  
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 Turkey, Agri  
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 Aksaray  
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 Amasya  
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 Ankara  
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 Ardahan  
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 Balikesir  
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 Batman  
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 Turkey, Bingol  
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 Turkey, Bolu  
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 Burdur  
 Turkey, Bursa  
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Cankiri  
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Corum  
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Denizli  
Turkey,  
Diyarbakir  
Turkey, Duzce  
Turkey, Edirne  
Turkey, Elazig  
Turkey,  
Erzincan  
Turkey,  
Erzurum  
Turkey,  
Eskisehir  
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Gaziantep  
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Giresun  
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Gumushane  
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Hakkari  
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Turkey, Igdir  
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Isparta  
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Istanbul  
Turkey, Izmir  
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Kahramanmar  
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Karabuk  
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Karaman  
Turkey, Kars  
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Kastamonu  
Turkey,  
Kayseri  
Turkey, Kilis  
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Kirsehir  
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Kocaeli  
Turkey, Konya  
Turkey,  
Kutahya  
Turkey,  
Malatya  
Turkey,  
Manisa  
Turkey,  
Mardin  
Turkey,  
Mersin  
Turkey, Mugla  
Turkey, Mus  
Turkey,  
Nevsehir  
Turkey, Nigde  
Turkey, Ordu  
Turkey,  
Osmaniye  
Turkey, Rize  
Turkey,  
Sakarya  
Turkey,  
Samsun  
Turkey,  
Sanliurfa  
Turkey, Siirt  
Turkey, Sinop  
Turkey, Sirnak  
Turkey, Sivas  
Turkey,  
Tekirdag  
Turkey, Tokat  
Turkey,  
Trabzon  
Turkey,  
Tunceli  
Turkey, Usak  
Turkey, Van  
Turkey,  
Yalova  
Turkey,  
Yozgat  
Turkey,  
Zonguldak  
Turkmenistan,

Ahal  
 Turkmenistan,  
 Balkan  
 Turkmenistan,  
 Dashoguz  
 Turkmenistan,  
 Lebap  
 Turkmenistan,  
 Mary  
 Uganda,  
 Adjumani  
 Uganda, Apac  
 Uganda, Arua  
 Uganda,  
 Bugiri  
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 Bundibugyo  
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 Bushenyi  
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 Busia  
 Uganda, Gulu  
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 Hoima  
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 Iganga  
 Uganda, Jinja  
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 Kabarole  
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 Kaberamaido  
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 Kalangala  
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 Kamuli  
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 Kapchorwa  
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 Kasese  
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 Kayunga

Uganda,  
 Kibale  
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 Kisoro  
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 Kitgum  
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 Kotido  
 Uganda, Kumi  
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 Kyenjojo  
 Uganda, Lira  
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 Luwero  
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 Masaka  
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 Masindi  
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 Mayuge  
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 Mbale  
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 Mbarara  
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 Moroto  
 Uganda, Moyo  
 Uganda, Mpigi  
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 Mubende  
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 Mukono  
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 Nakapiripirit  
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 Nakasongola  
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 Nebbi  
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 Ntungamo  
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 Pader  
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 Pallisa  
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 Rakai  
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Rukungiri  
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 Sembabule  
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 Sironko  
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 Soroti  
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 Tororo  
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 Wakiso  
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 Yumbe  
 Ukraine,  
 Cherkas'ka  
 Oblast'  
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 Chernihivs'ka  
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 ka Oblast'  
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 Donetsk'ka  
 Oblast'  
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 Ivano-Frankiv  
 s'ka Oblast'  
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 Kharkivs'ka  
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 Khersons'ka  
 Oblast'  
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 Khmel'nyts'ka  
 Oblast'  
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 Kirovohrads'k  
 a Oblast'  
 Ukraine, Krym  
 Ukraine, Kyyiv  
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 Kyyivs'ka  
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L'vivs'ka  
Oblast'  
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Luhans'ka  
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Rivnens'ka  
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Sevastopol'  
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Sums'ka  
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Ternopil's'ka  
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United Arab  
Emirates, Abu  
Dhabi  
United Arab  
Emirates,  
Ajman  
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Emirates,  
Dubai

United Arab  
 Emirates,  
 Fujairah  
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 Emirates, Ras  
 Al Khaimah  
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 Umm Al  
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 Aberdeen City  
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 Dundee City  
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Kingdom,  
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 Hammersmith  
 and Fulham  
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 Highland  
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 Hillingdon  
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 Hounslow  
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 Inverclyde  
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 Kingdom, Isle  
 of Anglesey  
 United  
 Kingdom, Isle  
 of Wight  
 United  
 Kingdom,  
 Islington  
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 Kingdom,  
 Kensington  
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## Mobile APM

Mobile Application Performance Management (Mobile APM) provides visibility into the end-user experience of your mobile users. If you have also instrumented your application servers, you can get end-to-end visibility from the mobile device all the way to multiple tiers on the server-side.

The Mobile APM Agents support applications running on iOS and Android.

Before you can use Mobile APM, you must instrument the applications that you want to monitor. See [Instrument a Mobile Application](#).

## What You Can Do with Mobile APM

The mobile agents help you with the following tasks.

### Understand and improve your mobile application's performance

- Know when your application is slow because of networking problems. See [Mobile APM Dashboard](#), [Network Requests List](#).
- Determine whether a request is slow because of your servers or because of the network connection. See [Network Request Dashboard](#).
- Trace an individual request from the initial user action in the mobile application through the associated business transaction(s) on the application server(s). See [Network Request Snapshots](#).
- Estimate the network performance you can expect for different requests, carriers, devices, and geographies by viewing current metrics. See [Monitor Network Requests by Usage Statistics](#).
- Compare your application's performance across application versions. See [Monitor Network Requests by Mobile Application Version](#).

### Reduce crashes

- Observe when your application crashes and what caused each crash. See [Crash Snapshots List](#), [Crash Snapshots](#).
- Learn which environments experience the most crashes. See [Crash Dashboard](#).

### Reduce errors

- Observe how many network errors occur and which requests caused them. See [Network Requests List](#), [Network Request Dashboard](#).

### Learn about your users

- Learn which devices and technologies most of your users are running. See [Monitor Network Requests by Usage Statistics](#), [Crash Dashboard](#).
- View where your users are located in the world. See [Monitor Mobile Applications by Location](#).

### Learn More

- [Prepare for Mobile APM Deployment](#)
- [Instrument a Mobile Application](#)

### Prepare for Mobile APM Deployment

- [Prerequisites for Instrumenting a Mobile Application](#)
- [Choosing a Mobile Application to Instrument](#)
  - [To create an application manually in AppDynamics](#)
- [Reviewing Controller Capacity](#)
- [Enabling and Disabling Mobile APM](#)
  - [To enable or disable mobile APM](#)
- [Instrumenting Your Application](#)

### Prerequisites for Instrumenting a Mobile Application

For every mobile application that you will monitor, you need to instrument that application with an AppDynamics Mobile APM Agent. There are separate agents for iOS and Android.

To instrument a mobile application you need:

- A Mobile APM license. See [Mobile APM Licenses](#).
- Access to your mobile application source code.  
You will need to modify the source code to instrument it.

### Choosing a Mobile Application to Instrument

To generate metrics for AppDynamics to monitor, instrument an application that makes HTTP calls.

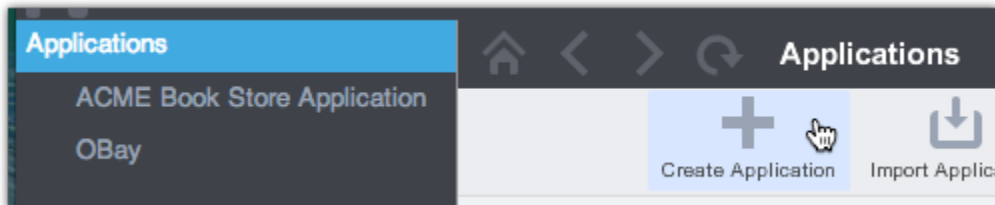
- An iOS application must use `NSURLConnection` to generate network requests that you can monitor in the AppDynamics console.
- An Android application must use `HttpClient` or `URLConnection` to generate network requests that you can monitor in the AppDynamics console.

If your mobile application calls a server application that is instrumented by an AppDynamics app agent and you want correlation between the mobile application and the server-side application, you will select the server-side application when you instrument the mobile application.

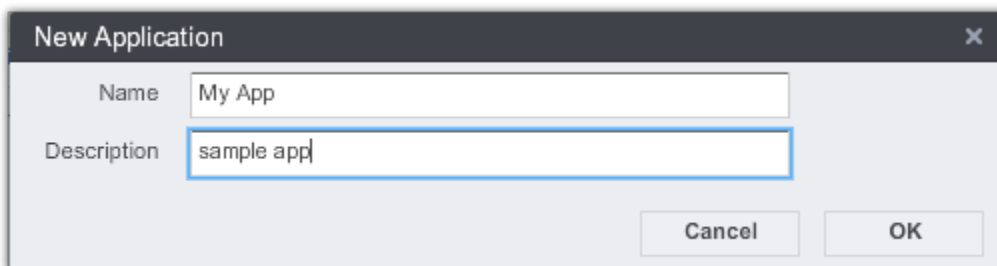
If your mobile application does not communicate with an instrumented server-side application or if it does but you do not want server-side correlation for your mobile application monitoring, you should manually create an application and select that application when you instrument the mobile application.

To create an application manually in AppDynamics

1. Log into the controller with your AppDynamics credentials.
2. In the left navigation pane click **Applications**.
3. In the right pane Click **+ Create Application**.



4. Enter a name and optional description for the mobile application that you will instrument.
5. Click **OK**.



## Reviewing Controller Capacity

If you use an on-premise controller and plan to monitor mobile applications, assess your controller's capacity to accommodate the increase in the number of metrics that Mobile APM will generate. The number of metrics generated depends on the level of activity of your mobile applications. As a rough guide the use of Mobile APM can increase the number of metrics by as much as 15 to 25K per instrumented application if your applications are heavily accessed by mobile users. The actual number depends on how many network requests your applications receive.

For more information about controller sizing see [Hardware Requirements per Performance Profile](#).

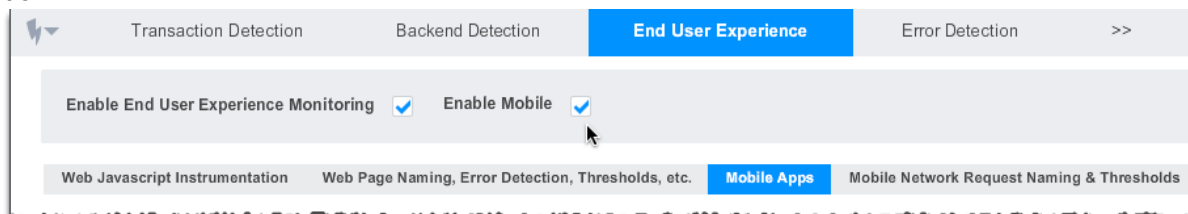
## Enabling and Disabling Mobile APM

To enable or disable mobile APM

In the left navigation pane click **Configure -> Instrumentation**.

1. Click the End User Experience tab.
2. To enable Mobile APM, check the Enable Mobile check box. To disable it, clear the check

box.



## Instrumenting Your Application

The next step is to instrument the mobile applications that you want to monitor with the AppDynamics Mobile APM agent. See [Instrument a Mobile Application](#).

## Supported Environments and Versions for Mobile APM

- Supported Platform Matrix for Mobile APM
  - Operating Systems
  - iDevice Architecture
  - iOS Environments
  - Android Environments

### Supported Platform Matrix for Mobile APM

#### Operating Systems

| Supported Operating System | Version |
|----------------------------|---------|
| iOS                        | 5.1.1+  |
| Android                    | 2.3.3+  |

#### iDevice Architecture

|                  |
|------------------|
| Apple 32-bit ARM |
| Apple 64-bit A7  |

#### iOS Environments

| Supported Framework | Version |
|---------------------|---------|
| XCode               | 5+      |

#### Android Environments

| Supported Framework | Version |
|---------------------|---------|
| Ant                 |         |
| Gradle              |         |
| Maven               | 3.1.1+  |

## Mobile APM Licenses

- Mobile APM License Information
  - To view Mobile APM License Information
- License Key
- License Type
- Usage Period
- Total Mobile EUM Agents Licensed
- Monthly Unique Users Allocated
- Consumed Monthly Unique Users
- Overages

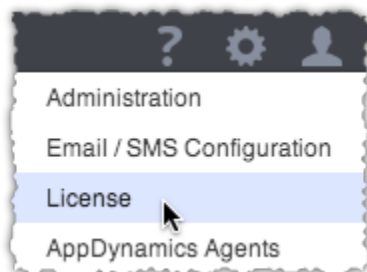
This topic describes how to interpret the details of your Mobile APM license information.

### Mobile APM License Information

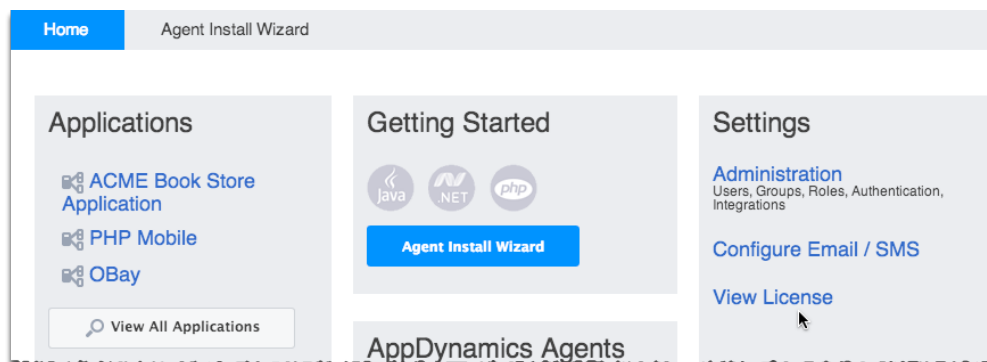
Your Mobile APM license is separate from your application server and Web End User Monitoring licenses.

To view Mobile APM License Information

1. In the upper right section of the AppDynamics console, click **Settings -> License**.



or on the Home screen in the AppDynamics under Settings click **View License**.



2. Scroll down to the Mobile entries under End User Monitoring.

|                                  |              |                         |
|----------------------------------|--------------|-------------------------|
| Mobile                           |              |                         |
|                                  | Type         | Mobile Lite             |
|                                  | Usage Period | 03/01/2014 - 04/01/2014 |
| Total Mobile EUM Agents Licensed |              | 1                       |
| Monthly Unique Users Allocated   |              | 50                      |
| Consumed Monthly Unique Users    |              | 4                       |
| Allow Overages                   |              | Yes                     |

## License Key

This is the unique identifier that AppDynamics uses to associate end user data, both Web and Mobile, to your account. From a practical perspective you only need to know this information for troubleshooting purposes. The same key applies to Web EUM and Mobile APM services. However each product has its own types and quantity of agents.

## License Type

There are two license types:

- Mobile Pro (Paid) license covers the number of Mobile Pro license units you have purchased. Each Mobile Pro license allows you to monitor a fixed number of active users per application per month. This number is specified in your AppDynamics service agreement.
- Mobile Lite (Free) provides one Mobile Lite license unit. Mobile Lite allows you to monitor 50 active users per month, which enables you to try the product and get some value from it without signing up for a paid account.

By purchasing additional Mobile Pro license units, you can increase the number of unique mobile users allocated to your account. If you have not purchased a Mobile Pro account, you will receive a Mobile Lite account.

## Usage Period

The usage period for mobile is always the current month, even if you have a multi-year license.

The usage period begins and the meter resets on the first of each month at 12:00pm Pacific time.

## Total Mobile EUM Agents Licensed

For a Mobile Pro license, this is the equivalent of the total number of license units licensed by your account.

For a Mobile Lite license, this is one Lite license unit, which provides your account with the ability to monitor 50 unique users per month.

## Monthly Unique Users Allocated

This is the number of unique mobile users per month allocated by your license.

Each Mobile Pro license unit provides a number of unique mobile users per month per native mobile app instrumented with AppDynamics iOS or Android SDK. To get your total number of unique users AppDynamics multiplies the number of licenses you have by the number of unique mobile users per license.

You cannot carry over unused allocated users from month to month.

## Consumed Monthly Unique Users

This is the number of monthly unique users actually monitored during the current month. The month begins on the 1st at 12:00pm Pacific time, at which time this value is reset to zero.

If this value is greater than Monthly Unique Users Allocated and your license allows overages, you are incurring overage charges.

When your consumed monthly usage is at 90% of of your month allocation you will see a warning in the mobile APM dashboard.

## Overages

How overages are handled is determined by the terms of your license agreement.

If your license does not allow overages, AppDynamics continues reporting mobile metrics generated by users who started using your application before you consumed all your allocated users. However, it does not report metrics for additional unique users. For example, if your license allows 50,000 monthly users, the agent does not report metrics generated by the 50,001st unique user and beyond but will continue to report on the first 50,000 for the rest of the month. Keep in mind that if there are patterns in which certain types of users activate the application in the first part of the month, you may be missing what other types of users are experiencing. Limiting the number of active users licensed is not a recommended way to do sampling.

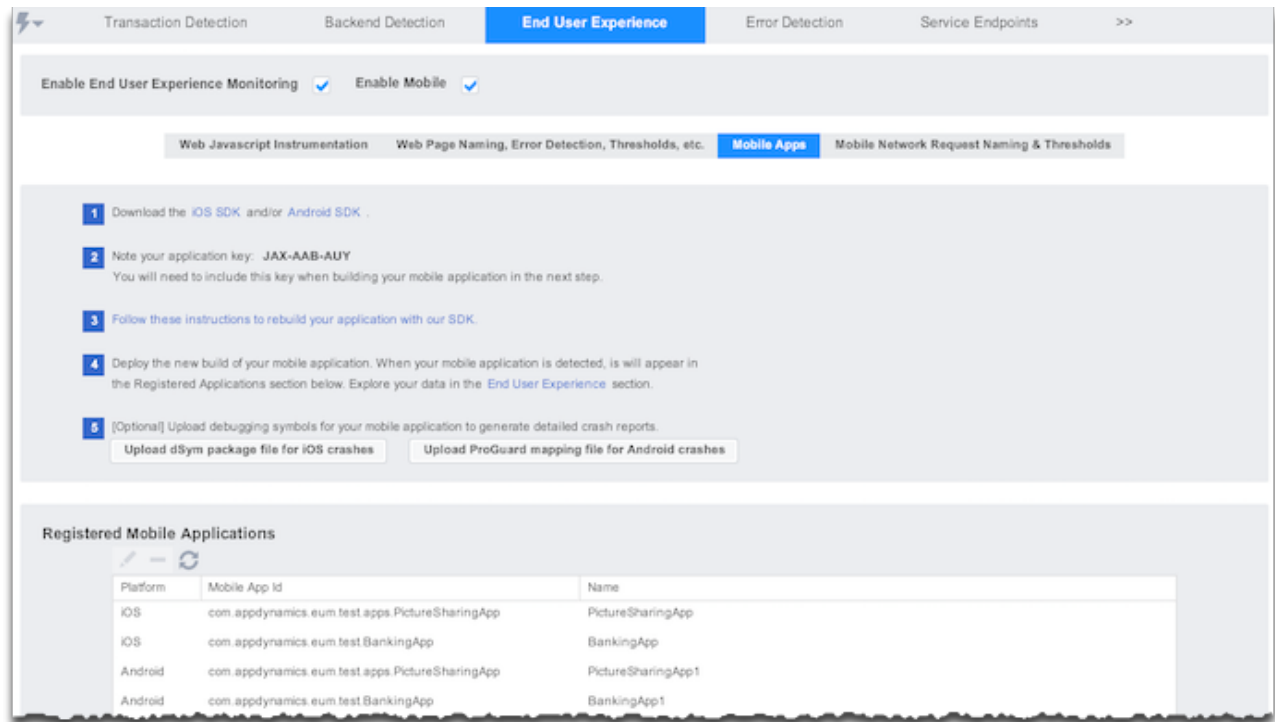
If your license does allow overages and your usage exceeds the limit, AppDynamics continues reporting mobile metrics for additional users and bills you for the overage at the unit rate stipulated by your license agreement.

If you need to stop incurring overage charges, you can disable mobile monitoring by clearing the Enable Mobile check box in the Mobile APM configuration window. This will stop mobile monitoring and stop overage charges after a delay of approximately one minute. See [Enabling and Disabling Mobile APM](#).

## Instrument a Mobile Application

To access the instrumentation window

1. In the left navigation pane, select the application that you are going to instrument. This is either the server-side instrumented application that your mobile application communicates with or an application that you have created manually. See [Prepare for Mobile APM Deployment](#).
2. Click **Configure -> Instrumentation**.
3. Click the End User Experience tab.
4. Click the Mobile Apps subtab.



To instrument an iOS application

See [Instrument an iOS Application](#).

To instrument an Android application

See [Instrument an Android Application](#).

## Instrument an iOS Application

- Downloading the iOS SDK
  - To get the mobile APM SDK for iOS
- Recording the Application Key
- Installing the Framework
- Modifying the Application Source Code
- Adding the Required Libraries
  - To add the libraries
- Rebuilding the Xcode Project
  - To rebuild the Xcode project
- Uploading the dSYM File
  - To get the dSYM file from Xcode
  - To upload the dSYM file to AppDynamics using the UI
- Uploading the dSYM File to AppDynamics Using the API
  - To set up your HTTP basic authentication credentials
  - To send the dSYM file
  - Example dSym Upload Request
  - Example dSym Upload Output

## Downloading the iOS SDK



You must download the SDK separately for each application that you instrument.

**To get the mobile APM SDK for iOS**

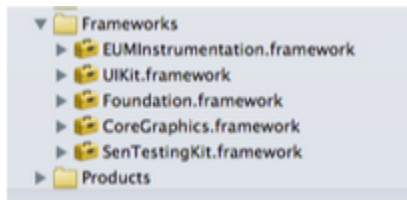
1. In the AppDynamics console, [access the instrumentation window](#).
2. Click the Download the **IOS SDK** link.
3. From the download site download the IOS SDK.

**Recording the Application Key**

Record the application key generated for this application, displayed under 2. You will need this key when you modify the source code.

**Installing the Framework**

Add the downloaded EUMInstrumentation framework to the Frameworks folder of your app's Xcode project. You can do this by dragging the EUMInstrumentation.framework directory into your project's Frameworks directory.



**Modifying the Application Source Code**

Edit your app's main() function to initialize the mobile agent as soon as the app launches.

1. In your application's main.m, add this import:

```
#import <ADEUMInstrumentation/ADEUMInstrumentation.h>
```

2. Add the call to ADEUMInstrumentation initWithKey passing your app key as a parameter by adding this line of code to the beginning of your application's main function:

```
[ADEUMInstrumentation initWithKey:@"$CURRENT_APP_KEY"];
```

Your main.m should look something like this:

```
#import <UIKit/UIKit.h>
#import <ADEUMInstrumentation/ADEUMInstrumentation.h>

#import "AppDelegate.h"

int main(int argc, char *argv[])
{
    [ADEUMInstrumentation initWithKey:@"<your key app here>"];
    @autoreleasepool {
        return UIApplicationMain(argc, argv, nil,
    NSStringFromClass([AppDelegate class]));
    }
}
```

3. Save the file.

### Adding the Required Libraries

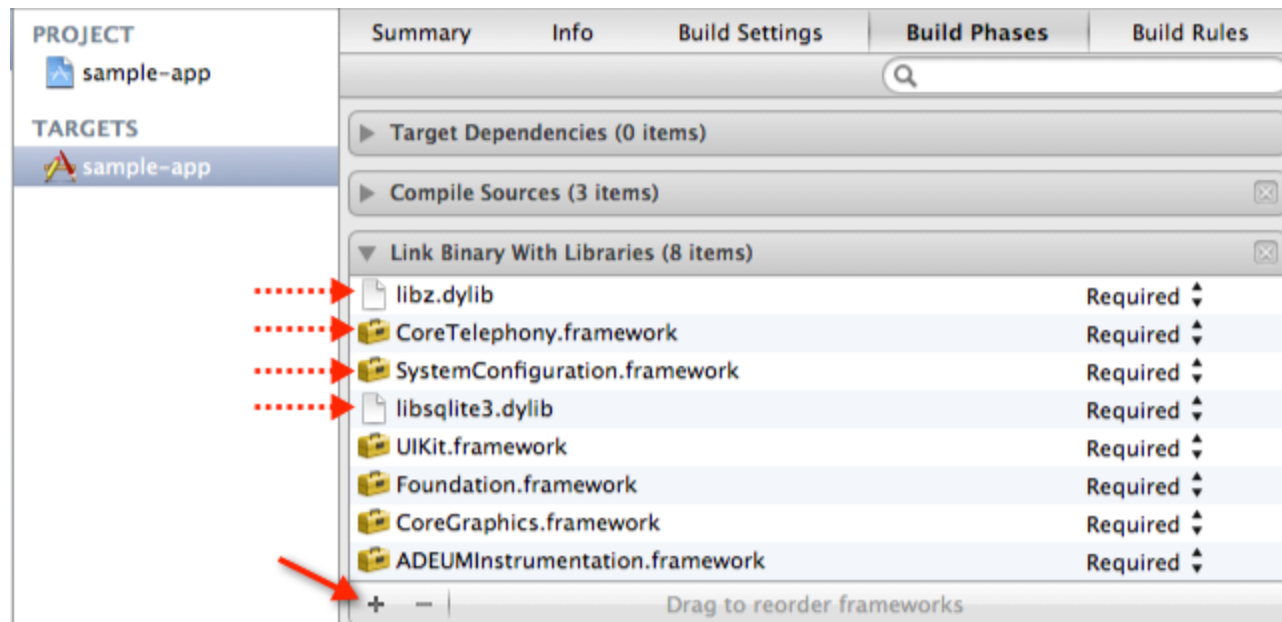
The Appdynamics iOS agent requires the following libraries:

- SystemConfiguration.framework
- CoreTelephony.framework
- libz.dylib
- libsqlite3.dylib

#### *To add the libraries*

1. Select the target that builds your app in Xcode.
2. Select the Build Phases tab.
3. Expand the Link Binary With Libraries section.
4. If any of the above libraries are not listed:
  - Click the **+** button.
  - Locate the missing library in the list.
  - Click **Add**.

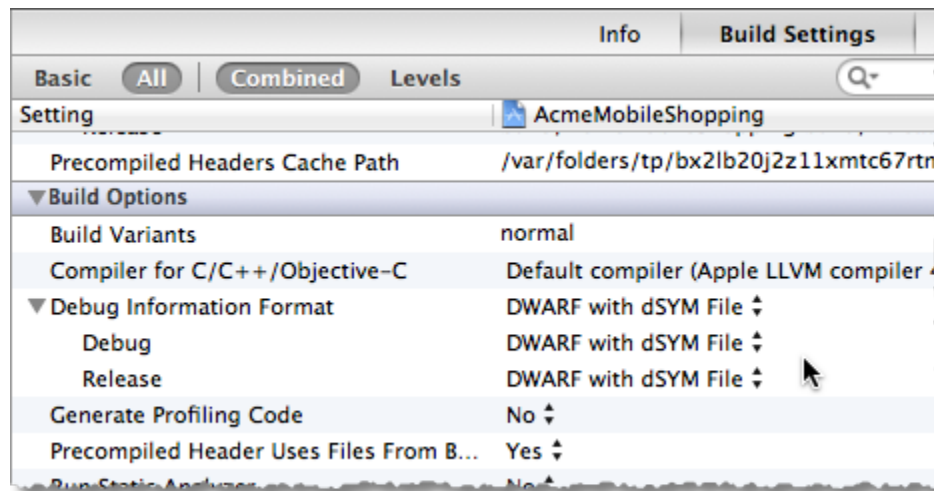
Repeat this step for each missing library.



### Rebuilding the Xcode Project

Rebuild the project with the modified application code.

To enable the agent to provide human-readable information in the crash snapshots that are produced if the application crashes, compile with the DWARF with dSYM file option to create a debug symbols file for the application. For more details about why you would want to do this see [Get Human-Readable Crash Snapshots](#).



### To rebuild the Xcode project

1. In Xcode, select your project in the Project Navigator.
2. In the target list, select the target that builds your application.
3. Select the Build Settings tab.
4. In the Build Options section, make sure that the Debugging Information Format is set to "DWARF with dSYM File".
5. Rebuild the Xcode project.

## Uploading the dSYM File

This step is optional but highly recommended if you plan to monitor crashes. AppDynamics needs the dSYM file for the application to produce human-readable stack traces for crash snapshots.

For details about why you should do this, see [Get Human-Readable Crash Snapshots](#).

If you update the application, you need to provide the new dSYM file for the new application version.

The dSYM file contains an UUID that links it to a specific Xcode build, so AppDynamics can unambiguously match the correct dSYM file with an incoming crash report with no additional information.

First get the dSYM file from Xcode. Then upload it to AppDynamics

You can upload the dSYM file using the instrumentation screen in the Controller UI or use a special REST API. Perform the upload separately for each dSYM file that you are providing.

### *To get the dSYM file from Xcode*

1. In Xcode, run the Xcode build: **Product > Build**.
2. View the log navigator: **View > Navigators > Show Log Navigator**.
3. Click the log entry for the most recent build.
4. Near the end of the log, find and mouse over the log entry named "Generate <Your\_App\_Name>.app.dSYM".
5. Click the button on the right side of the entry you found in step #4 to expand it. The end of the displayed command is the path to the dSYM file.
6. Navigate to this dSYM file in the Finder.
7. Right click on the dSYM file and choose **Compress**.
8. Upload to AppDynamics the .zip file that Finder generates.

### *To upload the dSYM file to AppDynamics using the UI*

1. [Access the instrumentation window](#).
2. Click the **Upload dSym package file for iOS crashes** button.
3. In the Xcode dSym package upload window click **Select zipped dSym file**.  
The uploader expects a file with a .zip extension.
4. In the file browser locate the zipped dSYM file for the application that you are instrumenting and click **Open**.
5. Click **Upload**.

### Uploading the dSYM File to AppDynamics Using the API

The api uses HTTP basic authentication to send a PUT request to AppDynamics. The username is your AppDynamics account name and the password is your EUM license key.

### *To set up your HTTP basic authentication credentials*

1. In the upper right section of the Controller UI, click **Settings -> License**.
2. Note the account name at the top of the Account panel. This will be your username for authentication.
3. Note the license key at the top of the End User Monitoring panel. This will be your password for authentication.

| Account         |                 |
|-----------------|-----------------|
| Name            | customer1       |
| Edition         | AppDynamics Pro |
| Access Key      | SJ5b2m7d1\$354  |
| Expiration Date | 11/24/2016      |

| Application          |       |
|----------------------|-------|
| Java Agents Licensed | 2,000 |
| .NET Agents Licensed | 2,000 |
| PHP Agents Licensed  | 2,000 |

| Infrastructure          |       |
|-------------------------|-------|
| Machine Agents Licensed | 2,000 |

| End User Monitoring |                                      |
|---------------------|--------------------------------------|
| License Key         | 1084871d-1ebc-442f-bb91-7ebe21943757 |

4. **URL-encode** the account name and the license key.
5. Generate an authentication string of the form: "<URL-encoded EUM account name>:<URL-encoded EUM license key>" and **base64** encode it. You will use this string the following step.
6. Add an authentication header to each request, setting its value to "Basic <authentication string>"

#### **To send the dSYM file**

Send the dSym as a zip archive in the body of a PUT request to the following URI:

```
https://api.eum-appdynamics.com/eumaggregator/crash-reports/iOSDSym
```

The content type of the body must be application/zip if the file is a zip file or application/gzip if it is a gzip file. Only these formats are accepted.

#### **Example dSym Upload Request**

The following example uses curl to send a dSym file named UISampleApp.app.dSYM.zip. The account name is "Example account " and the license key/password is Example-License-Key-4e8ec2ae6cfe. The plus signs replace spaces in the account name when the account name is URL-encoded.

```
curl -v --upload-file UISampleApp.app.dSYM.zip --user
Example+account:Example-License-Key-4e8ec2ae6cfe
https://api.eum-appdynamics.com/eumaggregator/crash-reports/iOSDSym
```

### **Example dSym Upload Output**

The successful output of the example request looks like this:

```
* About to connect() to api.eum-appdynamics.com port 443 (#0)*
Trying ::1...
* connected
* Connected to api.eum-appdynamics.com (::1) port 443 (#0)
* Server auth using Basic with user 'Example+account'
> PUT /eumaggregator/crash-reports/iOSDSym HTTP/1.1
> Authorization: Basic
SW50ZXJuYWwrdGVzdCthY2NvdW50OlRlc3RBY2N0LTFlMzktNDVkMy05MzAzLTRlOGVj
MmFlNmNmZQ==
> User-Agent: curl/7.24.0 (x86_64-apple-darwin12.0) libcurl/7.24.0
OpenSSL/0.9.8y zlib/1.2.5
> Host: localhost:7001
> Accept: */*
> Content-Length: 0
> Expect: 100-continue
>
< HTTP/1.1 100 Continue
< HTTP/1.1 200 OK
< Content-Length: 0
< Server: Jetty(8.1.4.v20120524)
<
* Connection #0 to host api.eum-appdynamics.com left intact
* Closing connection #0
```

## **Instrument an Android Application**

- Downloading the Android SDK
  - To get the mobile APM SDK for Android
- Recording the Application Key
- Setting Up Your Environment
  - Setup for Ant
    - To add the AppDynamics Android agent files
    - To add the post-compile hook
  - Setup for Maven
    - To add the AppDynamics Android agent repository to your project
    - To add the maven runtime dependency
    - To add the maven plugin

- Setup for Gradle
  - To add the AppDynamics Android agent repository to your project
  - To modify your build.gradle file
- Integrating ProGuard
- Modifying the Application Source Code
  - To modify the source code
- Adding the Required Permissions
- Rebuilding the Application
- Uploading the ProGuard Mapping File
  - To upload the ProGuard in the UI
  - Uploading the ProGuard Mapping File using the API
    - To set up your HTTP basic authentication credentials
    - To send the mapping file
    - Example Mapping File Upload Request
    - Example Mapping File Output

## Downloading the Android SDK

You must download the SDK separately for each application that you instrument.

### *To get the mobile APM SDK for Android*

1. Go to the mobile instrumentation screen for the application that you will instrument. See [Instrument a Mobile Application](#).
2. Click the Download **Android SDK** link.
3. From the download site download the Android SDK.

## Recording the Application Key

Record the application key generated for this application. You will need this key when you modify the source code.

## Setting Up Your Environment

Follow the instructions for your Android environment:

- [Setup for Ant](#)
- [Setup for Maven](#)
- [Setup for Gradle](#)

If you use Eclipse ADT to produce your builds, first build the application with ant and then follow the instructions for the Android Ant installation.

### Setup for Ant

If your build system is ant you must:

- [Add agent files to the project.](#)
- [Add the post-compile hook.](#)

### *To add the AppDynamics Android agent files*

1. Copy ADEumAgent.jar to the libs subdirectory in your project.
2. Copy ADEumInjector.jar to your project's root directory.

**To add the post-compile hook**

Do one of the following:

**If there is no custom\_rules.xml file in your project:**

1. Create a file in your project's root directory named custom\_rules.xml.
2. Copy and paste the following text into custom\_rules.xml.

```
<project>
  <target name="-post-compile">
    <taskdef name="injector"

    classname="com.appdynamics.android.ant.EUMAgentInjectorTask"
      classpath="ADEUMInjector.jar"/>
    <injector classfilespace="${out.classes.absolute.dir}"

    outputlocation="${out.absolute.dir}/instrumented-jars/"

    instrumentationjarlocation="${jar.libs.absolute.dir}/ADEUMAgent.jar"
      jarfilesrefid="project.all.jars.path"

    androidjarlocation="${project.target.android.jar}"/>
  </target>
</project>
```

**If there is an existing custom\_rules.xml file in your project but it does not contain a "-post-compile" <target> element:**

Add the following text to the end of the existing <project> element in the custom\_rules.xml file:

```
<target name="-post-compile">
  <taskdef name="injector"

  classname="com.appdynamics.android.ant.EUMAgentInjectorTask"
    classpath="ADEUMInjector.jar"/>
  <injector classfilespace="${out.classes.absolute.dir}"
    outputlocation="${out.absolute.dir}/instrumented-jars/"

  instrumentationjarlocation="${jar.libs.absolute.dir}/ADEUMAgent.jar"
    jarfilesrefid="project.all.jars.path"
    androidjarlocation="${project.target.android.jar}"/>
</target>
```

**If there is an existing custom\_rules.xml file in your project and it already contains a "-post-compile" <target> element:**

Add the following text to the end of the existing "-post-compile" <target> element in the custom\_rules.xml file:



```
<taskdef name="injector"

classname="com.appdynamics.android.ant.EUMAgentInjectorTask"
    classpath="ADEUMInjector.jar"/>
    <injector classfilespace="${out.classes.absolute.dir}"
        outputlocation="${out.absolute.dir}/instrumented-jars/"

instrumentationjarlocation="${jar.libs.absolute.dir}/ADEUMAgent.jar"
    jarfilesrefid="project.all.jars.path"
    androidjarlocation="${project.target.android.jar}"/>
```

#### Setup for Maven

If your build system is maven you must:

- [Add agent repository.](#)
- [Add the maven runtime dependency.](#)
- [Add the maven plugin.](#)

These instructions assume you are building your application using the android-maven-plugin with Maven 3.1.1+.

#### ***To add the AppDynamics Android agent repository to your project***

1. Copy the adeum-maven-repo directory to your project directory. This is the directory that contains pom.xml.
2. Add the following code to your pom.xml file:

```
<repositories>
    <repository>
        <id>adeum</id>
        <name>AppDynamics Repo</name>
        <url>file://${project.basedir}/adeum-maven-repo</url>
    </repository>
</repositories>
```

#### ***To add the maven runtime dependency***

Add the following code to the <dependencies> section of your pom.xml:

```
<dependency>
    <groupId>com.appdynamics</groupId>
    <artifactId>appdynamics-runtime</artifactId>
    <version>1.0</version>
</dependency>
```

#### ***To add the maven plugin***

Add the following code to the <plugins> section of your pom.xml:

```
<plugin>
  <groupId>com.appdynamics</groupId>
  <artifactId>appdynamics-maven-plugin</artifactId>
  <version>1.0</version>
  <executions>
    <execution>
      <phase>compile</phase>
      <goals>
        <goal>adinject</goal>
      </goals>
    </execution>
  </executions>
</plugin>
```

#### Setup for Gradle

If your build system is gradle:

- Add the AppDynamics Android agent repository to your project.
- Modify your build.gradle file.

#### *To add the AppDynamics Android agent repository to your project*

Copy the adeum-maven-repo directory to your project directory. This is the same directory that contains build.gradle.

#### *To modify your build.gradle file*

Make the following changes to build.gradle:

1. Edit or create the "buildscript" section and:
  - a. Add "adeum-maven-repo" as a repository
  - b. Add the appropriate version of the AppDynamics plugin as a "classpath" dependency. See the table to determine the correct version.

| Gradle version | Android Tools plugin version      | AppDynamics plugin version   | AppDynamics version |
|----------------|-----------------------------------|--|---------------------|
| 1.9            | 0.7.0,<br>0.7.1,0.7.3,0.8.3,0.9.2 | These Android Tools versions do not support this version of Gradle |                     |
| 1.8            | 0.6.3                             | com.appdynamics:appdynamics-gradle-plugin:1.0                      | 3.8.0 and later     |

|      |                    |   |                 |
|------|--------------------|---|-----------------|
| 1.10 | 0.7.3,0.8.3, 0.9.2 | com.appdynamics:<br>appdynamics-gradle-plugin:2.0 | 3.8.3 and later |
|      | 0.10.x             | Not supported yet                                 |                 |

2. In the main section:

- Add the "adeum" plugin immediately after the "android" plugin.
- Add "adeum-maven-repo" as a dependency.
- Add the appropriate version of the AppDynamics plugin as a compile-time dependency.

After you have added all the AppDynamics Android Agent requirements, your build.gradle file will have information similar to this:

```
buildscript {
    repositories {
        maven {
            url uri('adeum-maven-repo')
        }
    }
    dependencies {
        classpath 'com.appdynamics:appdynamics-gradle-plugin:1.0'
    }
}

apply plugin: 'android'
apply plugin: 'adeum'

repositories {
    maven {
        url uri('adeum-maven-repo')
    }
}

dependencies {
    compile 'com.appdynamics:appdynamics-runtime:1.0'
}
```

### Integrating ProGuard

If you use ProGuard to verify or optimize your code, add the following lines to your proguard.cfg:

```
-keep class com.appdynamics.eumagent.runtime.DontObfuscate
-keep @com.appdynamics.eumagent.runtime.DontObfuscate class * { *; }
```

If you use Proguard to obfuscate your code, note the name and location of the mapping file that ProGuard produced, because AppDynamics will need this file to create human-readable crash

snapshots. See [Uploading the ProGuard Mapping File](#). Every time the application is changed and recompiled the ProGuard mapping file changes also, so you need to upload the new mapping file to AppDynamics every time you modify the app.

### Modifying the Application Source Code

Modify the source code to initialize the mobile agent as soon as the app launches. A good place to do this is the `onCreate()` method of your application's primary Activity.

#### *To modify the source code*

In the source file that defines your application's primary Activity, add the following import:

```
import com.appdynamics.eumagent.runtime.Instrumentation;
```

In your primary Activity's `onCreate()` method, add the following line:

```
Instrumentation.start("$CURRENT_APP_KEY", getApplicationContext());
```

Save the file.

Your code should look something like this.

```
import com.appdynamics.eumagent.runtime.Instrumentation;
...

@Override
public void onCreate(Bundle savedInstanceState)
{
    ...
    Instrumentation.start("<your app key here>",
    getApplicationContext());
}
```

### Adding the Required Permissions

Open your application's `AndroidManifest.xml` file and verify that it has these permissions:

```
<uses-permission
android:name="android.permission.INTERNET"></uses-permission>
<uses-permission
android:name="android.permission.ACCESS_NETWORK_STATE"></uses-permission>
```

If both of these permissions are not present, add them.

### Rebuilding the Application

Rebuild your application.

### Uploading the ProGuard Mapping File

If you did not obfuscate your application source code, skip this step.

This step is optional but highly recommended if you obfuscated your code and plan to monitor crashes. AppDynamics needs the mapping file for the application to produce human-readable stack traces for crash snapshots. The mapping file is named "mapping.txt".

For details about why you should do this, see [Get Human-Readable Crash Snapshots](#)

If you update the application, you need to upload the new mapping file for the new application version.

To associate the mapping file with the correction version of the application, you need to provide:

- the package name of the Android package for the application
- the version code for that application from the AndroidManifest.xml file

You can either upload the mapping file using the instrumentation screen in the Controller UI or use a special REST API. Perform the upload separately for each ProGuard mapping file that you are providing.

#### *To upload the ProGuard in the UI*

1. [Access the instrumentation window](#).
2. Click the **Upload ProGuard mapping file for Android crashes** button.
3. In the ProGuard mapping file upload window, either select an existing package from the dropdown list or enter a new package name for the mobile application.  
If the application is already registered with the Controller, you can select its package is listed in the dropdown list.  
If the application is not yet registered, enter the package name in the New Package field.
4. Enter the version code (a number) for the package. This is the versionCode property in the AndroidManifest.xml of the application for which this mapping file was generated.
5. Click **Select ProGuard mapping file**.  
The uploader expects a file with .txt extension. The file is named mapping.txt.
6. In the file browser locate and select the mapping file and click **Open**.
7. Click **Upload**.

#### Uploading the ProGuard Mapping File using the API

The api uses HTTP basic authentication to send a PUT request to AppDynamics. The username is your AppDynamics account name and the password is your EUM license key.

#### *To set up your HTTP basic authentication credentials*

1. In the upper right section of the Controller UI, click **Settings -> License**.
2. Note the account name at the top of the Account panel. This will be your username for authentication.
3. Note the license key at the top of the End User Monitoring panel. This will be your password for authentication.

| Account         |                 |
|-----------------|-----------------|
| Name            | customer1       |
| Edition         | AppDynamics Pro |
| Access Key      | SJ5b2m7d1\$354  |
| Expiration Date | 11/24/2016      |

| Application          |       |
|----------------------|-------|
| Java Agents Licensed | 2,000 |
| .NET Agents Licensed | 2,000 |
| PHP Agents Licensed  | 2,000 |

| Infrastructure          |       |
|-------------------------|-------|
| Machine Agents Licensed | 2,000 |

| End User Monitoring |                                      |
|---------------------|--------------------------------------|
| License Key         | 1084871d-1ebc-442f-bb91-7ebe21943757 |

4. **URL-encode** the account name and the license key.
5. Generate an authentication string of the form: "<URL-encoded EUM account name>:<URL-encoded EUM license key>" and **base64** encode it. You will use this string the following step.
6. Add an authentication header to each request, setting its value to "Basic <authentication string>"

#### **To send the mapping file**

Send the ProGuard mapping file as a text file in the body of the PUT request to the following uri:

```
https://api.eum-appdynamics.com/eumaggregator/crash-reports/proguard  
MappingFile/<androidPackageName>/<versionString>
```

These parameters are required:

- **androidPackageName**: name of the Android package for which this mapping file was generated
- **versionString**: string representation of the `versionCode` property in the `AndroidManifest.xml` of the application for which this mapping file was generated

The request body contains the mapping file. The content type of the body is either `text/plain` or `gzip` if the body was ended with `gzip`.

#### **Example Mapping File Upload Request**

The following example uses curl to send a mapping file named mapping.txt. The account name is "Example account" and the license key/password is "Example-License-Key-4e8ec2ae6cfe". The plus signs replace spaces in the account name when the account name is URL-encoded. The package name for the Android application is "com.example.networklogger". The mapping file corresponds to the version with versionCode 1.

```
curl -v --upload-file mapping.txt --user
Example+account:Example-License-Key-4e8ec2ae6cfe
https://api.eum-appdynamics.com/eumagggregator/crash-reports/proguard
MappingFile/com.example.networklogger/1
```

### **Example Mapping File Output**

The successful output of the example request looks like this:

```
* About to connect() to api.eum-appdynamics.com port 443 (#0)
*   Trying ::1...
* connected
* Connected to api.eum-appdynamics.com (::1) port 443 (#0)
* Server auth using Basic with user 'Example+account'
> PUT
/eumagggregator/crash-reports/proguardMappingFile/com.example.network
logger/1 HTTP/1.1
> Authorization: Basic
SW50ZXJuYWwrdGVzdCthY2NvdW50OlRlc3RBY2N0LTFlMzktNDVhMy05MzAzLTRlOGVj
MmFlNmNmZQ==
> User-Agent: curl/7.24.0 (x86_64-apple-darwin12.0) libcurl/7.24.0
OpenSSL/0.9.8y zlib/1.2.5
> Host: app.eum-appdynamics.com
> Accept: */*
> Content-Length: 4
> Expect: 100-continue
>
< HTTP/1.1 100 Continue
* We are completely uploaded and fine
< HTTP/1.1 200 OK
< Content-Length: 0
< Server: Jetty(8.1.4.v20120524)
<
* Connection #0 to host app.eum-appdynamics.com left intact
* Closing connection #0
```

## **Verify Your Instrumentation**

After you have instrumented your application:

1. Cause your instrumented mobile application to generate some network traffic.
2. Wait a few minutes.

3. Check the list of registered mobile applications in the instrumentation window to verify that the application is registered with the controller.
4. Start monitoring your application! See [Monitor Mobile Applications](#).

## Monitor Mobile Applications

The Mobile APM Agents help you monitor network requests and crashes.

You can access all the mobile monitoring features from the [Mobile APM Dashboard](#). You can view this dashboard for all your iOS applications, all your Android applications or for a specific application.

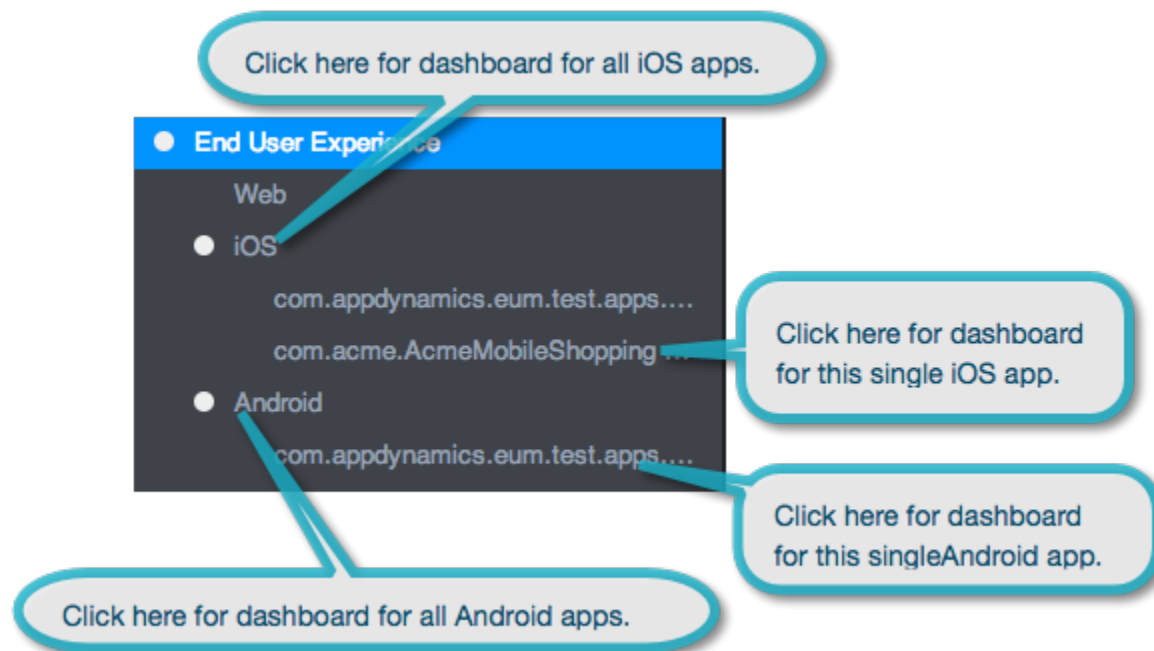
### Mobile APM Dashboard

- [Accessing the Mobile APM Dashboard](#)
- [How the Mobile APM Dashboard is Organized](#)
- [Learn More](#)

You monitor mobile network requests and crashes from the mobile APM dashboards.

#### Accessing the Mobile APM Dashboard

You access the mobile APM dashboards from the End User Experience tree in the left navigation pane.



#### How the Mobile APM Dashboard is Organized

The dashboard is divided into the following tabs:

**Geo Dashboard:** Displays key performance by geographic location. Use this to see which countries are experiencing the highest load, the slowest network request times, and the most



errors. See [Monitor Mobile Applications by Location](#).

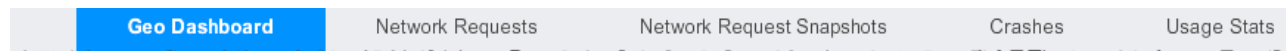
**Network Requests:** Displays all the network requests your applications, along with their key performance indicators.

**Network Request Snapshots:** Displays details about individual network requests that allow you to examine those that are slow or stalled.

**Crashes:** Displays information about application crashes and detailed snapshots of individual crashes that include stack traces of the crashed application.

**Usage Stats:** Displays key network request metrics by various criteria: device, carrier, operating system version, connection type and application.

By default this dashboard opens with the Geo Dashboard tab selected.



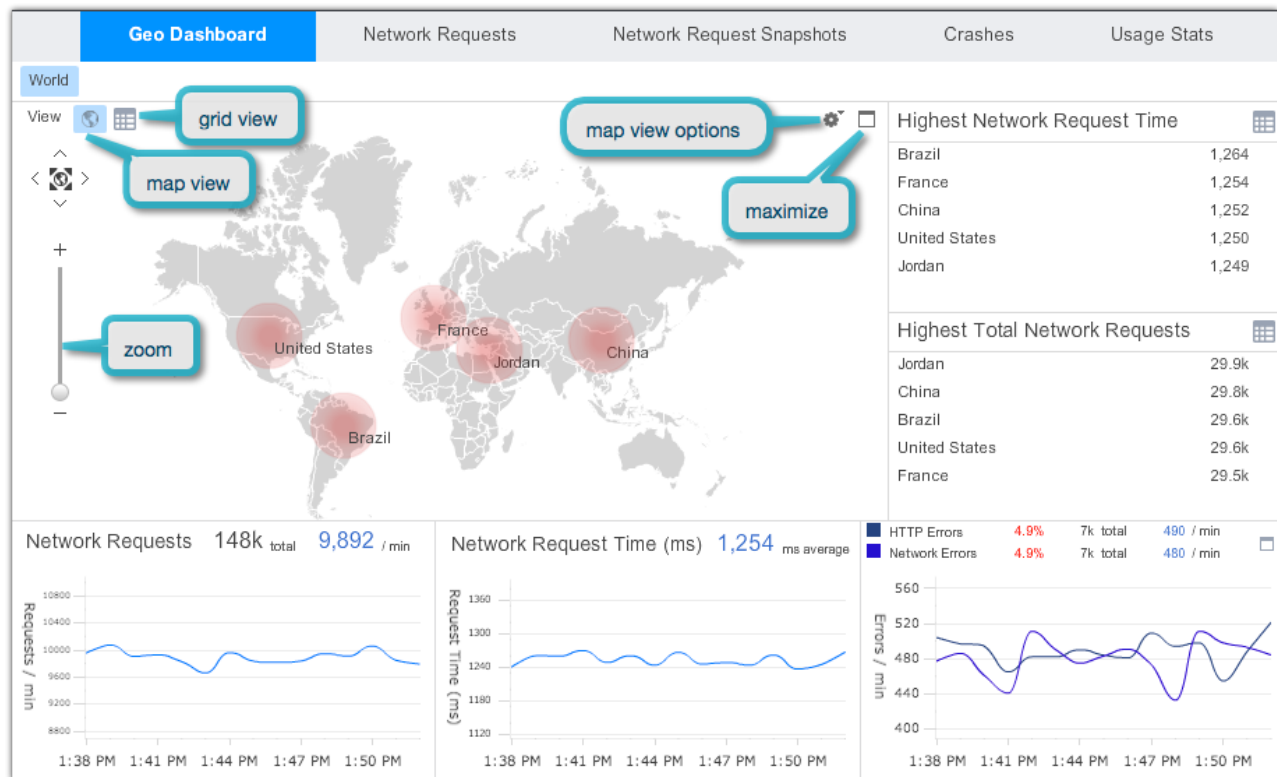
#### Learn More

- [Monitor Network Requests](#)
- [Monitor Crashes](#)
- [Mobile APM Metrics](#)

### Monitor Mobile Applications by Location

- [Mobile Geo Dashboard Window](#)
- [Using Map View](#)
  - [Map Actions](#)
- [Configuring Map View Options](#)
  - [To access the map view options configuration tool](#)
  - [To configure color ranges representing performance thresholds](#)
  - [To configure circle sizes representing load \(total number of network requests\)](#)
  - [To display the map control widget](#)
  - [To view a dark colored or light colored map](#)
- [Unknown Locations in Map and Grid Views](#)
- [Learn More](#)

You monitor performance by location from the geo dashboard tab of the mobile APM dashboard.

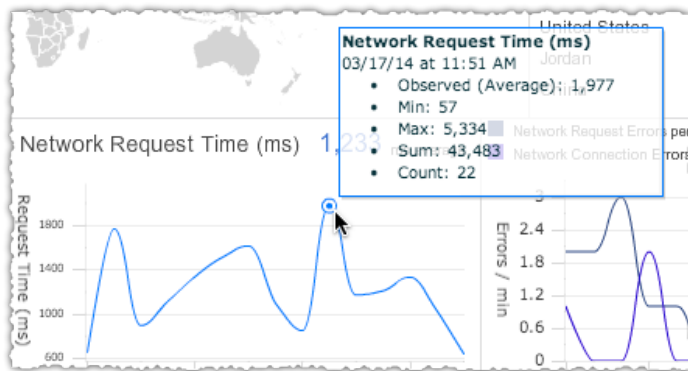


### Mobile Geo Dashboard Window

The window is divided into three panels:

- A main panel in the upper left that displays geographic distribution of mobile users on a map, if you clicked the map view icon, or on a grid if you clicked the grid view icon.
  - You can switch between map view and grid view by clicking these icons.
  - You can expand the map panel or the grid panel to fill the entire dashboard by toggling the expand icon in the upper right corner of the panel.
- A panel on the right displaying:
  - Countries with highest network request times (slowest performance).
  - Countries with the highest number of network requests (highest load).
- Trend graphs in the lower part of the dashboard that dynamically display the number and rate of network requests (load), network request time, and number and rate of HTTP errors and network errors. You can click the rates to see them displayed in the Metric Browser.

You can hover over a point in time in a trend graph to get the precise values at that moment for the individual metric you are hovering over.



The metrics displayed throughout the geo dashboard are for the country currently selected on the map or in the grid. For example, if you zoom down from world view to France in the map, the panel on the right disappears and the trend graphs display data for France.

### Using Map View

The main panel in map view displays a map superimposed with circles that represent average user experience by country.

The size of a circle indicates the relative amount of traffic in a country: the larger the circle the higher the load. The color of a circle represents the relative request time experienced by users in a country: green for a fast request time, yellow for a medium request time, red for a slow request time. Large red circles represent regions of most concern. See [Configuring Map View Options](#) for information on how to adjust circle color and size ranges.

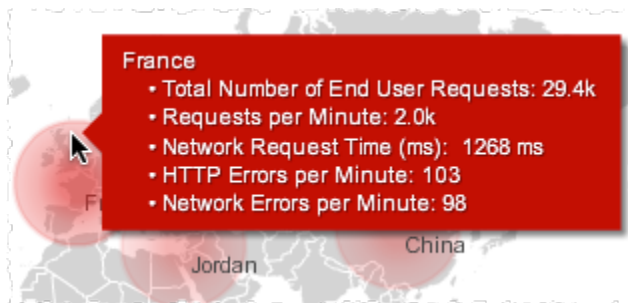
### Map Actions

You can perform the following actions directly in the map:

- Click any country on the map to drill down into metrics for that country. The country is colored blue to indicate that it is drilled down. To return to the world view from the country view, click World in the left corner of the map.



- View summary statistics for a region by hovering over its circle.



- Zoom the entire map using the slider on the left. You can also use your mouse wheel to increase or decrease the map's zoom level.
- Reposition the map by clicking and dragging it or by clicking the directional arrows in the map control widget.

### Configuring Map View Options

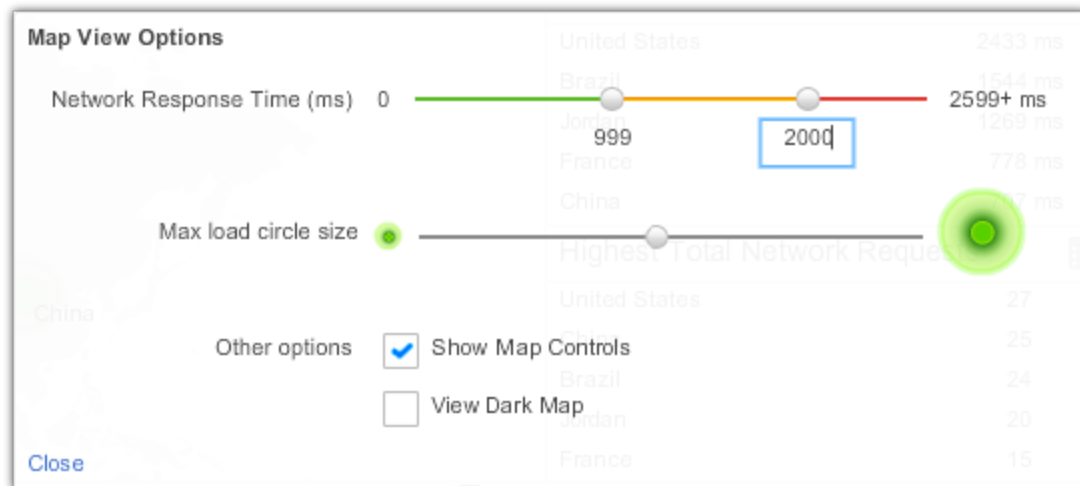
You can configure the dashboard display in a variety of ways:

- The ranges of the colors that indicate normal, warning and critical performance on the map.
- The ranges of circle sizes that indicate relative load on the map.
- Whether to display the zoom slider and Home button on the map.
- Whether to display a dark or light colored map.

All of these configurations are saved for the next time you log into AppDynamics.

#### ***To access the map view options configuration tool***

Click the gear icon in the upper right corner of the map or grid panel to get the configuration window.



**To configure color ranges representing performance thresholds**

Do one of the following:

- Adjust the Network Response Time slider. For example, if you want circles to be red whenever the network request time is 2000 milliseconds or greater, slide the maximum value of the yellow slider value to 2000.

or

- Double-click the text field that indicates the slider threshold value to make it editable, enter the value of the threshold in the text field, and press the tab key. You can enter as large a value as you like in the field (larger than the current maximum displayed value of the slider) and the displayed range of values for the circle color ranges will adjust accordingly.

**To configure circle sizes representing load (total number of network requests)**

Adjust the max load circle size slider to make the circles ranges larger or smaller.

**To display the map control widget**

Check Show Map Controls. To hide them clear this check box. The map controls let you reposition the map using arrows and zoom the map using + and - buttons. After moving or zooming the map, if you want to return to the default zoomed out home view, click the globe icon in the center of the map control widget.

**To view a dark colored or light colored map**

To view a dark colored map check View Dark Map. To view a light colored map clear this check box.

**Unknown Locations in Map and Grid Views**

An unknown location is one for which the mobile agent cannot determine the country from which the request originated.

In map view, you may also see a location named "Unknown" in the highest request times and highest loads panels to the right of the map.

In grid view, aggregated metrics for the unknown locations are displayed under the location name "Unknown".

You may also see metrics reported for a location named "Anonymous Proxy". The data for Anonymous Proxy represents the aggregated metrics from one or more private IP addresses that the agent cannot identify

#### Learn More

- [Mobile APM Metrics](#)
- [Monitor Network Requests](#)
- [Monitor Crashes](#)

## Monitor Network Requests

A network request is an HTTP request from an end-user to your mobile application.

The iOS agent detects network requests for which the underlying implementation is handled by the `NSURLConnection` class.

The Android agent detects network requests for which the underlying implementation is handled by the `HttpURLConnection`, `HttpsURLConnection`, or `HttpClient` classes.

You can monitor the aggregate performance of network requests to all your instrumented iOS applications or all your instrumented Android applications. Or you can monitor the performance of a single application.

There are different ways of viewing network request data:

- **Geographic view** is the top level view that reports aggregated mobile data by geographic location. Monitor the geographic view to learn which countries have the highest number of requests, the longest request times, and the most errors.
- **Network requests lists** display current network requests to your applications. You can sort the list according to key metrics such as the slowest response time, highest error rate, highest load, etc. You can view a **network request dashboard** that summarizes aggregate performance for a specific network request.
- **Network request snapshots** report information for a single instance of a network request taken at a certain point in time. Snapshots are useful for examining the details of the worst-performing requests. Access these snapshots from the **network request snapshots list**.
- **Usage stats** display key network request metrics by various criteria: device, carrier, operating system version, connection type and application. For example, you can see which carriers are the slowest or which devices are producing the most errors.

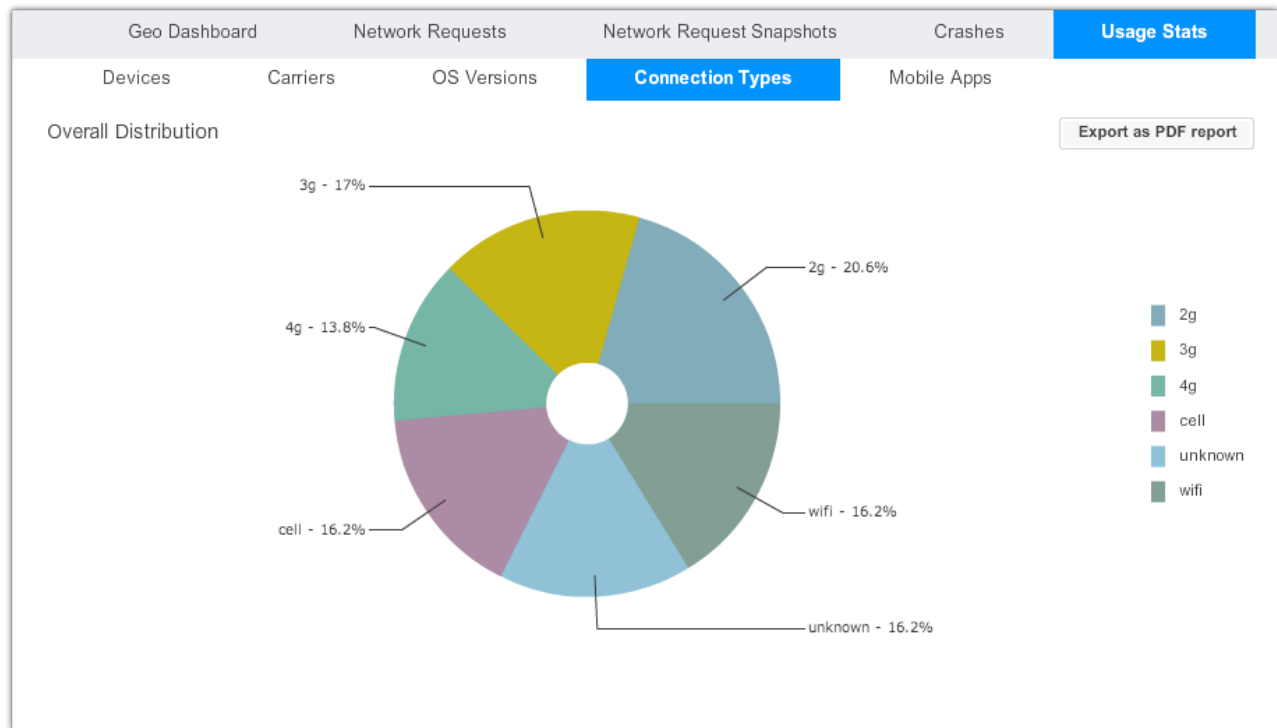
The controller processes a maximum of 500 network requests per account. See [Network Request Limits](#) for suggestions on how to configure network request detection to stay under this limit.

### Monitor Network Requests by Usage Statistics

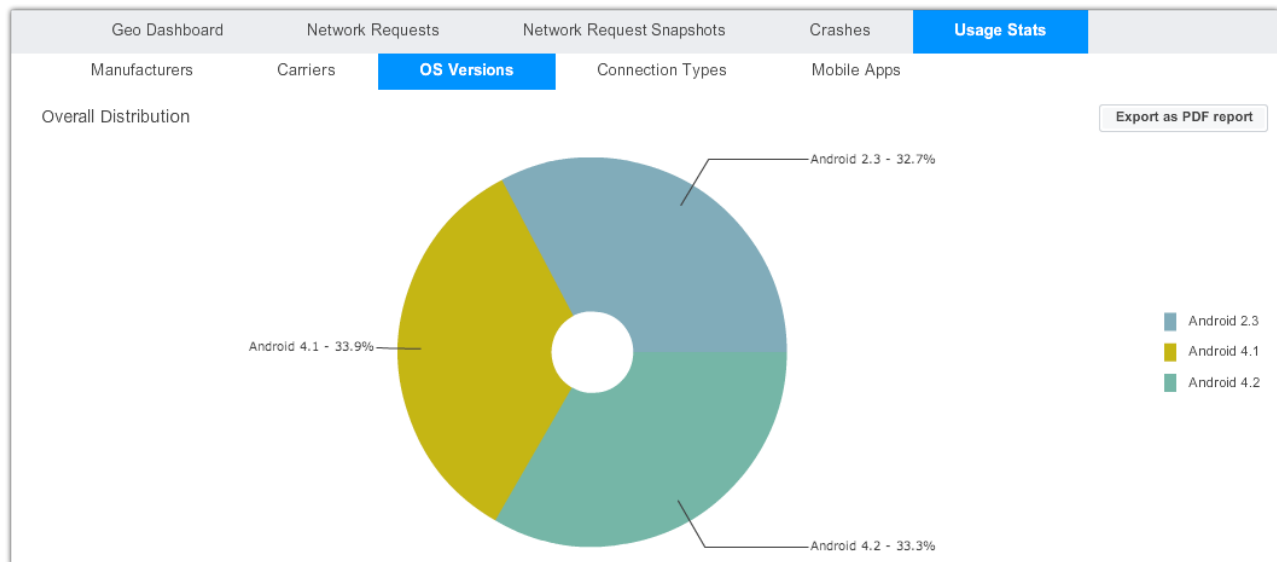
You can get summary statistics about your users from the usage stats tab of the mobile APM dashboard.

Click the appropriate subtab to monitor statistics by the criteria that interest you.

For example, this window displays the distribution of how your users' devices connect to the Internet.



This window displays the distribution of the versions of Android your application is running on.



For details of the individual screens see:

#### Monitor Network Requests by Device or Manufacturer

- [Accessing Mobile Data by Device](#)
- [How the Devices Window is Organized](#)
- [Overall Device Distribution](#)

- [Performance by Device/Manufacturer](#)
- [Export as a Report](#)
- [Learn More](#)

You can monitor mobile applications by the devices that your users use to access your application.

For iOS applications the device is the model of the device. For Android applications the device is the manufacturer of the device.

The device/manufacturer window helps you discover:

- the slowest devices in terms of total network request time
- the devices that are generating the most requests
- the devices that are experiencing the most errors

### ***Accessing Mobile Data by Device***

For iOS, click the Devices subtab of the Usage Stats tab in the [mobile APM dashboard](#).

For Android, click the Manufacturers subtab.

### ***How the Devices Window is Organized***

The window is divided into two panels:

- [Overall Distribution](#)
- [Performance by Device](#)

### ***Overall Device Distribution***

The Overall Distribution chart shows the percentages of your end users using different devices.

### ***Performance by Device/Manufacturer***

The Performance by Device/Manufacturer list below the chart displays a row for each device.

Click a column to sort the list based on the column's metric. For example, if you want to sort by Network Request Time with the slowest devices at the top of the list, click the Network Request Time column. You can toggle the column header to switch between ascending and descending order.

To filter the list to see only rows for a particular device, enter the device in the filter field.

### ***Export as a Report***

To export the data as a report in PDF format:

1. Click the **Export as PDF report** button in the upper right corner.
2. In the Export Complete field optionally edit the name of the report.
3. Click **Save Report**
4. Select the location to which to save the report.
5. Click **Save**.

### ***Learn More***

- [Mobile APM Metrics](#)

**Monitor Network Requests by Carrier**



- [Accessing Mobile Metrics by Carrier](#)
- [How the End User Carriers Window is Organized](#)
- [Overall Distribution](#)
- [Performance by Carrier](#)
- [Export as a Report](#)
- [Learn More](#)

You can monitor mobile applications by the mobile carriers that your users use to access your application.

The carrier dashboard helps you discover:

- The slowest carriers in terms of total network request time.
- The carriers that are generating the most requests.
- The carriers that are experiencing the most errors.

### ***Accessing Mobile Metrics by Carrier***

Click the Carriers subtab of the Usage Stats tab in the [mobile APM dashboard](#).

### ***How the End User Carriers Window is Organized***

The window is divided into two panels:

- [Overall Distribution](#)
- [Performance by Carrier](#)

### ***Overall Distribution***

The Overall Distribution chart shows the percentages of your end users using different carriers.

### ***Performance by Carrier***

The Performance by Carrier list below the chart displays a row for each carrier.

Click a column to sort the carriers based on the column's metric. For example, if you want to sort by Network Request Time with the slowest carriers at the top of the list, click the Network Request Time column. You can toggle the column header to switch between ascending and descending order.

To filter the list to see only rows for a particular carrier, enter the carrier in the filter field.

### ***Export as a Report***

To export the data as a report in PDF format:

1. Click the **Export as PDF report** button in the upper right corner.
2. In the Export Complete field optionally edit the name of the report.
3. Click **Save Report**
4. Select the location to which to save the report.
5. Click **Save**.

### ***Learn More***

- [Mobile APM Metrics](#)

Monitor Network Requests by Operating System Version

- [Accessing Mobile Metrics by Operating System Versions](#)
- [How the End User OS Versions Window is Organized](#)
- [Overall Operating System Version Distribution](#)
- [Performance by Operating System Version](#)
- [Export as a Report](#)
- [Learn More](#)

You can monitor mobile applications by the operating system running on the mobile device that your users use to access your application.

The operating system version dashboard helps you discover:

- the slowest operating system versions in terms of total network request time
- the operating system versions that are generating the most requests
- the operating system versions that are experiencing the most errors

#### ***Accessing Mobile Metrics by Operating System Versions***

Click the OS Versions subtab of the Usage Stats tab in the [mobile APM dashboard](#).

#### ***How the End User OS Versions Window is Organized***

The window is divided into two panels:

- [Overall Distribution](#)
- [Performance by Operating System Version](#)

#### ***Overall Operating System Version Distribution***

The Overall Distribution chart shows the percentages of your end users using different operating system versions.

#### ***Performance by Operating System Version***

The Performance by OS Version list below the chart displays a row for each operating system version.

Click a column to sort the operating system version based on the column's metric. For example, if you want to sort by Network Request Time with the slowest operating system version at the top of the list, click the Network Request Time column. You can toggle the column header to switch between ascending and descending order.

To filter the list to see only rows for a particular operating system version, enter the operating system version in the filter field.

#### ***Export as a Report***

To export the data as a report in PDF format:

1. Click the **Export as PDF report** button in the upper right corner.
2. In the Export Complete field optionally edit the name of the report.
3. Click **Save Report**
4. Select the location to which to save the report.
5. Click **Save**.

#### ***Learn More***

- [Mobile APM Metrics](#)

#### Monitor Network Requests by Connection Type

- [Accessing Mobile Metrics by Connection Types](#)
- [How the End User Connection Types Window is Organized](#)
- [Overall Connection Type Distribution](#)
- [Performance by Connection Types](#)
- [Export as a Report](#)
- [Learn More](#)

You can monitor mobile applications by the type of connection that your users use to access your application.

The connection types dashboard helps you discover:

- the slowest connection types in terms of total network request time
- the connection types that are generating the most requests
- the connection types that are experiencing the most errors

#### *Accessing Mobile Metrics by Connection Types*

Click the Connection Types subtab of the Usage Stats tab in the [mobile APM dashboard](#).

#### *How the End User Connection Types Window is Organized*

The window is divided into two panels:

- [Overall Distribution](#)
- [Performance by Connection Type](#)

#### *Overall Connection Type Distribution*

The Overall Distribution chart shows the percentages of your end users using different connection types.

#### *Performance by Connection Types*

The Performance by Connection Types list below the chart displays a row for each connection type. The Unknown connection type is the aggregate of all the network requests for which the agent was unable to determine the connection type.

Click a column to sort the connection types based on the column's metric. For example, if you want to sort by Network Request Time with the slowest connection types at the top of the list, click the Network Request Time column. You can toggle the column header to switch between ascending and descending order.

To filter the list to see only rows for a particular connection type, enter the connection type in the filter field.

#### *Export as a Report*

To export the data as a report in PDF format:

1. Click the **Export as PDF report** button in the upper right corner.

2. In the Export Complete field optionally edit the name of the report.
3. Click **Save Report**
4. Select the location to which to save the report.
5. Click **Save**.

#### ***Learn More***

- [Mobile APM Metrics](#)

#### **Monitor Network Requests by Mobile Application**

- [Accessing Mobile Data by Mobile App](#)
- [How the Mobile Apps Window is Organized](#)
- [Overall Mobile Apps Distribution](#)
- [Performance by Mobile Application](#)
- [Export as a Report](#)
- [Learn More](#)

When you access the mobile APM dashboard at the platform level, you can compare the key mobile metrics of different mobile applications of the selected platform.

The mobile applications window helps you discover:

- the slowest applications in terms of total network request time
- the applications that are generating the most requests
- the applications that are experiencing the most errors

To compare metrics from different versions of a single mobile application, see [Monitor Network Requests by Mobile Application Version](#).

#### ***Accessing Mobile Data by Mobile App***

Click the Mobile Apps subtab of the Usage Stats tab in the [mobile APM dashboard](#).

This tab is available only when you access the dashboard from the platform level.

#### ***How the Mobile Apps Window is Organized***

The window is divided into two panels:

- [Overall Distribution](#)
- [Performance by Mobile Application](#)

#### ***Overall Mobile Apps Distribution***

The Overall Distribution chart shows the percentages of your end users using different applications.

#### ***Performance by Mobile Application***

The Performance by Mobile Application list below the chart displays a row of metrics for each application.

Click a column to sort the list based on the column's metric. For example, if you want to sort by Network Request Time with the slowest application at the top of the list, click the Network Request Time column. You can toggle the column header to switch between ascending and descending order.

To filter the list to see only rows for a particular application, enter the application string in the filter field.

#### ***Export as a Report***

To export the data as a report in PDF format:

1. Click the **Export as PDF report** button in the upper right corner.
2. In the Export Complete field optionally edit the name of the report.
3. Click **Save Report**
4. Select the location to which to save the report.
5. Click **Save**.

#### ***Learn More***

- [Mobile APM Metrics](#)

#### **Monitor Network Requests by Mobile Application Version**

- [Accessing Mobile Data by Mobile Application Version](#)
- [How the Versions Window is Organized](#)
- [Overall Distribution](#)
- [Performance by Version](#)
- [Export as a Report](#)
- [Learn More](#)

When you access the mobile APM dashboard at the application level, you can compare the key mobile metrics of different versions of the application.

The versions window helps you discover:

- the slowest versions in terms of total network request time
- the versions that are generating the most requests
- the versions that are experiencing the most errors

#### ***Accessing Mobile Data by Mobile Application Version***

Click the Versions subtab of the Usage Stats tab in the [mobile APM dashboard](#).

This tab is available only when you access the dashboard from an individual application.

#### ***How the Versions Window is Organized***

The window is divided into two panels:

- Overall Distribution
- Performance by Version

#### ***Overall Distribution***

The Overall Distribution chart shows the percentages of your end users using different versions of the application.

#### ***Performance by Version***

The Performance by Version list below the chart displays a row of metrics for each version.

Click a column to sort the list based on the column's metric. For example, if you want to sort the list in terms of Network Request Time with the slowest version at the top of the list, click the Network Request Time column. You can toggle the column header to switch between ascending and descending order.

To filter the list to see only rows for a particular version enter the version substring in the filter field. For example, if you want to see metrics only for versions 2.x enter "2".

#### ***Export as a Report***

To export the data as a report in PDF format:

1. Click the **Export as PDF report** button in the upper right corner.
2. In the Export Complete field optionally edit the name of the report.
3. Click **Save Report**
4. Select the location to which to save the report.
5. Click **Save**.

#### ***Learn More***

- [Mobile APM Metrics](#)

#### **Network Requests List**

- [How the Network Requests List is Organized](#)
  - [To configure the displayed columns](#)
  - [To filter network requests that are displayed as rows](#)
  - [To view summary details for a network request](#)
- [More Actions Menu](#)
- [Learn More](#)

The network requests list shows all the network requests to your instrumented applications, along with their key performance indicators.

You access the network requests list from the Network Requests tab of the mobile APM dashboard.

#### **How the Network Requests List is Organized**

The network requests list is a table that displays the current network requests, with one row for each request. The columns display the name of the network request, its mobile application and the current network request metrics. See [Mobile APM Metrics](#) for descriptions of these metrics.

Click a column header to sort the the list based on the column's metric. For example, if you want to sort by the slowest requests, click the Network Request Time (ms) column header. You can toggle the column to switch between ascending and descending order.


Geo Dashboard


Network Requests


Network Request Snapshots

Crashes

Usage Stats








View Dashboard

More Actions









View Options

FILTER

☒ With Load

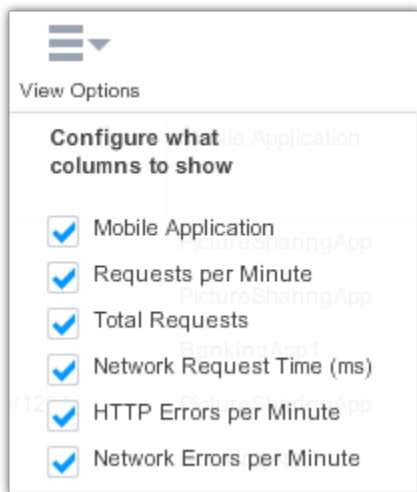


Viewing 8 of 8

|   | Name                       | Mobile Application | Requests per Minute | Total Requests | Network Request Time (ms) ▾ | HTTP Errors per Minute | Network Errors per Minute |
|---|----------------------------|--------------------|---------------------|----------------|-----------------------------|------------------------|---------------------------|
|  | myapp.com/getallfriends    | PictureSharingApp  | 1,251               | 18,767         | 1,260                       | 59                     | 63                        |
|  | myapp.com/sendmessage/1234 | PictureSharingApp  | 1,228               | 18,413         | 1,258                       | 60                     | 60                        |
|  | google.com/dosearch        | PictureSharingApp  | 1,230               | 18,453         | 1,254                       | 59                     | 64                        |
|  | twitter.com/sendtweet      | PictureSharingApp  | 1,227               | 18,409         | 1,247                       | 63                     | 63                        |
|  | google.com/dosearch        | BankingApp1        | 1,244               | 18,659         | 1,244                       | 58                     | 61                        |
|  | twitter.com/sendtweet      | BankingApp1        | 1,229               | 18,437         | 1,243                       | 59                     | 62                        |
|  | myapp.com/getallfriends    | BankingApp1        | 1,228               | 18,417         | 1,243                       | 62                     | 60                        |
|  | myapp.com/sendmessage/1234 | BankingApp1        | 1,253               | 18,789         | 1,230                       | 64                     | 63                        |

To configure the displayed columns

1. Click **View Options**.
2. Clear the check boxes for the columns that you do not want to see in the table.



To filter network requests that are displayed as rows

To see only network requests that currently have load, check the FILTER With Load check box.

To see only network requests with specific names, enter a substring of the network request name in the Filter field.

In the following example, the user has filtered out requests that do not have load and that do not have "checkout" in the request name.



To view summary details for a network request

1. Select the network request in the list.
2. Either click **View Dashboard** or just double-click.

More Actions Menu

Use the More Actions menu to select one or more requests in the list and perform the following actions on them.

- **Exclude Request(s)** Use this option to direct AppDynamics to ignore the selected request(s) and stop reporting metrics for them.  
You can use the **View Excluded Requests** option to see requests that have been excluded and then you can "unexclude" them.
- **Rename Request** Use this option to rename one selected request in the AppDynamics console.
- **Delete Request(s)** Use this option to remove the request(s) from the list. If AppDynamics discovers a deleted request again it will reappear in the list. To prevent it from re-appearing use **Exclude Request(s)**.

## Learn More

- [Network Request Dashboard](#)
- [Network Request Limits](#)
- [Mobile APM Metrics](#)

## Network Request Dashboard

- [Accessing a Network Request Dashboard](#)
  - [To view a request dashboard](#)
- [How the Network Request Dashboard is Organized](#)
- [Learn More](#)

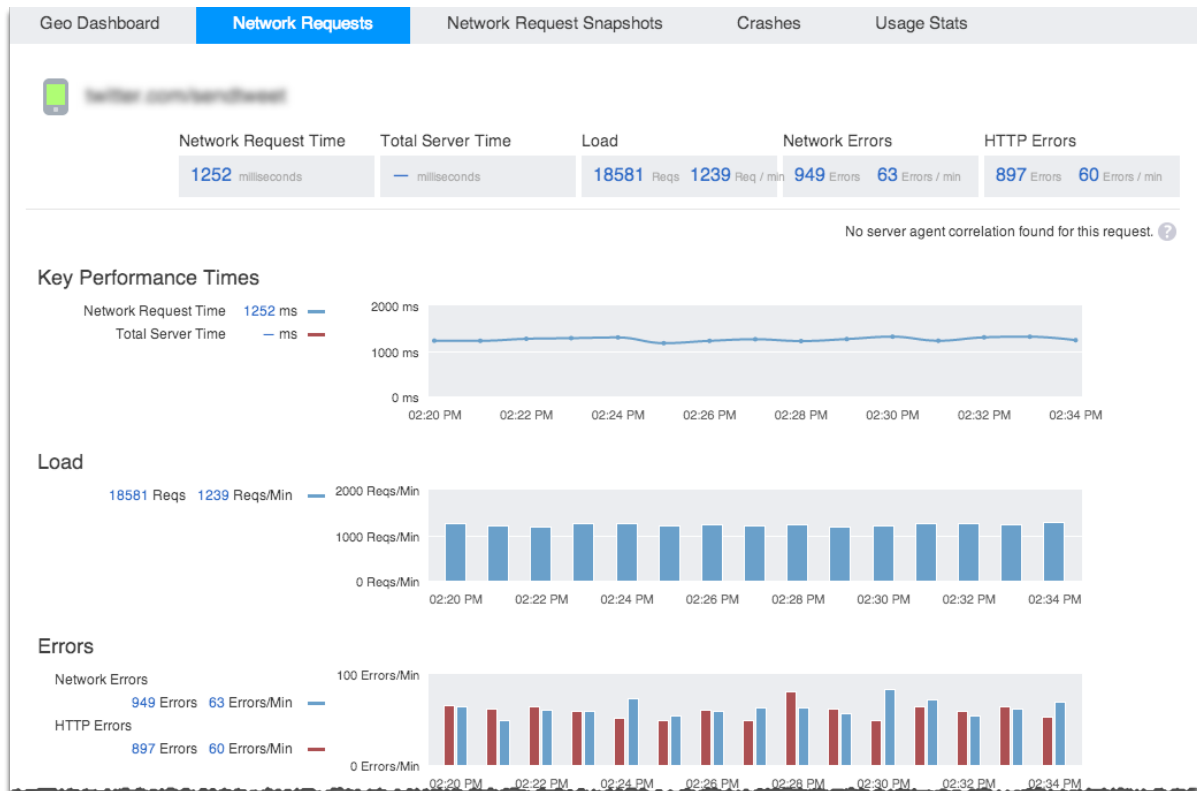
Each network request has its own dashboard that graphically displays key performance indicators for the network request over the selected time range.

## Accessing a Network Request Dashboard

### To view a request dashboard

1. In the mobile APM dashboard click the **Network Requests** tab.
2. In the network requests list, select the network request for which you want to see the dashboard.
3. Either double-click the request or click **View Dashboard**.





### How the Network Request Dashboard is Organized

The network request dashboard displays summary key network request metrics for the time selected in the time range dropdown menu at the top of the dashboard.

Below are trend graphs for the key performance indicators:

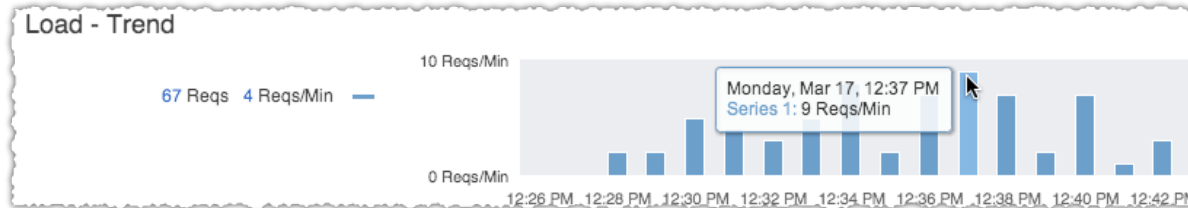
- **Key Performance Times:** Network Request Time and Total Server Time in milliseconds. Total Server Time is also displayed only If the mobile request is correlated with a server-side application. Total server time is interval between the time that the server-side application receives the network request to the time that it finishes processing the request. This metric equals the sum of the average response times from all the business transactions on the server side when more than one services processes the request. This graph lets you determine, on average, how much time is spent on the network versus how much time is spent on the server to process the user's request.
- **Load:** Total Requests and Requests per Minute
- **Errors:** Network Errors and HTTP Errors in total and per Minute
- **Related Business Transactions:** If the request is correlated with an instrumented server-side application, the dashboard lists business transactions associated with the request below the performance metrics.



You can click the link to a related business transaction to see its business transaction dashboard. See [Business Transaction Dashboard](#).

If transaction snapshots were taken at the same time as the network request, the dashboard lists the transaction snapshots below the business transactions. See [Transaction Snapshots](#)

You can hover over any data point on any of the trend graphs to see the metric for a precise point.



#### Learn More

- [Monitor Network Requests](#)
- [Network Requests List](#)
- [Mobile APM Metrics](#)
- [Business Transaction Monitoring](#)
- [Transaction Snapshots](#)

#### Network Request Snapshots

- [When Network Request Snapshots are Captured](#)
- [Network Request Snapshot Content](#)
- [Business Transactions in Network Request Snapshots](#)
  - [Accessing Network Request Snapshots from Transaction Snapshots](#)
- [Archiving Network Request Snapshots](#)
- [Learn More](#)

Network request snapshots capture information about an instance of a single user experience of your application. They can help you troubleshoot the causes of poorly performing mobile applications.

##### When Network Request Snapshots are Captured

The Mobile AMP Agent starts capturing snapshots when the user experience becomes slow. You define the thresholds for slow, very slow and stalled experience. See [Configure Mobile Network Request Thresholds](#).

The agent also captures periodic snapshots for normal user experience at least once per minute.

##### Network Request Snapshot Content


A network request snapshot contains summary data about the individual request as well as any business transactions associated with the request if correlation with an instrumented app server is available.

In the Summary Data:

- The User Experience can be Normal, Slow, Very Slow, or Stalled.
- The Time is when the request was received by the AppDynamics EUM Cloud collector, in

UNIX epoch time.

- The Mobile Network Request links to the network request dashboard for the network request of which this snapshot describes an instance. See [Network Request Dashboard](#).

| Summary Data           |  | Archive |
|------------------------|--|---------|
| Mobile App             | PictureSharingApp1   |         |
| Version                | 2.0  |         |
| User Experience        | ! Very Slow  |         |
| Time                   | 04/11/2014 12:35:00  |         |
| Network Request Time   | 6046 ms  |         |
| Mobile Network Request |  <a href="http://myapp.com/sendmessage/1234">myapp.com/sendmessage/1234</a> |         |
| HTTP Status Code       | 200  |         |
| Archived               | No   |         |
| Platform               | iOS  |         |
| Device                 | iPhone 5   |         |
| OS Version             | iOS 6.0  |         |
| Carrier                | Verizon  |         |
| Connection Type        | cell   |         |
| Country                | United States  |         |
| Request GUID           | b3b5743d-5539-42e6-9cba-c6ecd8f81e8a   |         |

### Business Transactions in Network Request Snapshots


When a network request snapshot is associated with one or more business transactions on an instrumented server, the business transaction are listed in the Business Transactions panel in the network request snapshot. You can click the link to see the business transaction dashboard for the associated business transaction.

If transaction snapshots for an associated business transaction were captured at the same time as the network request snapshot, they are linked in the Transaction Snapshots panel of the network request snapshot. If a call graph icon is displayed for a snapshot in the transaction snapshot list, a full or partial call graph is available for that transaction snapshot. This allows you to examine the cause of performance problems on the server side. Click the link to see the associated transaction snapshot.

Transaction snapshots are triggered on the server when slow or stalled business transactions are identified, when a diagnostic session is started, or periodically based on a configured interval. In general, slow, very slow and stalled transactions are more likely to trigger a transaction snapshot on the server than transactions operating within normal range. For more information about when server-side transaction snapshots are captured see [Transaction Snapshots](#) and [Configure Transaction Snapshots](#).

### Accessing Network Request Snapshots from Transaction Snapshots

If a transaction snapshot has a correlated browser snapshot, a link appears in the top right of the transaction snapshot flow map. Click the link to open the network request snapshot.

| Transaction: 047845f5-2f3d-42fa-84e9-97f171236163  |                                     |                      |                             |                                      |  |
|--|-------------------------------------|----------------------|-----------------------------|--------------------------------------|--|
| USER EXPERIENCE  | EXECUTION TIME                      | TIMESTAMP            | BUSINESS TRANSACTION        | REQUEST GUID                         | MOBILE SNAPSHOT                                      |
|  NORMAL | 1 ms                                | 03/10/14 11:52:57 AM | <a href="#">/xhr/uptime</a> | 047845f5-2f3d-42fa-84e9-97f171236163 | <a href="#">55ca737d-3fab-495e-ba9b-2dd4f1e27620</a> |
| <a href="#">Flow Map</a>   | Snapshot Execution - Waterfall View |                      | List View                   |                                      |  |

### Archiving Network Request Snapshots

Normally network request snapshots are purged after two weeks. You can archive a snapshot beyond the normal snapshot lifespan to retain it for future analysis.

To archive a snapshot, click the **Archive** button in the upper right corner of the snapshot window.

You can view archived snapshots by checking Archived as a view option in the network request snapshots list.

Customers with on-premise controllers can modify the default two-week period by configuring the `event.retention.period` in the Controller Settings section of the Administration console.

#### Learn More

- [Network Request Snapshots List](#)
- [Transaction Snapshots](#)

### Network Request Snapshots List

- [How the Network Request Snapshots List is Organized](#)
  - [To configure the columns displayed](#)
  - [To filter the network request snapshots that are displayed as rows](#)
  - [To view a network request snapshot](#)
- [Learn More](#)

A network request snapshot captures the details of a single instance of a network request. Examine these details to troubleshoot the causes of slow network request performance.

You access the network request snapshots list from the network request snapshots tab of the mobile APM dashboard.

#### How the Network Request Snapshots List is Organized

The network request snapshots list is a table that displays a row for each network request snapshot. The columns describe properties of each snapshot.

Click a column header to sort the the list based on the column's value. For example, if you want to sort alphabetically by country, click the Country column header. You can toggle the column to switch between ascending and descending order.

The Experience column displays an icon that indicates whether the user experience was normal, slow, very slow or stalled. These values are based on the configured network request thresholds. See [Configure Mobile Network Request Thresholds](#).

The Error column displays a red error icon if a network error or an HTTP error occurred.

The Call Graph column displays a call graph icon if there is a transaction snapshot with a call graph on the server side associated with this network request. This lets you drill down to the root cause of poor performance on the server side. See [Transaction Snapshots](#) and [Call Graphs](#).

Geo Dashboard

Network Requests

Network Request Snapshots

Crashes

Usage Stats

Filters

View Network Request Snapshot

Archive


View Options

Showing 600 of 600 snapshots. \*More than 600 matching snapshots found; please refine your search criteria.

| Experience | Error | Call Graph | Time                | Mobile App Name    | Mobile App Version | Network Request Name   | Network Request Time (ms) | Device / Manufacturer | OS Version | HTTP Status Code | Network Error |
|------------|-------|------------|---------------------|--------------------|--------------------|------------------------|---------------------------|-----------------------|------------|------------------|---------------|
| !          |       |            | 04/11/2014 14:55:00 | BankingApp1        | 2.0                | myapp.com/getallfri... | 7477                      | iPad 2 WIFI           | iOS 6.0    | 200              |               |
| !          |       |            | 04/11/2014 14:55:00 | PictureSharingApp1 | 1.0                | google.com/dosearch    | 5768                      | iPad 2 WIFI           | iOS 6.0    | 200              |               |
| !          |       |            | 04/11/2014 14:54:59 | BankingApp1        | 2.0                | twitter.com/sendtweet  | 8549                      | iPhone 5              | iOS 5.1    | 200              |               |
| !          | ✖     |            | 04/11/2014 14:54:59 | PictureSharingApp1 | 1.0                | google.com/dosearch    | 5411                      | iPad 2 WIFI           | iOS 6.0    | 200              | unknown...    |
| !          | ✖     |            | 04/11/2014 14:54:58 | BankingApp1        | 2.0                | myapp.com/sendme...    | 6284                      | iPad 2 WIFI           | iOS 6.0    | 200              | unknown       |
| !          |       |            | 04/11/2014 14:54:58 | PictureSharingApp1 | 1.0                | myapp.com/getallfri... | 6068                      | iPad 2 WIFI           | iOS 6.0    | 200              |               |
| !          |       |            | 04/11/2014 14:54:56 | PictureSharingApp1 | 1.0                | twitter.com/sendtweet  | 5773                      | iPad 2 WIFI           | iOS 6.0    | 200              |               |

To configure the columns displayed

1. Click **View Options**.
2. Clear the check boxes for the options that you do not want to see in the table.



View Options

**Columns**

- ☒ Experience
- ☒ Error
- ☒ Call Graph
- ☒ Time
- ☒ Mobile App Name
- ☒ Mobile App Version
- ☒ Network Request Name
- ☒ Network Request Time (ms)
- ☒ Request GUID
- ☒ Country
- ☒ Model
- ☒ OS Version
- ☒ Carrier
- ☒ Connection Type
- ☒ HTTP Status Code
- ☒ Network Error
- ☒ Archived

To filter the network request snapshots that are displayed as rows

1. Click **Filters** if filters are not showing.
2. Use the dropdown lists to specify the criteria for displaying a row. For example, you can specify a specific application, a specific network request, user experience, specific carriers, etc.

The screenshot shows the AppDynamics interface with the 'Filters' panel open. At the top, there are three tabs: 'Filters' (selected), 'View Network Request Snapshot', and 'View Options'. Below the tabs are two buttons: 'Clear Criteria' and 'Search'. The filter panel is organized into several sections, each with a title and a list of filter criteria:

- Mobile Application**: Mobile App (dropdown menu, currently set to 'Any').
- Errors**:
  - ☐ Network Error Occurred
  - ☐ HTTP Error Occurred
- Experience**:
  - ☐ Normal
  - ☐ Slow
  - ☐ Very Slow
- Server Side**:
  - ☐ Call Graph Exists
- Network**:
  - Carrier (dropdown menu, currently set to 'Any')
  - Connection Type (dropdown menu, currently set to 'Any')
  - Network Request Names (dropdown menu, currently set to 'Any')
- Device**:
  - Model (dropdown menu, currently set to 'Any')
  - OS Version (dropdown menu, currently set to 'Any')
- Geography**:
  - Country (dropdown menu, currently set to 'Any')

To view a network request snapshot

1. Select the network request snapshot in the list.
2. Either click **View Network Request Snapshot** or just double-click.

Learn More

- [Network Request Snapshots](#)

### Network Request Limits

- [Remove Network Requests Without Load](#)
  - [To delete network requests with no load](#)
- [Exclude Requests that Do Not Need to be Monitored](#)
- [Group Network Requests of Similar Type](#)
- [Learn More](#)

The EUM cloud can process a maximum of 500 network requests per controller application. The controller application is the application from which you downloaded and instrumented your mobile applications as described in step 1 [here](#). A single AppDynamics account can support more than

one controller application.

After 500 network requests have been registered, AppDynamics continues monitoring the 500 requests but does not process any additional requests.

If your usage exceeds the limit, a message pops up in the network request list.



Note that because the limit covers all your mobile applications, if you monitor both iOS and Android mobile applications, the list you are currently observing may not show 500 hundred requests. For example, if you have 200 network requests to Android applications and 301 network requests to iOS applications, you will see the warning in both lists until you take action to delete excess requests.

You can use the following techniques to keep your usage under the 500 network request limit.

#### Remove Network Requests Without Load

To see which network requests have no load, in the network requests list, view the list with the Filter With Load check box checked and then again with it unchecked. Compare the results to identify which requests have no load.

##### To delete network requests with no load

1. In the Network Requests list, display all the network requests, with the Filter With Load check box cleared.
2. Select the requests that you want to delete.
3. In the More Actions dropdown menu, click **Delete Request(s)**.

Deleting network requests does not prevent them from being re-discovered in the future if the application later receives traffic. To prevent specific network requests from ever being discovered, you must create exclude rules to exclude them from discovery. See [Creating Mobile Exclude Rules](#).

#### Exclude Requests that Do Not Need to be Monitored

The agent is probably detecting network requests that are not interesting for you to monitor. You can create exclude rules to prevent the agent from monitoring uninteresting network requests. See [Creating Mobile Exclude Rules](#).

After you have created exclude rules to reduce the number of network requests detected, delete the network requests for those that you have excluded, following the procedure described in [To delete network requests with no load](#).

#### Group Network Requests of Similar Type

Review the default network request naming rule described in [Configure Mobile Network Request Naming](#). It is possible that the default rule is generating many more network requests than are desirable.

For example, perhaps your application loads images dynamically and stores them on your server with URLs like "http://myapp.com/image/image1234.jpg". This would cause a separate network request to be generated for each image, which is probably not what you want. You could create a custom naming rule to group all the image URLs as a single network request. See [Creating Mobile Custom Naming Rules](#).

After you have created custom rules to reduce the number of network requests detected, unregister the network requests for those are now covered by the custom rule, following the procedure described in [Remove Network Requests Without Load](#).

#### Learn More

- [Configure Mobile Network Request Naming](#)

## Monitor Crashes

The crash dashboards display summary information about crashes.

A crash snapshot is a detailed report on a particular crash including the code that was executing when the application crashed. Crash snapshots help you understand the causes of crashes.

### Crash Dashboard

- [Crashes vs Requests](#)
- [Total Crashes](#)
- [Crashes by Mobile Application](#)
- [Crashes by Mobile Application Version](#)
- [Crashes by Operating System Version](#)
- [Crashes by Device or Manufacturer Name](#)
- [Crashes by Carrier](#)
- [Crashes by Connection Type](#)

The crash dashboard graphs aggregate mobile application crash data over time.

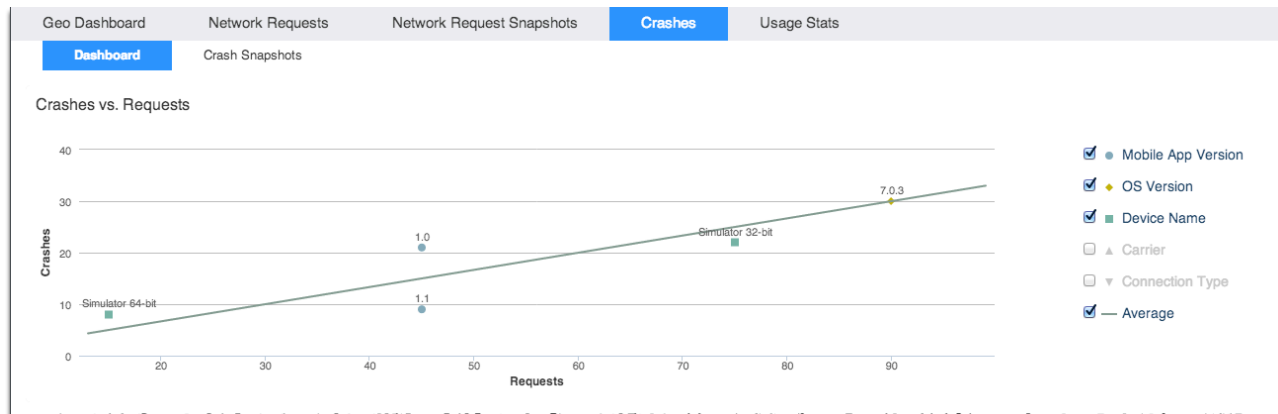
You monitor crashes from the Crashes tab of the mobile APM dashboard.



## Crashes vs Requests

The Crashes vs Requests graph shows how the number of crashes correlates with the number of network requests over the selected time range. The solid line represents the average aggregated number of crashes.

Crashes are also categorized by criteria: device, carrier, connection type and so on. You can check or clear the criteria in the key to display more or fewer criteria. This graph shows which types of applications are crashing more often or less often than average.



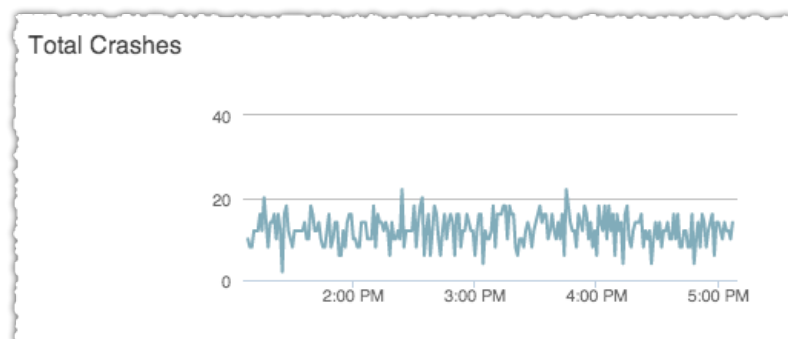
Typically as the load increases the number of crashes also increases. Criteria that are clustered near the average line are within normal range. Criteria above the line (Mobile App Version 1.0 in the example) indicate the types of applications that are crashing more often than would be expected for the load. Criteria below the line ((Mobile App Version 1.1 in the example) indicate types of applications that are crashing less often than would be expected for the load. Applications that are crashing significantly more often than average merit further examination.

For example, if applications running on a particular carrier are clustering above the line:

- Scroll down to the Crashes by Carrier section of the dashboard to see if a significant percentage of your total crashes are attributable to that carrier and note the times that those crashes are occurring.
- Then examine individual crash snapshots filtered for that carrier to determine the root cause of those crashes.

## Total Crashes

This line graph shows total crashes over the selected time period.



## Crashes by Mobile Application

These graphs are visible only when you access the dashboard from the platform level.

The pie chart shows the percentage breakdown of crashes by application.

The line graph shows crashes by application over time.

## Crashes by Mobile Application Version

These graphs are visible only when you access the dashboard from the application level level.

The pie chart shows the percentage breakdown of crashes by application version.

The line graph shows crashes by application version over time.

## Crashes by Operating System Version

The pie chart shows the percentage breakdown of crashes by the version of the operating system running on the device.

The line graph shows crashes by operating system over time.

## Crashes by Device or Manufacturer Name

The pie chart shows the percentage breakdown of crashes by the type of device (iOS) or manufacturer (Android).

The line graph shows crashes by device/manufacturer over time.

## Crashes by Carrier

The pie chart shows the percentage breakdown of crashes by mobile carrier.

The line graph shows crashes by carrier over time.

## Crashes by Connection Type

The pie chart shows the percentage breakdown of crashes by connection type.

The line graph shows crashes by connection type over time.

## Crash Snapshots List

- [How the Crash Snapshots List is Organized](#)
  - [To configure the displayed columns](#)
  - [To filter the crashes that are displayed as rows](#)
  - [To view a crash snapshot](#)
  - [To archive a crash snapshot](#)
- [Learn More](#)

When an instrumented application crashes, a crash snapshot is created. The snapshot provides information to help you analyze the cause of the crash, including:

- crashed function

- source file containing the crashed function
- line number in the source file, if available
- stack trace of the application at the time of the crash

For iOS applications, crash snapshots are based on:

- fatal signals (SIGSEGV, etc)
- unhandled Objective-C exceptions

For Android applications, crash snapshots are based on:

- UI thread hangs (cases where the "Application not responding" error message appears)
- unhandled Java exceptions

You monitor crashes from the Crash Snapshots subtab of the Crashes tab in the mobile APM dashboard. Click **Crash Snapshots** to see the list of crash snapshots for the selected time range.


## How the Crash Snapshots List is Organized

The crash snapshots list is a table that displays the current crash snapshots, with one row for each snapshot. The columns represent the crash snapshot properties. See [Crash Snapshot Properties](#) for descriptions of these properties.

Click a column header to sort the list based on the column's metric. For example, if you want to sort alphabetically by connection type, click the Connection Type column header. You can toggle the column to switch between ascending and descending order.

### To configure the displayed columns

1. Click **View Options**.
2. Clear the check boxes for the options that you do not want to see in the table.



View Options

**Columns**

- ☒ Mobile App Name
- ☒ Mobile App Version
- ☒ App Crash Time
- ☒ Device / Manufacturer
- ☒ OS Version
- ☐ Country
- ☐ Carrier
- ☐ Connection Type
- ☐ Crash Id
- ☒ Exception
- ☒ Crashed Function
- ☒ Crashed File / Line
- ☒ Symbolicated
- ☒ Deobfuscated
- ☐ Archived

To filter the crashes that are displayed as rows

1. Click **Filters** if filters are not showing.
2. Use the dropdown lists to specify the criteria for displaying a row. For example, you can specify a specific application, or specific carriers or specific exceptions.

The screenshot shows a 'Filters' panel with three tabs: 'Filters', 'View Session Snapshot', and 'View Options'. The 'Filters' tab is active. At the top are 'Clear Criteria' and 'Search' buttons. Below are several filter sections, each with a title and one or more input fields:

- Mobile Application**: Mobile App (dropdown menu with 'Any' selected)
- Network**: Carrier (dropdown menu with 'Any' selected), Connection Type (dropdown menu with 'Any' selected)
- Device**: Model (dropdown menu with 'Any' selected), OS Version (dropdown menu with 'Any' selected)
- Geography**: Country (dropdown menu with 'Any' selected)
- Advanced**: Crash Id (text input), Crashed File (text input), Crashed Function (text input), Exception Name (text input)

**To view a crash snapshot**

1. Select the crash snapshot in the list.
2. Either click **View Crash Details** or just double-click.

**To archive a crash snapshot**

1. Select the crash snapshot in the list.
2. Click **Archive**.

For more information see [Archiving Crash Snapshots](#).

**Learn More**

- [Crash Dashboard](#)
- [Crash Snapshots](#)
- [Crash Snapshot Properties](#)
- [Get Human-Readable Crash Snapshots](#)
- [Instrument a Mobile Application](#)

**Crash Snapshots**

- [Content of Crash Snapshots](#)
- [Archiving Crash Snapshots](#)
- [Learn More](#)

AppDynamics captures a crash snapshot when an instrumented mobile application crashes.

## Content of Crash Snapshots

The left side of the snapshot displays the key properties of the snapshot, such as the application that crashed, the time of the crash, the exception thrown when the application crashed, function in which the application crashed, the file containing the crashed function, the in number on which the application crashed. Sometimes not all of this information is available.

The right side of the snapshot displays the call stack of the crashed application, showing the thread in which the crash occurred.

Download
Archive

|  |   |
|--|---|
| <div>Mobile App</div> <div>Version</div> <div>Crash Time</div> <div>Exception Name</div> <div>Crashed Function</div> <div>Crashed File</div> <div>Crashed Line Number</div> <div>Archived</div> <div>Request Timestamp</div> <div>Platform</div> <div>OS Version</div> <div>Device</div> <div>Carrier</div> <div>Connection Type</div> | <div>ManualTestApp</div> <div>1.0</div> <div>03/25/2014 16:09:23</div> <div>SIGBUS</div> <div>-[MTFirstViewController<br/>segFault]</div> <div>MTFirstViewController.m</div> <div>87</div> <div>No</div> <div>03/25/2014 16:09:24</div> <div>iOS</div> <div>7.0.3</div> <div>Simulator 32-bit</div> <div></div> <div>wifi</div> |
|--|---|

```

Incident Identifier: c811d603-628d-4cec-9abd-f8e7a06ac05e
CrashReporter Key:   T0D0
Hardware Model:      x86_64
Process:             ManualTestApp [18806]
Path:                /Users/mcannizzaro/Library/Application Support/iPhone Simulator/7.0.3/Applications/BD5D7506-A855-44E9-A29B-E79C32DE26AF/ManualTestApp
Identifier:          com.appdynamics.ManualTestApp
Version:              1.0
Code Type:           X86 (Native)
Parent Process:      launchd_sim[18747]
Date/Time:            2014-03-25 23:09:23 +0000
OS Version:           iOS 7.0.3 (12F45)
Report Version:       104

Exception Type:       SIGBUS
Exception Codes:      BUS_ADRERR at 0x0
Crashed Thread:       0

Thread 0 Crashed:
0  ManualTestApp 0x00002cc0 -[MTFirstViewController segFault] (MTFirstViewController.m:87)
1  libobjc.A.dylib 0x017b5f74 -[NSObject performSelector:withObject:withObject:] + 77
2  UIKit 0x0051d0c2 -[UIApplication sendAction:toTarget:fromSender:forEvent:] + 108
3  UIKit 0x0051d04e -[UIApplication sendAction:toTarget:fromSender:forEvent:] + 61
4  UIKit 0x006150c1 -[UIControl sendAction:toTarget:forEvent:] + 66
5  UIKit 0x00615484 -[UIControl sendActionForEvent:withEvent:] + 577
6  UIKit 0x00614733 -[UIControl TouchesEnded:withEvent:] + 641
7  UIKit 0x0055a51d -[UINavigationController sendAction:toTarget:forEvent:] + 852
8  UIKit 0x0055b184 -[UINavigationController sendEvent:] + 1232
9  UIKit 0x0052ee86 -[UIApplication sendEvent:] + 242
10 UIKit 0x0051918f UIApplicationHandleEventQueue + 11421
11 CoreFoundation 0x019b383f _CFRunLoopIsCallingOutToASourcePerformFunction + 15
12 CoreFoundation 0x019b31cb _CFRunLoopDoSources0 + 235
13 CoreFoundation 0x019d029e _CFRunLoopRun + 910
14 CoreFoundation 0x019cfac3 CFRunLoopRunSpecific + 467
15 CoreFoundation 0x019cf8db CFRunLoopRunInMode + 123
16 GraphicsServices 0x02d2a8e2 GSEventRunModal + 192
17 GraphicsServices 0x02d2a809 GSEventRun + 104
18 UIKit 0x0051bd3b UIApplicationMain + 1225
19 ManualTestApp 0x000021bc main (main.m:19)
20 libdyld.dylib 0x01f69725 start + 0

Thread 1:
0  libsystem_kernel.dylib 0x0221a9ca kevent64 + 10
1  libdispatch.dylib 0x01ccac7a _dispatch_mgr_init + 0

Thread 2:
0  libsystem_kernel.dylib 0x0221a0ee __workq_kernreturn + 10
1  libsystem_c.dylib 0x020d6e79 _pthread_wqthread + 448
2  libsystem_c.dylib 0x020bedaa start_wqthread + 30

Thread 3:
0  libsystem_kernel.dylib 0x0221a0ee __workq_kernreturn + 10
1  libsystem_c.dylib 0x020d6e79 _pthread_wqthread + 448
2  libsystem_c.dylib 0x020bedaa start_wqthread + 30

Thread 4:
0  libsystem_kernel.dylib 0x0221a0ee __workq_kernreturn + 10
1  libsystem_c.dylib 0x020d6e79 _pthread_wqthread + 448
2  libsystem_c.dylib 0x020bedaa start_wqthread + 30

Thread 5:
0  libsystem_kernel.dylib 0x022177ce mach_msg_trap + 10
1  CoreFoundation 0x019c9e49 _CFRunLoopServiceMachPort + 169
2  CoreFoundation 0x019d03b1 _CFRunLoopRun + 1185
3  CoreFoundation 0x019cfac3 CFRunLoopRunSpecific + 467
4  CoreFoundation 0x019cf8db CFRunLoopRunInMode + 123
5  Foundation 0x013a99de +[NSURLConnection(Loader) _resourceLoadLoop:] + 381

```

If the information in the stack trace is cryptic, it is possible that source code for your iOS app was not symbolicated or the source code for your Android app was obfuscated. See [Get Human-Readable Crash Snapshots](#) for information about why this happens and what you can do about it.

Click **Download** to copy the stack trace in a file that you can forward to developers.

## Archiving Crash Snapshots

Normally crash snapshots are purged after two weeks. You can archive a snapshot beyond the normal snapshot lifespan to retain it for future analysis.

To archive a snapshot, click the **Archive** button in the upper right corner of the snapshot window.

You can also archive a crash snapshot from the crash snapshots list.

You can view archived snapshots by checking Archived as a view option in the crash snapshots list.

Customers with on-premise controllers can modify the default two-week period by configuring the

events.retention.period in the Controller Settings section of the Administration console.

#### Learn More

- [Crash Snapshots List](#)
- [Crash Snapshot Properties](#)
- [Get Human-Readable Crash Snapshots](#)

### Crash Snapshot Properties

These is the list of crash snapshot properties. They appear in the crash snapshot list and the crash snapshots themselves.

- **Mobile App Name:** application bundle ID (iOS) or package name (Android) for the application that crashed
- **Mobile App Version:** the version string of the crashed application
- **App Crash Time:** timestamp when the crash occurred, based on the mobile device's clock
- **Model:** model or manufacturer name of the mobile device on which the crash occurred
- **Os Version:** operating system version of the mobile device on which the crash occurred
- **Country:** country that the mobile device was located in when the crash snapshot was generated (not necessarily when the crash occurred)
- **Carrier:** name of the mobile carrier
- **Connection Type:** active connection type at the time of the crash, if known
- **Crash Id:** unique identifier for the crash snapshot
- **Exception:** name of the fatal signal (iOS) or uncaught exception (Android) associated with the crash
- **Crashed Function:** name of the topmost function on the crashed thread's callstack. If this function is an Objective-C method, this name includes the class name. For Android, this name is the fully qualified name of the topmost method on the uncaught exception's stack trace.
- **Crashed File/Line:** Name of the source file containing the crashed function and line number, if available
- **Symbolicated:** iOS only. True if this crash report has been matched with a dSYM file and symbolicated; false otherwise.  
The application must have been compiled with the Debugging Information Format set to "DWARF with dSYM File" for a crash report to exist. See [Uploading the dSYM File](#) and [Get Human-Readable Crash Snapshots](#).
- **Deobfuscated:** Android only: True if this crash report has been matched with a ProGuard mapping file and deobfuscated; false otherwise.

See [Uploading the ProGuard Mapping File](#) and [Get Human-Readable Crash Snapshots](#). A false value for this property does not necessarily indicate that the crash report will not be human-readable since it is possible that the application in question was not obfuscated.

#### Get Human-Readable Crash Snapshots

- [iOS dSYM File](#)
- [ProGuard Mapping File for Android](#)
- [Learn More](#)

To see stack traces in your crash snapshots that show you clearly where in the code execution your application crashed, you need to upload certain files. Normally you upload the files at the time that you instrument your mobile application.

For iOS see [Uploading the dSYM File](#). For Android see [Uploading the ProGuard Mapping File](#).

This topic explains the advantages of providing these files.

#### iOS dSYM File

For iOS applications, the raw data in the stack traces in crash snapshots consists of memory addresses of stack frames that point to executable application code. It also includes symbols and memory offsets for the system library code used by the application. Such a partially symbolicated stack trace looks something like this:

```
Thread 11 Crashed:
0  libobjc.A.dylib                0x38cb50fc objc_retain + 12
1  SomeApp                       0x003a2204 0xc6000 + 2998788
2  SomeApp                       0x003a0854 0xc6000 + 2992212
3  SomeApp                       0x003a09d4 0xc6000 + 2992596
4  SomeApp                       0x003948e4 0xc6000 + 2943204
5  Foundation                    0x2f3a2dc2 __NSThread__main__ +
1058
6  libsystem_pthread.dylib        0x392cec5a _pthread_body + 138
7  libsystem_pthread.dylib        0x392cebca _pthread_start + 98
8  libsystem_pthread.dylib        0x392cccc thread_start + 4
```

AppDynamics attempts to display stack traces with the names of functions with offsets into those functions to help you identify the line of code that was executing when the application crashed. To get the symbols that map to the executable code, it needs the dSYM (desymbolication) file for the crashed application.

If the dSYM file for the crashed application has been uploaded, the symbolicated stack trace shows the function name and the offset into the function where the app crashed. It looks something like this:

```
Thread 0 Crashed:
0  libobjc.dylib                 objc_release + 0x14
1  CoreFoundation               CFStringCreateWithFormat + 0x4
2  UIKit                        -[UIButton init] + 0x96
3  MyApp                        createUI (MyAppDelegate.m:42)
```



The dSYM file is created when the application source code is compiled with the Debugging Information Format set to "DWARF with dSYM file". AppDynamics recommends that you build all the iOS apps that you want to monitor using this option and then upload the dSYM file to AppDynamics. The best time to do this is when you instrument the app.

If a dSYM has been uploaded for a crashed application, in the crash list the Symbolicated column for the associated crash snapshot is true.

If the symbolicated property is false and you want to see user-friendly stack traces in your crash snapshots for this application, you need to locate and upload the dSYM file for the crashed application.

#### ProGuard Mapping File for Android

If an Android app was not obfuscated to prevent reverse engineering, you should see human-readable stack traces in your crash snapshots by default.

However, if the code was obfuscated, AppDynamics needs the ProGuard mapping file to be able to deobfuscate the app. The best procedure is to upload this file at the time you build the app.

If a ProGuard mapping file has been uploaded for a crashed application, in the crash list the Deobfuscated column for the crash snapshot is true.

If the obfuscated property is false and the stack traces you see in the crash snapshots are obfuscated, you need to locate and upload the mapping file for the application.

#### Learn More

- [Crash Snapshots List](#)
- [Crash Snapshots](#)
- [Uploading the dSYM File](#)
- [Uploading the ProGuard Mapping File](#)

## Troubleshoot Mobile Applications

### Troubleshoot Slow Network Requests from Mobile Applications

- [Identifying the Slowest Network Requests](#)
  - [To identify slow network requests](#)
- [Finding Causes of Slow Network Requests](#)
  - [To investigate details of the slowest individual requests](#)
- [Learn More](#)

#### Identifying the Slowest Network Requests

First identify which network requests are the slowest.

##### *To identify slow network requests*

1. In the left navigation pane click either **End User Experience->iOS** for iOS applications or **End User Experience->Android** for Android applications.  
The Mobile APM dashboard opens.
2. Click the Network Requests tab.
3. Click the top of the Network Request Time (ms) column, then toggle it to sort the network requests with the slowest ones at the top.

4. Skip over network requests that you expect to run for a long time or that have very little load (low Requests per Minute).
5. Select and double-click one of the slow network requests that you want to investigate.
6. In the network request dashboard, view the Key Performance Times at the top of the Network Request Dashboard.

If the graph shows that most of the time to service the request was server time, scroll down to the Related Business Transactions section to investigate related business transactions on the server side.

If most of the time is in the network, the request or response body may be too large and is taking a while to transmit. Or the data connection might be slow.

### Finding Causes of Slow Network Requests

After you have identified a slow network request that you want to troubleshoot, investigate some individual instances of that network request using network request snapshots.

#### *To investigate details of the slowest individual requests*

1. Still in the the Mobile APM dashboard, click the Network Request Snapshots tab.  
The Network Request Snapshots List opens.
2. Click **Filters**.
3. In the Network Request Names dropdown list under Network in the Filters panel, check the check box for the network request that you identified in [To identify slow network requests](#), then click **Search**.  
This restricts the list to snapshots for that network request only.
4. Click **Filters** again to close the filters panel.
5. In the list, click the top of the Network Request Time (ms) column, then toggle it to sort the network request snapshots with the slowest requests at the top.
6. Select and double-click one of the slow network requests.  
The network request snapshot displays the details of the slow request.
7. Scroll down to see if transaction snapshots associated with this network request snapshot are available on the server side.  
If transaction snapshots are available and if most of the time for this network request is spent on the server, click on some of the related transaction snapshots to drill down into causes of slow performance on the server. See [Transaction Snapshots](#).

### Learn More

- [Monitor Network Requests](#)

### Troubleshoot Mobile Application Crashes

- [Identifying Criteria of Applications that Crash Most Often](#)
  - [To identify criteria of applications that crash](#)
- [Finding Causes of Crashes](#)
  - [To find root cause of individual crashes](#)
- [Learn More](#)

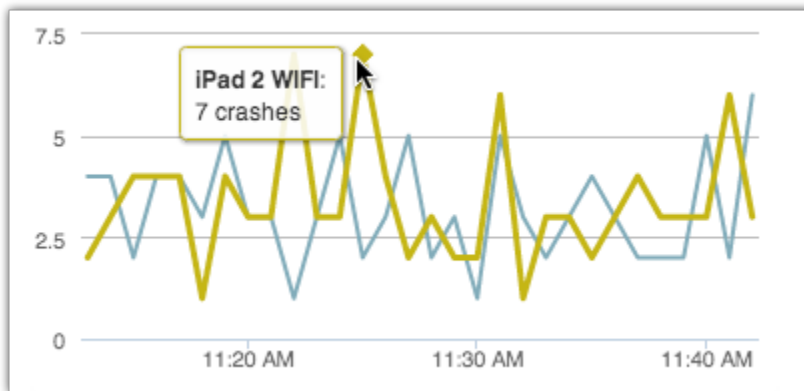
Use crash dashboards and crash snapshots to troubleshoot mobile application crashes.

### Identifying Criteria of Applications that Crash Most Often

Sometimes most of your crashes share one or more criteria. In other words, your application crashes more often on certain devices or operating systems or carriers or connections.

**To identify criteria of applications that crash**

1. In the left navigation pane click either **End User Experience->iOS** for iOS applications or **End User Experience->Android** for Android applications.  
The Mobile APM dashboard opens.
2. Click the Crashes tab.
3. Click the Dashboard subtab if it is not already selected.
4. In the Crashes vs Requests graph, identify values that are significantly above the Average line. For example, if a device name is above the line, that type of device is experiencing more crashes than would be expected for the current load.
5. Scroll down to the section for the criteria that seem to be experiencing more crashes.
6. In the line graph, note the times that crashes spike. You can hover over a point on the graph to see the exact number of crashes at that time.



7. Note the criteria (in this example the iPad 2 WIFI device) and the time that most crashes seem to occur.

**Finding Causes of Crashes**

After you have identified which applications are causing most of your crashes and approximately when most crashes occur, you can examine a few of those individual crashes to identify the cause.

**To find root cause of individual crashes**

1. In the Crashes tab of Mobile APM Dashboard, click the Crash Snapshots subtab.
2. Click **Filters**.
3. Check the check box for the criteria of apps experiencing the most crashes that you identified in [Identifying Criteria of Applications that Crash Most Often](#).

This filters the crash snapshots list to display only snapshots of crashed applications meeting those criteria.

4. In the crash snapshots list, select and double-click a snapshot that occurred around the time that most crashes occurred. In the stack trace of the crash snapshot, note the thread and function in which the crash occurred. For some crashes the crashed line number is also available.
5. Optional: Click **Download** to get a text version of the stack trace to send to your application development team.

#### Learn More

- [Crash Dashboard](#)
- [Crash Snapshots List](#)
- [Crash Snapshots](#)

## Configure Mobile Network Requests

You can configure:

- how mobile requests are named
- the thresholds that cause mobile request snapshots to be considered, slow, very slow or stalled

To access mobile request configuration

1. In the left navigation pane of the AppDynamics console, click **Configure -> Instrumentation**

2. Click the End User Experience tab.
3. Click the Mobile Network Request Naming & Thresholds subtab.

## Configure Mobile Network Request Naming

- [Modifying the Mobile Request Naming Rule](#)
  - [To configure network request naming](#)
- [Creating Mobile Custom Naming Rules](#)
  - [To create a custom naming rule](#)
- [Creating Mobile Exclude Rules](#)
  - [To create a custom exclude rule](#)
- [Learn More](#)

By default AppDynamics names network requests using:

- the host name
- the first two segments of the URL

For example, if an application makes this HTTP request:

```
http://facebook.com/friends/profiles/12345?viewWall=true
```

The default network request name is:

```
facebook.com/friends/profiles
```

## Modifying the Mobile Request Naming Rule

You can configure a different default rule for naming your network requests that helps you visualize your application more clearly.

Try to group logically related requests together while keeping unrelated requests in separate groups. The task is similar to configuring naming rules for business transactions on the server side.

If the default host name and first two segments of the URL for all your requests are identical, you might want to name the requests based on the last segments or a selection of non-contiguous segments of the URL to distinguish among requests in the network requests list.

You can also name the requests based on query parameters. For example if the request passes an order number, you could specify that the value of the order-number query parameter be used in the network request name.

You can also base the name on a regular expression run on the URL. AppDynamics uses the Java libraries for regular expressions. For more information see:

- Tutorial: <http://download.oracle.com/javase/tutorial/essential/regex/index.html>
- Javadoc: <http://download.oracle.com/javase/1.5.0/docs/api/java/util/regex/Pattern.html>

### To configure network request naming

1. Access the mobile network request configuration window.
2. In the Mobile Network Request Naming & Thresholds subtab, expand **Configure how Network requests will be named**.
3. In the Default Naming Convention section, select the elements to use in network request names.
4. Click **Save**.

Save

▼ Configure how Network Requests will be named

**Default Naming Configuration**

Requests will be named using these configurations.

Enabled ☒

Show Protocol ☐

Show Domain ☐ Show Full Domain ☐ Show Subdomain ☒

What part of the URL should be used in Request Names

☒ Use first  segments

☐ Use last  segments

☐ Use segment numbers

(comma separated list, starts at 1) [Example](#)

☐ Run regex on URI

and use groups

(comma separated list of indices from regex output, starting at 0.) [Example](#)

Query String Parameters to use in Request Name

Comma separated list of parameter names. The values will be used in Request Names.

### Creating Mobile Custom Naming Rules

By default, the same naming rule is applied to every URL that your application requests. If you want to apply different naming rules to different URLs, create custom naming rules.

For example, if some requests call your own in-house server and others call out to a third-party API, you may want to see all the third-party API calls as a single network request and use the default naming rules for the calls to your own server. You would create a custom naming rule that matches the third party calls and uses only the host in the default rule name or perhaps also include certain query parameters.

### To create a custom naming rule

1. In the Mobile Network Request Naming & Thresholds subtab of the End User Experience tab, click the + icon under **Custom Naming Rules**.
2. In the Custom Naming Rule window, enter a name for the custom rule that you are creating.
3. Check the Enabled check box to enable the rule.
4. Select the check boxes and radio buttons and enter the match criteria for AppDynamics to use to name network requests.
5. Use the Priority parameter on a custom rule to specify which rule to apply to the request name if it could be detected by more than one custom rule. Custom rules are always

evaluated before the default naming rule, beginning with the custom rule that has the highest priority.

6. Click **OK**.

### Sample custom naming rule

The following rule creates a custom match rule for requests to the AcmeMobileShopping application in which the URL contains "ourpartner.com". This rule uses the protocol, the subdomain and the third and fourth segments of the URL in the network request name.

The screenshot shows the 'Custom Naming Rule' dialog box with the following configuration:

- Name:** OurPartnerRule
- Enabled:** ☒
- Priority:** 0
- URL:** Contains ourpartner.com
- Mobile Application Name:** Contains AcmeMobileShopping
- Show Protocol:** ☒
- Show Domain:** ☒ Show Full Domain ☒ Show Sub-domain
- What part of the URL should be used in Request Names:**
  - ☐ Use first 2 segments
  - ☐ Use last 1 segments
  - ☒ Use segment numbers 3,4 (comma separated list, starts at 1) [Example](#)
  - ☐ Run regex on URI and use groups (comma separated list of indices from regex output, starting at 0.) [Example](#)
- Query String Parameters to use in Request Name:** (empty field)

Buttons: Cancel, OK

You can temporarily cancel the application of a custom naming rule by clearing the **Enabled** check box in the custom rule configuration. In this case the default naming rule is applied to requests that would have been named by the disabled custom rule. To remove the rule permanently, select the custom rule in the Custom Naming Rules list and click the Delete icon.

### Creating Mobile Exclude Rules

If there are certain types of requests that you do not want to monitor, create custom exclude rules for them based on the URL and/or the application name. Excluded network requests are not reported or counted toward the network request limit of 500 requests per controller application.

#### To create a custom exclude rule

1. In the Mobile Network Request Naming & Thresholds subtab of the End User Experience tab, click the plus icon under **Custom Exclude Rules**.
2. Enter a name for the exclude rule that you are creating
3. Check the Enabled check box to enable the rule.
4. Use the dropdown menus to provide the matching criteria for the URL and mobile

application of the requests to be excluded.

5. Click **OK**.

You can temporarily cancel the application of an exclude rule by clearing the **Enabled** check box in the exclude rule configuration. To remove the rule permanently, select the exclude rule in the Custom Exclude Rules list and click the Delete icon.

#### Learn More

- [Network Request Limits](#)
- [Monitor Network Requests](#)

### Configure Mobile Network Request Thresholds

- [To configure network request thresholds](#)

The mobile agent uses configurable thresholds to determine whether network request time is normal, slow, very slow or stalled. It uses these thresholds:

- to decide whether to create a mobile request snapshot
- for labeling network request experience in a network request snapshot

By default the mobile agent uses the following default values to determine whether a request is slow or stalled:

- slow: greater than 3 standard deviations
- very slow: greater than 4 standard deviations
- stall: greater than 45000 ms

You should configure these defaults to conform to your own criteria for your mobile applications. An absolute threshold rather than one based on the standard deviation is often more appropriate for mobile applications.

#### *To configure network request thresholds*

1. [Access the mobile network request configuration window.](#)
2. In the Mobile Network Request Naming & Thresholds subtab of the End User Experience tab, expand **Thresholds for Slow End User Experience**.
3. In the Thresholds for Slow End User Experience section, set the thresholds for slow, very slow and stalled in milliseconds.
4. Click **Save**.



The screenshot shows the 'Instrumentation' tab in AppDynamics, specifically the 'End User Experience' subtab. The 'Enable End User Experience Monitoring' checkbox is checked. Below this, there are tabs for 'Web Javascript Instrumentation', 'Web Page Naming, Error Detection, Thresholds, etc.', 'Mobile Apps', and 'Mobile Network Request Naming & Thresholds'. The 'Mobile Network Request Naming & Thresholds' tab is selected. A 'Save' button is visible. Under the heading 'Configure how Network Requests will be named', there is a section for 'Thresholds for Slow End User Experience'. This section includes a sub-header 'Configure User Experience Thresholds for Mobile Network Request Snapshots.' and two sets of radio buttons for selecting 'Slow' or 'Very slow' thresholds. The 'Slow' thresholds are set to 'greater than 1200 ms' and 'greater than 1500 ms'. The 'Very slow' thresholds are set to 'greater than 0 standard deviations' and 'greater than 0 standard deviations'. There is also a 'Stall greater than 45000 ms' threshold.

## Administer Mobile Applications

After a mobile application has been instrumented and starts reporting metrics to the controller, it is registered with the controller. Registered applications are listed in the Registered Mobile Apps panel of the [Mobile Apps](#) subtab under the End User Experience instrumentation tab.

You can rename a mobile application or remove it from the list of registered applications.

The screenshot shows the 'Registered Mobile Applications' panel. It features a table with columns for Platform, Mobile App Id, and Name. The table lists three applications: an iOS app, an Android app, and another iOS app. Callouts with arrows point to specific elements: a refresh button (circular arrow icon) with the text 'Click here to refresh the list.', a pencil icon with the text 'Click here to rename the selected application.', and a trash can icon with the text 'Click here to remove the selected application.'

| Platform | Mobile App Id                                 | Name   |
|----------|---|--|
| iOS      | com.appdynamics.eum.test.apps.ACEMShoppingApp | com.appdynamics.eum.test.apps.ACEMShopping.App @ iOS     |
| Android  | com.appdynamics.eum.test.apps.ACEMShoppingApp | com.appdynamics.eum.test.apps.ACEMShopping.App @ Android |
| iOS      | com.acme.AcmeMobileShopping                   | com.acme.AcmeMobileShopping @ iOS                        |

## Mobile APM Metrics

- Mobile Metrics Defined
  - Network Request Metrics
    - HTTP Errors
    - Network Errors
    - Calls to Instrumented Application Servers

- [Crash Metrics](#)

AppDynamics reports key mobile metrics on the mobile geo, network request and crash dashboards, on the network requests and crash dashboards, and in the Metric Browser.

In the Metric Browser, mobile metrics are aggregated in the Mobile tree by agent (iOS and Android), application, carrier, connection type, device, geographic location, operating system version, and application version.

## Mobile Metrics Defined

For the time metrics, average is calculated by the arithmetic mean.

### Network Request Metrics

Network request metrics are reported for each platform and for each instrumented mobile application.

- **Network Request Time:** average interval in milliseconds between the time that a mobile application initiates a request by calling the system API and the time that the system returns the response to the application
- **Network Requests per minute:** average number of network requests per minute; for all requests to the app over HTTP.
- **Total Requests:** derived by adding all the networks requests per minute over the selected time range.

### HTTP Errors

An HTTP error occurs when the HTTP request and response are sent and received successfully, but the response status code indicates that an error occurred. These errors suggest that the network is working correctly but there is a problem on the client side (4xx status codes) or the server side (5xx status codes) that prevented normal handling of the request.

- **HTTP Errors per minute:** average errors per minute for errors that return an HTTP response code between 400 and 599
- **HTTP Errors (total):** total number of errors that return an HTTP response code between 400 and 599 over the selected time range

### Network Errors

A network error is any occurrence that prevents the HTTP request from being sent or the HTTP response from being received successfully. Typical causes of network errors include:

- Host cannot be resolved.
- Host refused connection.
- Connection timed out.
- Device is offline.
- General connectivity problems.
- **Network Errors per minute:** average network errors per minute
- **Network Errors (total):** total number of network errors over the selected time range

## *Calls to Instrumented Application Servers*

- **Application Server Calls per Minute:** average call rate from the mobile application to instrumented application servers for network requests correlated with server-side business transactions
- **Application Server Time:** average response time from the mobile application to instrumented application servers for network requests correlated with business transactions server-side business transactions

## **Crash Metrics**

- **Total Number of Crashes**
- **App Crashes per Minute**