

Oracle® SD-WAN Enhanced Application Identification & Application Signatures Guide

Capabilities and Configuration



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About This Document

This document discusses how to configure the Application Identification functionality on platforms running APN 7.3 GA or later.

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Under the SD-WAN header, select a product.

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5. To download a file to your location, right-click the PDF link, select Save target as (or similar command based on your browser), and save to a local folder.

References

The following documents are available:

- *Talari Glossary*
- *Talari APN 7.3 GA Release Notes*
- *Talari APN 7.3 New Feature Guide*

Introduction to Enhanced Application Identification & Talari Application Signature Library

Benefits

Talari Networks introduces Enhanced Application Identification, which allows the Talari service to recognize an application based on domain name or sub-domain name, and allows users to steer application traffic to a defined service. Enhanced Application Identification leverages the Talari Application Signature Library of pre-defined categories and applications to make configuration simple for the user, while also supporting custom user-defined categories and applications. The Talari Application Signature Library comes with more than 100 pre-defined applications. Talari will provide updates to the Talari Application Signature Library based on customer feedback. New signature libraries can be upgraded independently of software packages via the APN configuration editor process.

Enhanced Application Identification is configured globally for ease of use. The user may define application policies to steer applications to the local Internet service or to hair-pin them back to the data center or NCN site. Application policies may be applied to the entire APN, to a single site, or to a subset of sites within the APN. When applications are steered to a Conduit service (as when hair-pinning to the data center or NCN), traditional QOS services are applied and users may map the application to a predefined classification or select their own classification from a pre-defined list.

Additionally, the appliance now provides an application dashboard view which allows the user to view top live and cumulative applications, bandwidth usage by service, application health information. These features are described in more detail in this document.

Capabilities

Talari Enhanced Application Identification provides the capability to identify an application and match multiple configuration components to a policy. Some of these configurable components are pre-defined and some are user definable. These are included below with a brief definition, and described in more detail below:

| Component | Description | Used For | User Defined / Customizable | Pre-Defined | Optional Usage |
|-----------------------------|-----------------------|---|-----------------------------|-------------|----------------|
| <i>Application Category</i> | Group of Applications | Application Dashboard: Top Applications | YES | YES | YES |
| Component | Description | Used For | User Defined / Customizable | Pre-Defined | Optional Usage |

| | | | | | |
|--|---|--|-----|-----|-----|
| Application (Defined by User) | User-defined specific application (comprised by domain name, 5 tuple). Can be enabled or disabled at any time. | Application Dashboard | YES | NO | YES |
| Application (Defined by Talari) | Applications part of Talari Application Signature Library. (comprised of subdomains, 5 tuple. By default disabled.) | Application Dashboard | YES | YES | YES |
| DNS Snooping | Enabling any application enables DNS snooping throughout the APN. (Default is disabled.) | Display of Applications with Domain Name Match | YES | YES | YES |
| Probing Intervals | Application probing frequency for an application can be enabled or disabled, and configured. Probing is only performed when an application includes one or more domain names as match criteria. | Application Health | YES | YES | YES |
| Response Times | Normal and Warning level application response times can be configured. (Default to 100 for Normal and 200 for Warning.) | Application Health | YES | YES | YES |
| Site Response Time Bias | Adjust the Normal and Warning level application response times on a per-site basis. (Default is 0.) | Application Health | YES | NO | YES |

Application Categories

Application Categories are used to group applications for the purpose of more easily defining policies that apply to multiple applications. Application Categories can be created by users, or users can leverage the Application Categories contained in the Talari Application Signature Library, or a combination of both. The Talari Application Signature Library provides multiple pre-defined Application Categories, including

Business, Music, News, Voice, and more. Users may add or remove Application Categories as desired. Application Categories may be used as one of the match criteria for Application Policies. Usage reporting is available for Application Categories via the Application Dashboard. (For more details see the Application Dashboard Section)

User Defined Applications

In addition to the applications included in the Talari Application Signature Library, users may define applications to match on protocol, port, network IP address or domain name, and DSCP tag or a combination of these items. Traffic will be evaluated against userdefined applications before being evaluated against the Talari Defined Applications that originate from the Talari Application Signature Library. Applications may be used as one of the match criteria for Application Policies. Usage reporting is available for applications via the Application Dashboard. (For more details see the Application Dashboard Section)

Talari Defined Applications

Talari Defined Application will originate from the Talari Application Signature Library that the user may elect to import and use alone or along with their User Defined Applications. The Talari Application Signature library includes more than 100 predefined commonly requested applications in multiple categories to save users time defining them individually. Users may customize or remove these pre-defined applications after importing the Talari Application Signature Library. Just as with User Defined Applications, Talari Defined Applications may be used as one of the match criteria for Application Policies. Usage reporting is available for applications via the Application Dashboard.

Note: Talari Defined Applications imported from the Talari Application Signature library are disabled by default and must be explicitly enabled in the Talari Configuration Editor. DNS snooping will only occur after an application has been enabled.

Application Policies

Application Policies are user-defined and provide a mechanism to specify that a specific application or Application Category once identified by the Talari should be steered to a particular Talari service. For example, internet-based applications such as Salesforce and Office365 may be steered to a local internet service, or they may be hair-pinned to the NCN for internet access by creating an Application Policy.

Note: Once the user defines an application policy or makes any changes to an application policy, the configuration must be saved and then applied to the APN to implement the policy. The user would use the Change Management process to activate the updated configuration file containing the new/edited application policies.

Site Groups

Site Groups allow users to group multiple sites together for use with one or more Application Policies. There are three default site groups available for user convenience

including: All Sites, ControllerSites, and NonControllerSites. Users may define additional site groups as desired for use in any Application Policies.

Network Objects

Network objects allow users to specify an IP address and subnet mask list for an application policy. Network Objects are user-defined.

Application Matching Functionality

Talari has supported application identification in the past by leveraging a 5-tuple match where the user would configure IP address or ports based on the application flow. In addition, Talari has also supported the concept of DNS proxy which allowed Talari to learn DNS resolution information from DNS replies.

Talari has added a DNS snooping capability to our Application Identification suite which matches flows to domain names within an application flow. Prior to a host initiating a new session the host initiates a DNS request to learn the IP address of the application. This DNS request and DNS response must pass through the Talari, and the appliance caches DNS resolution information (A Records) for use in application matching. Once the host receives the DNS reply it initiates the session to the destination IP address. Talari then matches the request initiated by the host to a learned IP address defined for the specific application. When DNS snooping is enabled, DNS proxy is no longer required for domain-based application identification.

Note: Since the Talari appliance must be able to read DNS information in order to identify applications, Application Identification is not supported in conjunction with Encrypted DNS.

Note: Application Identification only matches the first connection when multiple DNS A records resolve to the same IP address. Subsequent connections using the same IP address will be attributed to the original application match, and will block the addition of that IP address as a match for other applications. For example, if Application A uses the domain name “[domain1.com](#)” as one of its match criteria and Application B uses the domain name “[domain2.com](#)” as one of its match criteria, if the DNS resolution for both domains is “1.2.3.4” then all connections using that address will be assigned to the first application the record is matched against.

Application Policy Processing

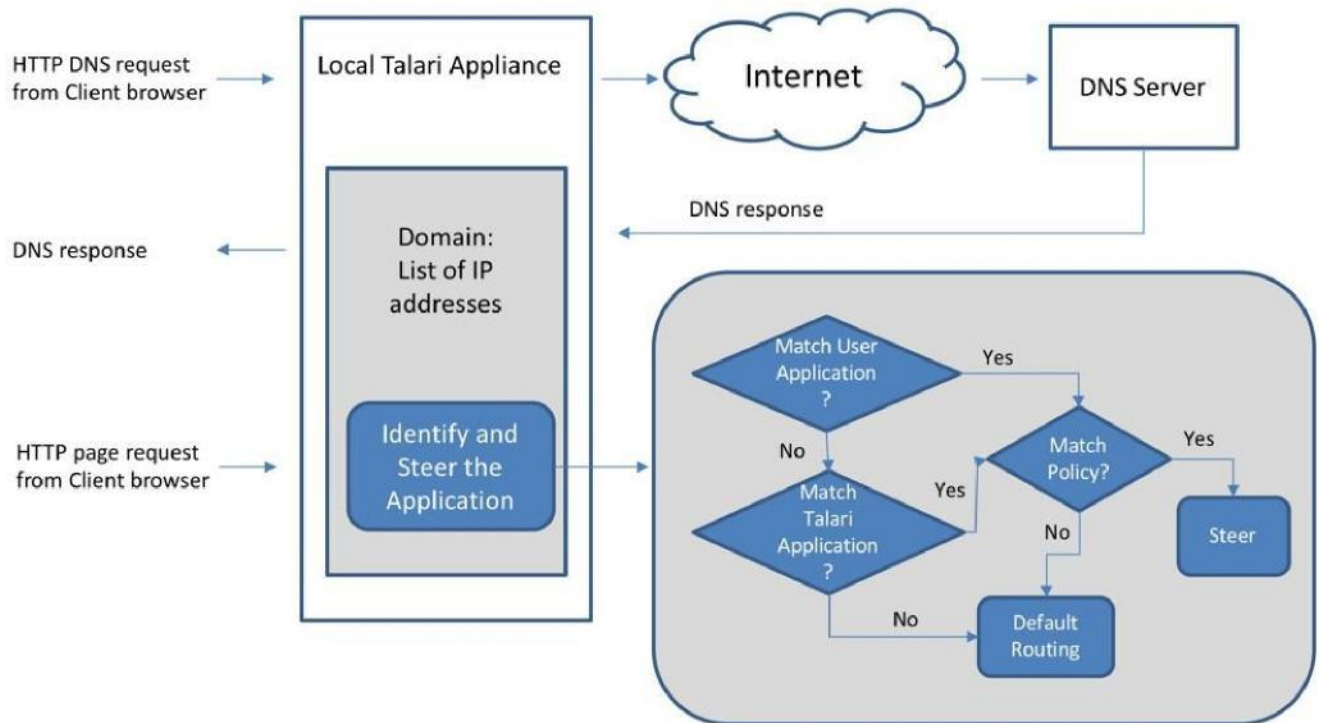
The priority for matching on a defined policy is as follows:

- User-defined application policies
- Talari-defined application policies

All policies are listed in priority order, with lower-numbered policies processed first. Once a session matches an application policy, additional policies will not be evaluated for that session. The user defined applications take priority over the Talari defined applications when matching an application policy. If the session does not match an

application policy, the session will default to the Talari routing table. If the application policy is steered to a service that is down, the routing table is used to forward the flow to the appropriate destination service. Currently, users cannot configure a failover policy as the routing table is used if the service associated with an application policy is down.

If the user steers an application to a service, the service must exist at the destination site. For example, if the application policy is steering to the local Internet service of a site, the Internet service must exist at that site when defining the application policy. If the service does not exist at a site, the decision to forward the packets/flow is based on the appliance routing table.



Application Health

Application Identification provides application health information on a per-application basis. Health information will be collected for all enabled applications which include domain name as a match criteria and displayed on the Application Dashboard. Health indicators are determined by RTT probing. Probing is used to determine the real-time health of an application. Probing is disabled by default and must be enabled on a perapplication basis.

Note: Health information for applications is only available when probing is enabled. Probing is only performed on applications which include a domain name in the match criteria.

When probing is enabled and the application domain name is resolved by DNS snooping, a TCP request will be sent to the IP(s) associated with the application and the

RTT time will be calculated based on the response (details below). For applications with more than one associated IP address, the top 5 addresses used will be probed and an average RTT calculated from the results. The TCP SYN contains the timestamp in the Options field and the expectation is that the Server will respond with a Timestamp. If the server does not respond with a timestamp the RTT is not calculated at this time. These probes will also show up in the Talari flow table – source IP address will be a Talari VIP address with the destination IP being that of the application domain. These will be TCP based using a source port of 2156 and a destination port of 443. The RTT is compared to the timer thresholds specified in the configuration (default or user-defined) to determine application health. Applications which are at or below the normal response time will be classified as Normal. Applications which are at or below warning response time but above the normal response time will be classified as Warning. Applications which are above the warning threshold will be classified as Critical. The user has the ability to change these values per application.

Since different sites may have different acceptable thresholds, an additional timer delay (the site bias normal / warning timer) is configurable on a per-site basis. This value is added to the value defined within each application.

Configuration

Configuration Overview

Application Identification is configured through the Talari Configuration Editor tool. In order for Application Identification to provide data on application health and usage, one or more applications must be defined and enabled. In order to take advantage of Application Identification's steering capabilities, one or more application policies must be defined as well.

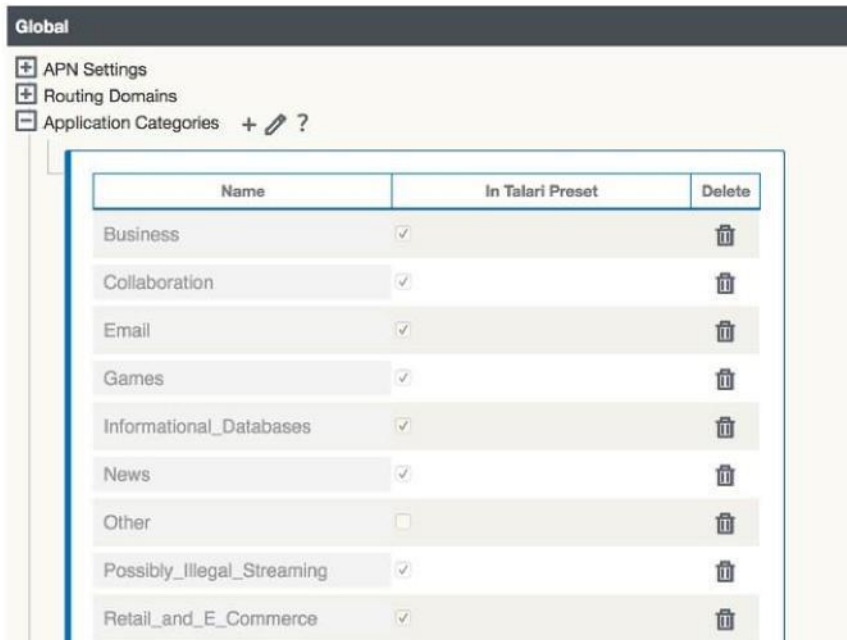
Below are more details about the configurable components that may be leveraged by the user for enhanced application identification.

Configure Application Categories (Optional)

Note: Configuring or removing Application Categories is not required for Application Identification to function.

In the Advanced view of the Configuration Editor, open **Global > Application Categories**.

Pre-defined application categories may not be edited. However, they may be deleted by clicking the Delete icon in the right-hand column.

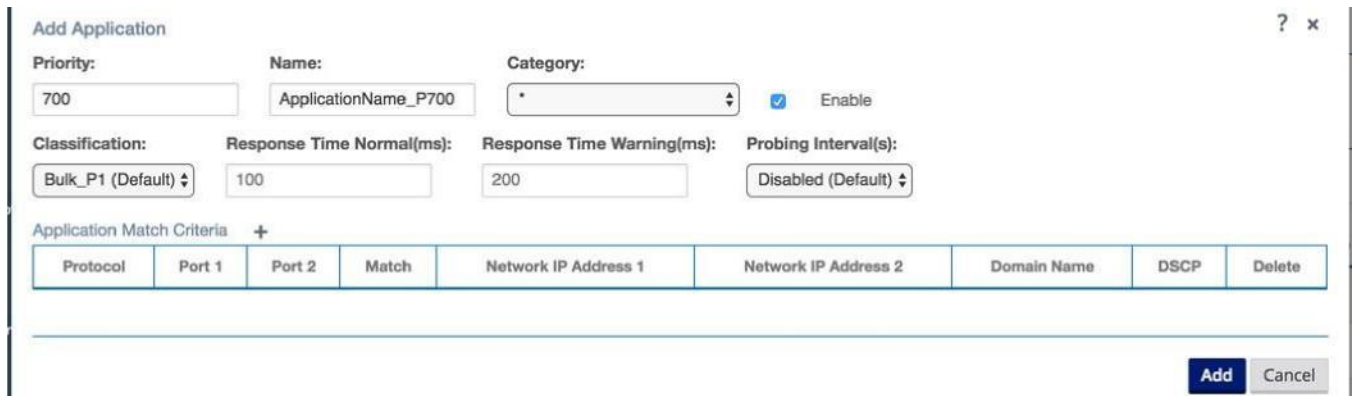


To add a new application category, click the “+” icon, assign a name to the new category, and click “Apply”.

Configure User Defined Applications

Add a New Application

To add a user-defined application, open **Global > User Defined Applications** in the Advanced view of the Configuration Editor and click the “+” icon.



Applications defined are evaluated by a user-customizable priority order (see above). Once the Talari finds a match for the traffic, additional applications defined will not be evaluated for that traffic. More specific application definitions should be given a higher priority (closer to 100) so that these matches will be achieved before more general criteria (e.g. an application matching based on the domain name “analytics.google.com” should be ordered before an application matching based on the domain name

“google.com”). User defined application priorities will supersede the Talari Defined Application priorities.

The application definition priority is different from the Application Policy priority (see ***Application Policy Configuration*** Section further below)

Applications will be assigned an automatically generated name. Best practice is to replace this with a descriptive name. Applications should be assigned a category to aid in grouping the application on the Application Dashboard. If no category is selected, the application will be assigned to a category named “Other”.

Classification

All applications have been defined a default classification for application identification. These default classifications map to the Talari Default Rulesets. Details on how each default classification for application identification maps to the Talari Default Rulesets can be found in ***Appendix: Talari Application ID Classification Mapping***.

Response Time and Probing Interval(s)

When probing is enabled and the application domain name is resolved by DNS snooping, a TCP request will be sent to the IP(s) associated with the application and the RTT time will be calculated based on the response. The RTT is compared to the Response Time thresholds (Normal and Warning) specified in the application configuration to determine application health.

Applications which are at or below the normal response time will be classified as Normal on the Application Health section of the Application Dashboard. Applications which are at or below warning response time but above the normal response time will be classified as Warning. Applications which are above the warning threshold will be classified as Critical.

To configure Application Health related settings for an application the user should:

1. Make sure the Enable box is checked to enable DNS snooping and Application Identification.
2. Review/modify normal and warning response times for the application (see above).
3. Select a probing interval from the dropdown

Note: By default, the probing interval is disabled. When the probing interval is disabled, health checking will not be available for the application.

Site Bias

In addition to the per application response time settings, an overall Site Bias can be configured under Basic Settings for each site. The site bias allows the adjustment of the normal and warning times the Talari will expect to see for an individual site. This is useful when there are sites that are known to experience slower rates of speed than others.

When normal and warning response times are set up for an application with polling enabled, the site bias can be used to increase the RTT checks if a certain site is known to have slower WAN response times/higher latency across the WAN to access applications. Using the site bias will prevent the known slower performance site from constantly showing up under the Application Dashboard Health with a warning or critical status for what is considered expected behavior at a that site.

The screenshot shows the 'Basic Settings' configuration page for a site named 'Site0-E1000'. The page includes the following fields and controls:

- Appliance Name:** Site0-E1000
- Secure Key:** 5a8618baee392ebf (with a 'Regenerate' button)
- Model:** E1000 (dropdown menu)
- Mode:** primary NCN (dropdown menu)
- Site Template:** <None> (dropdown menu)
- Default Direct Route Cost:** 5 (text input)
- Gateway ARP Timer (ms):** 1000 (text input)
- Enable Source MAC Learning**
- Application Normal RTT adjust time (ms):** 0 (text input)
- Application Warning RTT adjust time (ms):** 0 (text input)

At the bottom right of the form are 'Apply' and 'Close' buttons.

For example: An application is defined with a Normal RTT of 30ms. However, for a specific site know to have slower performance, a site bias can be set (within the Basic Settings for the Site) to 20ms. The outcome would be that the Application Dashboard would not display a warning for this specific site and application unless the RTT is >50ms. All other sites without the site bias specified would appear with a warning on the Application Health section of the Application Dashboard if the RTT is >30ms.

User Defined Applications + ?

Search:

| Priority | Name | Enabled | Category | Classification | Response Time (ms) | | Probe Interval(s) | Edit | Delete | Clone |
|----------|--------------------|-------------------------------------|-------------------------|----------------|--------------------|---------|-------------------|------|--------|-------|
| | | | | | Normal | Warning | | | | |
| 100 | FNAS_Replication | <input checked="" type="checkbox"/> | Other | bulk_p1 | 100 | 200 | 0 | | | |
| 200 | Microsoft | <input checked="" type="checkbox"/> | Technology | bulk_p1 | 100 | 200 | 0 | | | |
| 300 | Media | <input checked="" type="checkbox"/> | Other | bulk_p1 | 100 | 200 | 0 | | | |
| 400 | TNET_Monitor_email | <input checked="" type="checkbox"/> | Other | bulk_p1 | 100 | 200 | 0 | | | |
| 500 | Zoom | <input checked="" type="checkbox"/> | Other | bulk_p1 | 100 | 200 | 60 | | | |
| 600 | Reddit | <input checked="" type="checkbox"/> | Informational_Databases | bulk_p1 | 100 | 200 | 10 | | | |

Match Criteria

The final step in defining an application is the Application Match Criteria, which consists of the following attributes when the Match criteria is “Network IP”:

Protocol: TCP,UDP,ICMP the user has an extensive selection to choose from

Port1/Port2: The user can define ports for a specific application if required

Network IP Address 1/Network IP Address 2: The user can define IP addresses if required

DSCP: The user can select from a list of default DSCP values

When the Match Criteria is “Domain Name,” all other options are greyed out and cannot be defined except for the following:

Domain Name: Where the user would specify a domain name like yahoo.com



Note: Any domain name defined as a match criterion will be treated for matching purposes as if it has a wildcard in front of it. Therefore, if the domain name is defined as talari.com

After all configuration details have been specified, click Add to add the new application.

Manage Talari Defined Applications











Pre-defined applications are disabled by default and must be explicitly enabled by the user. Users may make limited edits to applications included in the Talari Application Signature Library. Pre-configured applications may also be deleted, if desired.

To edit or remove a pre-defined application, open **Global > Talari Defined Applications** in the Advanced view of the Configuration Editor.

Talari Defined Applications  

Application Preset Version: 20180526

Search:

| Priority | Name | Enabled | Category | Classification | Response Time (ms) | | Probe Interval(s) | Edit | Delete |
|----------|---------------------|--------------------------|----------------------|----------------|--------------------|---------|-------------------|---|---|
| | | | | | Normal | Warning | | | |
| 100 | Office365 | <input type="checkbox"/> | Business | interactive_p1 | 100 | 200 | 0 |  |  |
| 200 | One_Drive_Microsoft | <input type="checkbox"/> | Web_and_File_Hosting | bulk_p2 | 100 | 200 | 0 |  |  |
| 300 | Salesforce | <input type="checkbox"/> | Business | interactive_p1 | 100 | 200 | 0 |  |  |
| 400 | Box | <input type="checkbox"/> | Web_and_File_Hosting | bulk_p2 | 100 | 200 | 0 |  |  |
| 500 | YouTube | <input type="checkbox"/> | Streaming | interactive_p3 | 100 | 200 | 0 |  |  |


To enable multiple applications at once, click the Edit icon next to the Talari Defined Applications header and click the Enabled checkbox for the desired applications, then click Apply.

To enable or edit a single application, click the Edit icon in the righthand column which corresponds with the application. Click the Enable checkbox to enable the application:

Edit Application

Priority: Name: Category: Enable

Classification: Response Time Normal(ms): Response Time Warning(ms): Probing Interval(s):

Application Match Criteria 

| Protocol | Port 1 | Port 2 | Match | Network IP Address 1 | Ni |
|----------|--------|--------|-------|----------------------|----|
| | | | | | |

Users may not edit the application priority or name of a Talari Defined Application. However, users may change the category, classification, response time thresholds, and probing intervals of a Talari Defined Application, and add or delete match criteria for a pre-defined application.

Additionally, users may clone a Talari Defined Application and further customize all values. To clone a Talari Defined Application, click the Clone icon in the far right column:

Enhanced Application Identification Guide Capabilities and Configuration

Talari Defined Applications

Application Preset Version: 20180626

Search:

| Priority | Name | Enabled | Category | Classification | Response Time (ms) | | Probing Interval (S) | Edit | Delete | Clone |
|----------|---------------------|--------------------------|----------------------|----------------|--------------------|---------|----------------------|------|--------|-------|
| | | | | | Normal | Warning | | | | |
| 200 | One_Drive_Microsoft | <input type="checkbox"/> | Web_and_File_Hosting | bulk_p2 | 100 | 200 | 0 | | | |
| 400 | Dropbox | <input type="checkbox"/> | Web_and_File_Hosting | bulk_p2 | 100 | 200 | 0 | | | |

The newly cloned application will appear in the Talari Defined Applications list highlighted in green. Click the Apply button to complete the cloning process and move the cloned application into the User Defined Application section:

Talari Defined Applications

Application Preset Version: 20180626

Search:

| Priority | Name | Enabled | Category | Classification | Response Time (ms) | | Probing Interval (S) | Edit | Delete | Clone |
|----------|---------------------|-------------------------------------|----------------------|----------------|--------------------|---------|----------------------|------|--------|-------|
| | | | | | Normal | Warning | | | | |
| 200 | One_Drive_Microsoft | <input type="checkbox"/> | Web_and_File_Hosting | bulk_p2 | 100 | 200 | 0 | | | |
| 400 | Dropbox | <input checked="" type="checkbox"/> | Web_and_File_Hosting | bulk_p2 | 100 | 200 | 0 | | | |
| 400 | Dropbox | <input type="checkbox"/> | Web_and_File_Hosting | bulk_p2 | 100 | 200 | 0 | | | |

Apply Revert

Once a Talari Defined Application is cloned, it will appear in the User Defined Application section to be edited as desired.

User Defined Applications

Search:

| Priority | Name | Enabled | Category | Classification | Response Time (ms) | | Probing Interval (S) | Edit | Delete | Clone |
|----------|---------------|--------------------------|----------------------|----------------|--------------------|---------|----------------------|------|--------|-------|
| | | | | | Normal | Warning | | | | |
| 100 | Dropbox-Clone | <input type="checkbox"/> | Web_and_File_Hosting | bulk_p2 | 100 | 200 | 0 | | | |

Configure Site Groups (Optional)

Three site groups are defined by default for users to leverage. Additionally, users may create their own site groups.

The default site groups are:

AllSites: This site group contains all of the sites in the APN.

ControllerSites: This site group contains the NCN and Geo-Diverse NCN sites.

NonControllerSites: The site group contains all client sites in the APN.

Default site groups may not be edited or deleted.

User created site groups may be added, edited, or deleted by opening **Global > Site Group Objects** in the Advanced view of the Configuration Editor.

A site may be in more than one site group. For example, if the APN consists of sites AG, and only sites A, E, and F use a particular application, a new site group containing those sites can be defined for use in a policy for that application.

Configure Application Policies

In the Advanced view of the Configuration Editor, open **Global > Application Policies**.

| Priority | Name | Enabled | Routing Domain | Destination | | | Classification | Edit | Delete | Clone |
|----------|----------------------------------|-------------------------------------|----------------|-------------|--------------|--------------|----------------|------|--------|-------|
| | | | | Site | Service Type | Service Name | | | | |
| 100 | ControllerSit_Local_Applications | <input checked="" type="checkbox"/> | | local | internet | | bulk_p1 | | | |
| 200 | SJ_Local_Applications-Clone | <input checked="" type="checkbox"/> | swim | local | internet | internet | bulk_p1 | | | |
| 300 | AHodge_Apps | <input checked="" type="checkbox"/> | | local | internet | internet | bulk_p1 | | | |
| 400 | DPereira_Applications | <input checked="" type="checkbox"/> | | local | internet | internet | bulk_p1 | | | |

To add a new Application Policy, click the “+” icon.

Add Application Policy ? x

Priority: Name: Enable Routing Domain:

Dest Site: Dest Service Type: Dest Service Name: Classification:

Application Category Match +

| | |
|----------------------|--------|
| Application Category | Delete |
|----------------------|--------|

Application Match +

| | |
|-------------|--------|
| Application | Delete |
|-------------|--------|

Source Network Match +

| | |
|----------------|--------|
| Source Network | Delete |
|----------------|--------|

Site Group Match +

| | |
|------------|--------|
| Site Group | Delete |
|------------|--------|

Site Match +

| | |
|------|--------|
| Site | Delete |
|------|--------|

Application Policies will be assigned an automatically generated name. Best practice is to replace this with a descriptive name.

Select a destination site (where traffic matching the policy will be sent), service type, and service name (if applicable). By default the QoS classification for the policy will match the application the policy is applied to, but the user may select a different classification from the dropdown to override the default.

Note: QoS classification is only applied when the application is steered to a Conduit service.

A policy may have multiple match criteria defined:

Application Category Match: The user may select a category (group of applications) and steer the category to a service.

Application Match: The user may select a specific application and steer it to a service.

Source Network Match: The user may define source group address prefixes under **Global > Network Objects** and use them as a source match for the application policy.

Site Group Match: The user may define a site group as a source match for a policy.

Site Match: The user may define a single source site match for a policy. If the user has a single site with unique services this option can be selected for the specific site. The application policy is then only applied to that site.

To search for a specific application match, begin typing with the dropdown selected to find an application in the list.

Note: Configuring duplicate application policies with the same match criteria (source network, site, and application) that steer to different services is not supported.

Application priorities are automatically incremented by 100. When a user would like to re-order policy priorities, the application priority can be set to fall between any two other priorities, as shown below:

Application Policies + ?

Search:

| Destination | | | | | | | | | |
|-------------|----------|-------------------------------------|-------|--------------|--------------|----------------|------|--------|-------|
| Priority | Name | Enabled | Site | Service Type | Service Name | Classification | Edit | Delete | Clone |
| 100 | Policy_A | <input checked="" type="checkbox"/> | local | internet | internet | | | | |
| 200 | Policy_B | <input checked="" type="checkbox"/> | RDU | internet | internet | | | | |

Navigation: << < 1 > >>

Add Application Policy ? x

Priority: Name: Enable

Dest Site: Dest Service Type: Dest Service Name: Classification:

In this example, Policy_C is being inserted between Policy_A (with a priority of 100) and Policy B (with a priority of 200). A priority of 150 has been assigned to Policy_C. Once the changes to Policy C have been applied, the Configuration Editor automatically reorders the policies as shown below:

Application Policies + ?

Search:

| Destination | | | | | | | | | |
|-------------|----------|-------------------------------------|-------|--------------|--------------|----------------|------|--------|-------|
| Priority | Name | Enabled | Site | Service Type | Service Name | Classification | Edit | Delete | Clone |
| 100 | Policy_A | <input checked="" type="checkbox"/> | local | internet | internet | | | | |
| 200 | Policy_C | <input checked="" type="checkbox"/> | RDU | internet | | | | | |
| 300 | Policy_B | <input checked="" type="checkbox"/> | RDU | internet | internet | | | | |

Configure Site Response Time Bias

To configure a Site Response Time Bias at a site which has higher expected latency for applications, navigate to **Sites > [Site] > Basic Settings** in the Advanced View of the APN Configuration Editor. Click the Edit icon and edit the Application Normal RTT adjust time and Application Warning RTT adjust time fields. These values will be added to the application RTT for all applications at the site. Please see pages 4 and 5 for more information on how application health is calculated based on the RTT time.

RDU

Basic Settings ?

Appliance Name: T860-Primary Secure Key: 132bb462cbc68809

Model: T860 Mode: primary NCN

Site Template: <None>

Default Direct Route Cost: 5

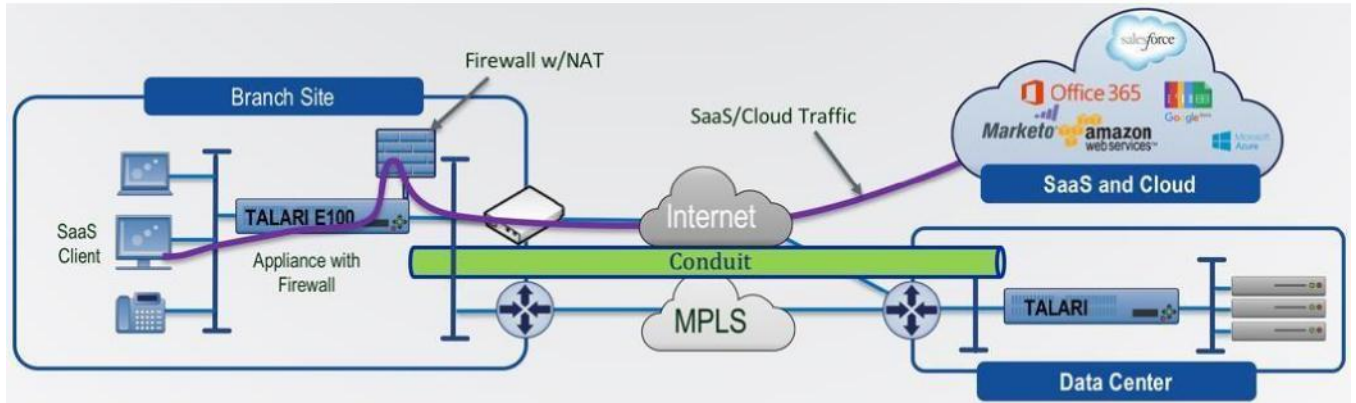
Gateway ARP Timer (ms): 1000

Enable Source MAC Learning

Application Normal RTT adjust time (ms): Application Warning RTT adjust time (ms):

Configuration Examples

Steer to Local Internet Service



In the scenario pictured above, certain application traffic from the branch site is steered directly to the local internet service. Below is a sample application policy for this scenario:

Edit Application Policy ? x

Priority: Name: Enable Routing Domain:

Dest Site: Dest Service Type: Dest Service Name: Classification:

Application Category Match +

| Application Category | Delete |
|--|--------|
| <input type="text" value="Retail_and_E_Commerce"/> | |

Application Match +

| Application | Delete |
|---------------------------------------|--------|
| <input type="text" value="Petsmart"/> | |

Source Network Match +

| Source Network | Delete |
|----------------------|--------|
| <input type="text"/> | |

Site Group Match +

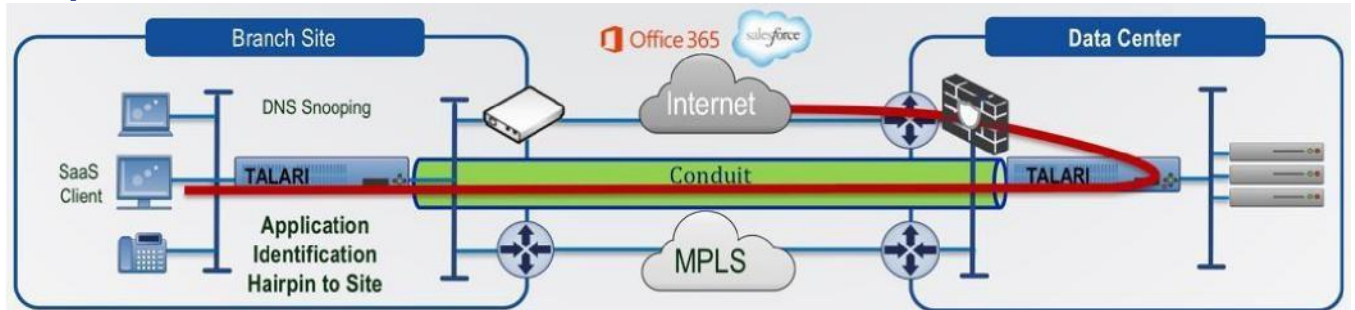
| Site Group | Delete |
|---|--------|
| <input type="text" value="Site-RS-PS"/> | |

Site Match +

| Site | Delete |
|----------------------|--------|
| <input type="text"/> | |

In this policy, traffic for all enabled applications in the Retail_and_E_Commerce category and the Petsmart application to/from the sites in site group Site-RS-PS will be steered to the local internet service at each site. In order for this policy to perform as intended, the sites in the chosen site group must all have a local internet service enabled which has usage allowed on at least one WAN link, and the internet service must be provisioned adequately to serve the application traffic.

Hairpin to NCN or Data Center Internet Service



In the scenario pictured above, certain application traffic from a branch site is hairpinned to the NCN or data center for internet access. Below is a sample application policy for this scenario:

Edit Application Policy ? x

Priority:
Name:
 Enable
 Routing Domain:

Dest Site:
Dest Service Type:
Dest Service Name:
Classification:

Application Category Match +

| Application Category | Delete |
|----------------------|--------|
| | |

Application Match +

| Application | Delete |
|---|--------|
| <input type="text" value="Google_G_Suite"/> | |
| <input type="text" value="Google_Drive"/> | |

Source Network Match +

| Source Network | Delete |
|----------------|--------|
| | |

Site Group Match +

| Site Group | Delete |
|------------|--------|
| | |

Site Match +

| Site | Delete |
|---------------------------------|--------|
| <input type="text" value="RS"/> | |

In this policy, traffic that matches the Google_G_Suite and Google_Drive applications to/from site RS is steered to destination site PPARK, where it uses the PPARK internet service. In order for this policy to perform as intended, the NCN must have a local internet service enabled which has usage allowed on at least one WAN link, and the internet service must be provisioned adequately to serve the application traffic.

Verification

Once Application Policies have been configured, new routes and rules are automatically generated as needed in the Talari configuration based on the policy criteria. These routes and rules are not editable by users.

Rules created based on application policies will display the parent Application Policy:

Rules + ?

| Order | Rule Group Name | Routing Domain | Application Policy | Application Name | IP Address | | | Protocol | Protocol # | Port | | | DSCP | VLAN | Rebind Flow on Change | Delete | Clone |
|-------|-----------------|-----------------------|--------------------|------------------|------------------|----------|------|----------|------------|--------|----------|------|------|------|-----------------------|--------|-------|
| | | | | | Source | Dest+Src | Dest | | | Source | Dest+Src | Dest | | | | | |
| 100 | <None> | Default_RoutingDomain | AHodge_Apps | Gmail | 192.168.64.16/32 | | * | Any | 0 | * | * | * | Any | | | | |
| 200 | <None> | Default_RoutingDomain | AHodge_Apps | Outlook | 192.168.64.16/32 | | * | Any | 0 | * | * | * | Any | | | | |
| 300 | <None> | Default_RoutingDomain | AHodge_Apps | Sports | 192.168.64.16/32 | | * | Any | 0 | * | * | * | Any | | | | |
| 400 | <None> | Default_RoutingDomain | AHodge_Apps | Yahoo_Mail | 192.168.64.16/32 | | * | Any | 0 | * | * | * | Any | | | | |
| 500 | <None> | Default_RoutingDomain | AHodge_Apps | YouTube | 192.168.64.16/32 | | * | Any | 0 | * | * | * | Any | | | | |

Routes created based on application policies will display the parent Application Policy and the application they apply to, as well as the service type and name (if applicable):

Routes + ?

Search:

| Order | Network IP Address | Application Policy | Source Network | Source Network Name | Application Name | Cost | Service Type | Service Name | Gateway IP Address | Info | Edit | Delete |
|-------|--------------------|--------------------|------------------|---------------------|------------------|------|--------------|--------------|--------------------|------|------|--------|
| 1 | 192.168.64.11/24 | | | | | 5 | Local | | | ⓘ | | |
| 2 | 0.0.0.0/0 | | | | | 5 | Internet | | | ⓘ | | |
| 3 | 0.0.0.0/0 | | | | | 16 | Passthrough | | | ⓘ | | |
| 4 | | AHodge_Apps | 192.168.64.16/32 | Ahodge | Gmail | 5 | Conduit | PPark | | ⓘ | | |
| 5 | | AHodge_Apps | 192.168.64.16/32 | Ahodge | Outlook | 5 | Conduit | PPark | | ⓘ | | |
| 6 | | AHodge_Apps | 192.168.64.16/32 | Ahodge | Sports | 5 | Conduit | PPark | | ⓘ | | |
| 7 | | AHodge_Apps | 192.168.64.16/32 | Ahodge | Yahoo_Mail | 5 | Conduit | PPark | | ⓘ | | |
| 8 | | AHodge_Apps | 192.168.64.16/32 | Ahodge | YouTube | 5 | Conduit | PPark | | ⓘ | | |

Importing New Signature Libraries

Users can install new signature libraries from Talari without requiring a software upgrade.

To install a new signature library, open the APN Configuration Editor and click the **Import Application Preset** button and click **Browse...** to import from a file. Select the signature library downloaded. Select **Merge** to keep any changes made to the presets in the running package, or **Overwrite** to overwrite any changes made to the running package. Click **Import** to complete the import process.

Monitoring

The new Application menu provides access to Application Identification data. The expected information is described by page and menu item within each of the sections below.

Dashboard

From the left navigation menu, the application Dashboard can be found by navigating to **Application > Dashboard**. The Application Dashboard provides at-a-glance insight into application behavior and usage for all enabled applications at a site:

Enhanced Application Identification Guide Capabilities and Configuration

Service Type Data (From: 22:01:27 on 6/28/2018 - To: 12:13:28 on 6/29/2018)

Conduit Applications
1 10
Apps | Mbps

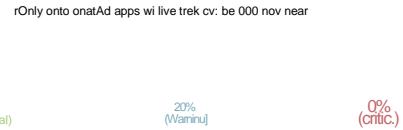
Internet Applications
19 10.94
Apps | Mbps

Intranet Applications
0/0
Apps | Mbps

Top 5 Applications (Cumulative Data) (From: 22:01:27 on 6/28/2018 - To: 12:13:28 on 6/29/2018)



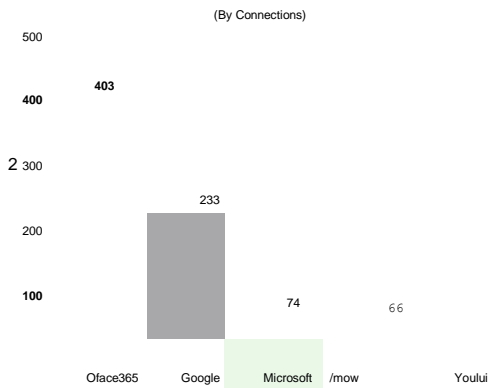
Application Health (Realtime Data collected every 60s) (Taken At: 12:13:28 on 6/29/2018)



Top 10 Response Time (by Critical, Warning, Normal)

| Application | Min (ms) | Average (ms) | Max (ms) | Health | Probe Loss % |
|-------------|----------|--------------|----------|---------|--------------|
| Facebook | 19 | 21 | 23 | Normal | 0 |
| Google | | 15 | 22 | Normal | 0 |
| Office365 | 13 | 47 | 64 | Normal | 0 |
| Outlook | 0 | 0 | | Normal | 80 |
| Reddit | 43 | 43 | 44 | Normal | 0 |
| Salesforce | | 22 | 40 | Normal | 0 |
| Skype | 99 | 163 | 228 | Warning | 0 |
| Yahoo | 123 | 123 | 123 | Warning | 0 |
| Yahoo_Mail | 13 | 40 | 54 | Normal | 40 |
| YouTube | | 18 | 25 | Normal | 0 |

Top 5 Live Applications (Realtime) (Taken At: 12:13:28 on 6/29/2018)



Note: Timestamps may not be displayed on smaller screens.

Service Type Data

Service Type Data (From: 22:01:27 on 6/28/2018 - To: 12:13:28 on 6/29/2018)

Conduit Applications
1 10
Apps | Mbps

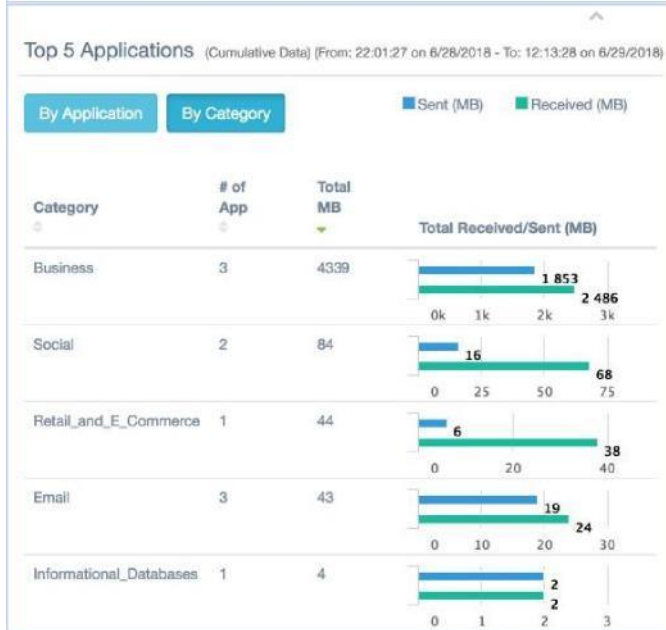
Internet Applications
19 10.94
Apps | Mbps

Intranet Applications
0/0
Apps | Mbps

The Service Type Data section at the top of the Application Dashboard displays service data in summary with the ability for the user to view additional details. The summary data displayed is realtime information which may change each time the Dashboard is refreshed. This data is summarized for up to seven days or from the last reboot/restart of the Talari.

Users may click on the “Conduit Applications”, “Internet Applications”, and “Intranet Applications” text on the top of the Service Type Data on the Application Dashboard to view additional details for Conduit Applications, Internet Applications, or Intranet Applications respectively. Additionally, if the user would like to see information for all Service Types at one time, this can be achieved by clicking on the “Service Type Data” header on the top of the Application Dashboard to be directed to the Service Type data page. To navigate to this same page via the left navigation menus, this page is accessible by clicking on the Application Menu > Service Type menu item.

Top 5 Applications



Within the Application Dashboard, the Top 5 Applications (Cumulative Data) may be viewed by individual application, or by application category. The Top 5 Applications cumulative data displayed is summarized since the last reboot / restart of the Talari.

Additionally, for more information on all applications beyond the Top 5, the user may click on the text that reads “Top Applications” on the top of this section of the Application Dashboard, or navigate through the menus to Application > Cumulative Usage.

Application Health

Application Health (Realtime *Data collected every 60s) (Taken At: 12:13:28 on 6/29/2018)

[*Only Probe enabled apps w/ live traffic will be displayed here.]



Top 10 Response Time (by Critical, Warning, Normal)

| Application | Min (ms) | Average (ms) | Max (ms) | Health | Probe Loss % |
|-------------|----------|--------------|----------|---------|--------------|
| Facebook | 19 | 21 | 23 | Normal | 0 |
| Google | 11 | 15 | 22 | Normal | 0 |
| Office365 | 13 | 47 | 64 | Normal | 0 |
| Outlook | 0 | 0 | 0 | Normal | 80 |
| Reddit | 43 | 43 | 44 | Normal | 0 |
| Salesforce | 11 | 22 | 40 | Normal | 0 |
| Skype | 99 | 163 | 228 | Warning | 0 |
| Yahoo | 123 | 123 | 123 | Warning | 0 |
| Yahoo_Mail | 13 | 40 | 54 | Normal | 40 |
| YouTube | 11 | 18 | 25 | Normal | 0 |

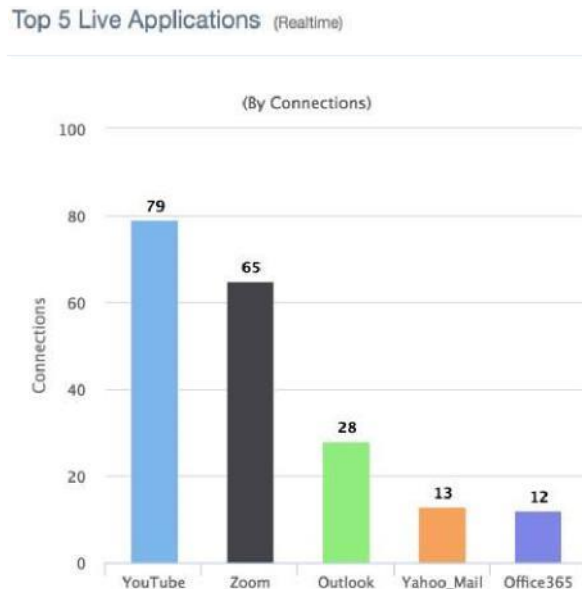
The Application Health section of the Application Dashboard will provide details on the health of up to ten applications enabled for probing. Application Health data is realtime (i.e. not cumulative over any time frame) and is expected to change each time the Application Dashboard is refreshed to show the latest information.

Additional applications beyond the initial ten shown on the Application Dashboard may be viewed by either clicking the “Application Health” text header on the Application Dashboard, or by navigating to the Application > Application Health on the left navigation. For more details see the Health and Response Time Section.

Applications will be classified as Normal, Warning, or Critical based on the response time thresholds specified by the user for Normal and Warning. Any application that has a response time above the Normal threshold specified by the user will be classified as “Warning” under Application Health. Similarly, any application that has a response time above the Warning threshold specified by the user will be classified as “Critical” under Application Health.

The Probe Loss % column displayed for Application Health is calculated based upon the following calculation: $(\text{probing request sent} - \text{probing reply received}) / (\text{probing request sent})$. Probe loss is not used to determine application health.

Top 5 Live Applications



The Top 5 Live Applications provides a realtime view of the top 5 live applications based upon the number of connections. The Top 5 Live Applications data is realtime (i.e. not cumulative over any time frame) and is expected to change each time the Application Dashboard is refreshed to show the latest information. To appear as a Live Application, an application must be enabled and traffic must be identified by the Talari.

Health and Response Time

Accessible from the navigation menu from **Application > Health & Response Time**. The Health and Response Time screen shows health information for all currently enabled applications:

Application Health & Response Time

Response Time

Show entries

Search:

| Application | Min (ms) | Average (ms) | Max (ms) | Health | Probe Loss % |
|-------------|----------|--------------|----------|--------|--------------|
| Outlook | 0 | 0 | 0 | Normal | 80 |
| Reddit | 14 | 24 | 36 | Normal | 0 |
| Salesforce | 11 | 70 | 129 | Normal | 0 |
| YouTube | 11 | 20 | 36 | Normal | 0 |

Showing 1 to 4 of 4 entries

Previous **1** Next

The minimum, maximum, and average RTT in milliseconds is shown for each application, along with a current health designation and percentage of lost probes.

Cumulative Usage

Accessible from the navigation menu from **Applications > Cumulative Usage**. The Cumulative Usage screen shows the overall usage per application or application category:

Enhanced Application Identification Guide Capabilities and Configuration

Top Applications (Cumulative Data)

By Application

Show 100 entries

Search: _____

| Application | Category | Total MB | 17 | Total Rcvd (MB) | Total Sent (MB) |
|--------------------|-------------------------|----------|----|-----------------|-----------------|
| Zoom | Other | 341 | | 246 | 95 |
| Office365 | Business | 316 | | 243 | 73 |
| YouTube | Streaming | 155 | | 131 | 24 |
| Outlook | Email | 64 | | 9 | 55 |
| Yahoo Mail | Email | 49 | | 46 | 3 |
| Salesforce | Business | 38 | | 27 | 11 |
| Facebook | Social | 34 | | 29 | 5 |
| Microsoft | Technology | 23 | | 14 | 9 |
| Skype | Social | 13 | | 5 | 8 |
| Google | Business | 9 | | 7 | 2 |
| Reddit | Informational Databases | 7 | | 5 | 2 |
| Yahoo | Web_Portals | 2 | | 1 | 1 |
| TNET_Monitor_email | Other | 0 | | 0 | 0 |

Top Applications (cumulative)

By Application

Show 1. 100 41 entree

Search'

| Category | # of App | Total MB | Total Rcvd (MB) | Total Sent (MB) |
|-------------------------|----------|----------|-----------------|-----------------|
| Business | 3 | 363 | 276 | 87 |
| Other | 4 | 342 | 246 | 96 |
| Streaming | 1 | 155 | 131 | 24 |
| Email | 2 | 113 | 55 | 58 |
| Social | 2 | 47 | 34 | 13 |
| Technology | 1 | 23 | 14 | 9 |
| Informational Databases | 1 | 7 | 5 | 2 |
| Web_Portals | 1 | 2 | 1 | 1 |

Live Sessions

Accessible from the navigation menu from **Application > Live Sessions**. The Live Sessions screen shows live application statistics and can be set to auto refresh.

Applications

Enable Auto Refresh 5 seconds Refresh Show Latest Data

Applications Statistics

Show entries Search:

| Application | Service Type | Packets Received | Kbps Recieved | Packets Sent | Kbps Sent | Sessions |
|------------------|--------------|------------------|---------------|--------------|-----------|----------|
| YouTube | INTERNET | 80 | 31.61 | 85 | 15.71 | 50 |
| Reddit | INTERNET | 6 | 0.34 | 11 | 0.54 | 8 |
| Salesforce | INTERNET | 5 | 0.29 | 10 | 0.49 | 23 |
| Facebook | INTERNET | 2 | 0.12 | 4 | 0.2 | 3 |
| Yahoo_Mail | INTERNET | 18 | 4.85 | 30 | 3.65 | 18 |
| Zoom | INTERNET | 1415 | 517.56 | 1287 | 215.82 | 67 |
| Outlook | INTERNET | 1 | 0.06 | 6 | 0.33 | 7 |
| FNAS_Replication | CONDUIT | 0 | 0 | 0 | 0 | 0 |
| Microsoft | CONDUIT | 0 | 0 | 0 | 0 | 0 |

Service Type Data

Accessible from the navigation menu from **Application > Service Type Data**. Displays a full list of all service type data with sort ability by column.

Service Type App Data

Calculated over: 0 day(s), 14 Hr(s), 15 Minute(s), 22 Second(s)

Show 100 entries

Search:

| Application | Service Type | Packets Received | Kbps Received | Packets Sent | Kbps Sent |
|--------------------|--------------|------------------|---------------|--------------|-----------|
| Zoom | INTERNET | 1576993 | 62.65 | 1121261 | 24.02 |
| Office365 | INTERNET | 323431 | 44.27 | 242436 | 12.36 |
| YouTube | INTERNET | 249766 | 33.98 | 188125 | 4.65 |
| Outlook | INTERNET | 79220 | 1.57 | 132804 | 9.56 |
| Salesforce | INTERNET | 68926 | 4.49 | 84508 | 1.91 |
| Facebook | INTERNET | 55705 | 5 | 74048 | 0.94 |
| Yahoo_Mail | INTERNET | 52624 | 8.72 | 37250 | 0.63 |
| Microsoft | INTERNET | 35600 | 2.22 | 36774 | 1.54 |
| Reddit | INTERNET | 24843 | 1.69 | 38026 | 0.36 |
| Google | INTERNET | 19374 | 1.13 | 17285 | 0.33 |
| Skype | INTERNET | 12352 | 0.8 | 17975 | 1.3 |
| Yahoo | INTERNET | 4142 | 0.14 | 4405 | 0.13 |
| TNET_Monitor_email | INTERNET | 4079 | 0.04 | 4433 | 0.06 |
| Media | INTERNET | 1644 | 0.32 | 982 | 0.02 |
| Amazon | INTERNET | 749 | 0.03 | 853 | 0.02 |
| TNET_Monitor_email | CONDUIT | 503 | 0.01 | 534 | 0.01 |
| FNAS_Replication | CONDUIT | 0 | 0 | 0 | 0 |

Appendix

Upgrade Scenarios

Note: Please download a copy of the active configuration before upgrading to APN 7.3 GA. Configurations edited using the APN 7.3 GA Configuration Editor are not compatible with previous software versions and cannot be used to revert back to a previous release if reversion is necessary.

Upgrade with No Applications Defined

If no application objects have previously defined in the Talari configuration and no changes are made to the configuration in conjunction with the upgrade, the application dashboard will show “0” for all service type data, and Top Applications, Top Live Applications, and Application Health will display no data.

Pre-set applications will be displayed in the Configuration Editor, but all pre-set applications are disabled by default.

Note: When no Application Health data is available, the message “No real time snooping data available” will be displayed.

Upgrade with Applications Defined

If application objects have been previously defined in the Talari configuration with domain names as match criteria, DNS snooping is automatically enabled for these applications after upgrading to APN 7.3 GA. The application dashboard will automatically begin populating the Service Type Data, Top Applications, and Top Live Applications sections. No Application Health or Application Category data will be available.

Pre-set applications will be displayed in the Configuration Editor, but all pre-set applications are disabled by default.

Note: When no Application Health data is available, the message “No real time snooping data available” will be displayed.

Upgrade and Customize Applications

If application objects have been previously defined in the Talari configuration with domain names as match criteria, DNS snooping is automatically enabled for these applications after upgrading to APN 7.3 GA. If a probing interval is enabled on applications after upgrade, all sections of the application dashboard will populate, including Application Health data. If previously-configured application objects are edited to add category information or Talari defined applications are enabled, Application Category data will be available on the Application Dashboard.

Revert to An Earlier Release

After a configuration file has been edited using the APN 7.3 GA Configuration Editor, it cannot be used when reverting back to a previous APN release. APN 7.3 GA configuration files are not compatible with previous software versions.

If a configuration was saved prior to upgrading, it may be loaded to Change Management on the NCN from **Manage Appliance > Options > Upload Configuration File/Package to APN Change Management**. Once upload is complete, navigate to **Configuration > Change Management** and verify the saved configuration is selected from the dropdown. After confirming that the appropriate configuration is selected, follow the process outlined in the *Talari Software Update Guide* to upload new software packages for the desired APN version and proceed with the Change Management process as usual to stage and activate.

Talari Application ID Classification Mapping

Summary of how application policy priority maps to existing Talari Default Rules.

| Policy Priority Name | Default Rule | Classification |
|----------------------|--------------|----------------|
| Real-Time-P1 | Default_EF | Real-Time |
| Real-Time-P2 | Default_UDP | Real-Time |

| | | |
|----------------|----------------|-------------|
| Interactive-P1 | Default_ICMP | Interactive |
| Interactive-P2 | Default_SSH | Interactive |
| Interactive-P3 | Default_HTTP | Interactive |
| Interactive-P4 | Default_Telnet | Interactive |
| Bulk-P1 | Default_CIFS | Bulk |
| Bulk-P2 | Default_FTP | Bulk |

Talari Defined Applications

Talari Application Signature Library v1.0

The Talari Application Signature Library v1.0 includes the following applications:

| Name | Category |
|--------------------|----------------------|
| Office 365 | Business |
| Microsoft OneDrive | Web and File Hosting |
| Salesforce | Business |
| Box | Web and File Hosting |
| YouTube | Streaming |
| Gmail | Email |
| Concur | Business |
| Jira | Business |
| Zendesk | Business |
| ADP | Business |
| Dropbox | Web and File Hosting |

| | |
|----------------------|----------|
| Adobe Creative Cloud | Business |
| Confluence | Business |
| DocuSign | Business |
| FedEx US | Business |
| GitHub | Business |
| Microsoft | Business |

| | |
|-----------------------------------|---------------|
| NetSuite | Business |
| ServiceNow | Business |
| Workday | Business |
| GoToMeeting | Collaboration |
| WebEx | Collaboration |
| Zoom | Collaboration |
| RingCentral | Voice |
| Vonage | Voice |
| The 8x8 | Voice |
| Outlook | Email |
| Facebook | Social |
| LinkedIn | Social |
| Twitter | Social |
| Instagram | Social |
| Netflix | Streaming |
| Reddit | Social |
| Snapchat | Social |
| Tumblr | Social |
| Pinterest | Social |
| Vimeo | Streaming |
| Pandora | Streaming |
| Spotify | Streaming |
| Yahoo Mail | Email |
| Voice Cisco Signal Control | Voice |
| Voice Signal Control | Voice |
| Voice H323 | Voice |
| CAPWAP Control | Business |

| | |
|--------------------------------|-----------------------|
| CAPWAP Data | Business |
| Cisco VPN | Business |
| Remote Desktop Protocol | Business |
| TACACS | Business |
| RADIUS | Business |
| Stateless Browsing | Business |
| Google | Business |
| Oracle SQL | Business |
| MS SQL | Business |
| SMTP | Business |
| NTP | Business |
| DNS | Business |
| TFTP | Business |
| Syslog | Business |
| NetFlow | Business |
| BBC | News |
| CNN | News |
| Fox News | News |
| MSNBC | News |
| IMDB | News |
| Amazon | Retail and E-Commerce |
| Best Buy | Retail and E-Commerce |
| eBay | Retail and E-Commerce |
| Walmart | Retail and E-Commerce |
| ESPN | Sports |
| FOX Sports | Sports |
| NBA | Sports |

| | |
|---------------------|----------------------|
| MLB | Sports |
| NFL | Sports |
| NHL | Sports |
| Apple iCloud | Web and File Hosting |
| Skype | Social |
| Yahoo | Web Portals |
| Bing | Search Engines |
| Slack | Business |

| | |
|----------------------------|----------------------------|
| Facebook Messenger | Social |
| WhatsApp | Social |
| MSN | Web Portals |
| Wikipedia | Informational Databases |
| Ask | Social |
| Yelp | Informational_Databases |
| UPS | Retail and E-Commerce |
| USPS | Retail and E-Commerce |
| Forbes | News |
| The New York Times | News |
| The Huffington Post | News |
| CNET | News |
| Target | Retail and E-Commerce |
| AOL | Web Portals |
| Steam Community | Games |
| IGN | Games |
| GameSpot | Games |
| SteamPowered | Games |
| The Pirate Bay | Possibly Illegal Streaming |

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|--------------------|-------------------------|
| Craigslist | Retail and E- Commerce |
| Xfinity | Retail and E -Commerce |
| GoDaddy | Business |
| Groupon | Retail and E-Commerce |
| Home Depot | Retail and E-Commerce |
| Thesaurus | Informational Databases |
| Twitch | Games |
| VK | Social |
| Nextdoor | Social |
| PlayStation | Games |
| SoundCloud | Streaming |
| BuzzFeed | News |
| Trello | Collaboration |
| Crackle | Streaming |
| Daily Mail | News |
| Baidu | Search Engines |
| Zillow | Retail and E-Commerce |
| Kohls | Retail and E-Commerce |