Junos Space for Android: Manage Your Network on the Go

Combining the power of Junos Space and Android SDKs to build powerful and smart applications for network administrators

Challenge

It is important for administrators to keep their networks robust and downtime free—even when they are on the move. To do this, they need an easy, reliable, and secure way to monitor their network using smartphones, tablets, and other mobile devices.

Solution

The Junos Space SDK makes it simple to safely extract data from the network for use in applications. An Android application can be built that allows network administrators to monitor their network using the data from Junos Space.

Benefits

• Ease the work of network administrators by enabling remote mobile access to the network, its status, and any alarms while on the go

• Increase agility by alerting administrators about impending problems to facilitate quicker reaction times

• Customize the application to fit individual requirements

Globally, the virtual private network (VPN) market is growing at a record pace, and the business services submarket is dominated by service provider provisioned MPLS VPNs. The growing number of customers subscribing to an increasing number of services will intensify demands on operational tasks and possibly strain organizational resources. The common solution to managing growth is to expand the organization, mainly from technical aspects but also from an administrative point of view.

An expanding market also drives competition, and price erosion becomes a certainty to which service provider need to adapt. To stay ahead of the competition while expanding the organization is not a feasible option. Service providers must meet higher technical requirements with shorter time-to-market and lower production cost.

PacketFront Software Solutions has developed a solution that utilizes Juniper Networks® Junos® Space SDK to integrate Juniper Networks Junos operating system-based products with PacketFront's BECS automated network management system. This solution meets the high technical requirements of a multiservice network on the business edge, and it fully automates tasks required for configuring, provisioning, and managing MPLS services. BECS reduces the required technical staff to a minimum, which solves the challenge of delivering more complex services at a lower cost.

The Challenge

Network management has become difficult with complex networks, distributed campus/offices, different geographical locations, etc. Traditional network administration includes monitoring various systems and applications; creating configurations, viewing alarms, usage, statistics, and status; assigning tasks and managing escalations, etc. The applications that help in these day-to-day activities are usually on servers with thick or thin Web clients that run on laptops or desktop computers. It would be difficult for administrators to constantly monitor the network with these applications if they were not accessible remotely on mobile devices. And, getting alerts about serious issues or a security breach is critically important, if network administrators are going to successfully prevent a major network disaster. With this in mind, network administrators need a way to be constantly updated with status and issues on their network.

The Juniper Networks Android Solution—Mobile App for Managing the Network Using Junos Space SDK

Mobile device proliferation has forced organizations and businesses to embrace mobility in the workplace. Employees are now allowed to use a combination of personal and company-owned mobile devices to get their jobs done. Network administrators are one of most significant beneficiaries of this trend, able to use mobile devices to stay connected to the network, get email alerts, and check status wherever they happen to be. And, there are a number of applications available in the market designed to help them do just that.

Also, the usage of Android-based smartphones and devices has increased significantly, and this has influenced some of its other competitors. The Android platform SDK, for example, allows developers to innovate and build smart applications for their devices quickly and easily, spawning numerous applications for everything and anything. To build a smart network administration application requires data from the network for status, alerts, alarms, etc., and this is where Junos Space Network Management Platform and Junos Space SDK come into play.

Junos Space Network Management Platform

Junos Space Network Management Platform is a comprehensive network management solution that simplifies and automates the management of Juniper's switching, routing, and security devices. It consists of a network management platform for deep element management; plug-and-play management applications for reducing costs and provisioning new services quickly; and a programmable Junos Space SDK for network customization. With each of these components working together, Junos Space offers a unified network management and orchestration solution to help you more efficiently manage the new network.

Designed for service providers and enterprises, the Junos Space network management platform provides broad fault, configuration, accounting, performance, and security (FCAPS) capability; same day support for new devices and Juniper Networks Junos operating system releases; a task-specific user interface; and northbound APIs to easily integrate into existing network management system (NMS) or operations support system/business support system (OSS/BSS) deployments. Multiple Junos Space applications extend the breadth of this solution by optimizing network management for various domains. These applications, with their easy-to-use interface, enable you to provision new services across thousands of devices, as well as

optimize workflow tasks for specific domains and use cases such as core, edge, data center, campus and branch, security, mobility, and more.

Additionally, you can create and deploy custom management applications using Juniper's programmable interface. Junos Space improves network agility by providing an SDK toolkit and APIs both at the platform and application level for a complete customized solution, enabling you to meet the specific needs of your business or internal procedures. With Junos Space, you can simplify and automate the network, improve network agility, and deliver new services quickly—all from a single console.

Junos Space SDK enables developers to leverage the Junos Space network application platform to abstract the capability and connections to your Juniper Networks routers, switches, and firewalls. It encompasses a rich set of tools including RESTful APIs, the Eclipse Integrated developer environment, device simulators, reference applications, support tools, and documentation. There are various application types that one can build using this SDK—rich applications, data applications, workflows, and integrations.

Android Application Using Junos Space Network Management Platform

To develop an Android application for network monitoring and management, all that is needed is an easy and lightweight method to connect to Junos Space Network Management Platform and collect the required information.

The goal of the Junos Space API is to use RESTful Web services to support light and easy programmatic integrations. The selection of Representational State Transfer (REST) is the epitome of this, as it can support just about any client capable of issuing HTTP requests. This goal even extends to simple scripts written on top of command-line utilities such as wget and curl. That said, it is
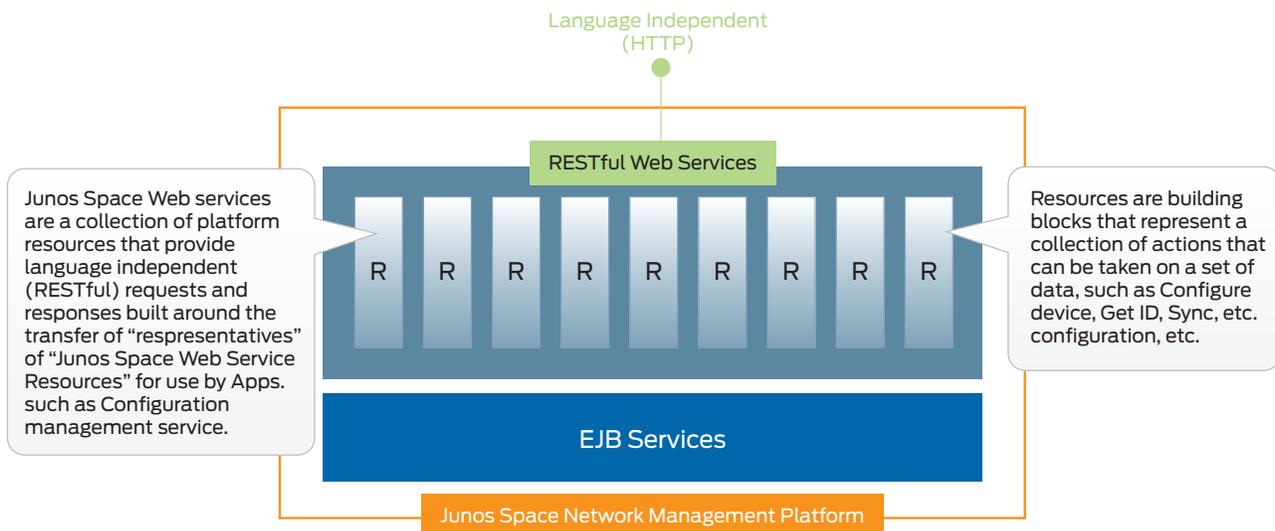

Figure 1: RESTful Web services on Space

not a goal of this API to support Web browsers. The Space API is based on the Hypertext Transfer Protocol, version 1.1 (RFC 2616). Requests are authenticated using HTTP Basic Authentication (RFC 2617), which involves the clear text transmission of passwords and thus should not be used outside of a secure channel such as HTTP over Transport Layer Security (TLS).

The capabilities of Junos Space Network Management Platform are presented as Web services, as shown in the Figure 1. Each Web service encapsulates a portion of the platform and exposes it through a well-defined API. The selection of REST ensures that external applications written in essentially any language can access the value of Junos Space Network Management Platform through the use of simple operations expressed as XML or JavaScript Object Notation (JSON) over HTTPS. At the same time, use of strict versioning of these interfaces protects those applications against any changes in future versions of the platform.

Junos Space Network Management Platform contains a role-based access control (RBAC) system that spans across the graphical user interface (GUI) and the platform services interfaces. This means that a specific operator can be authorized to perform certain functions in the GUI or to access parts of the platform services, all authorized against a common user database.

The architectural benefits of RESTful Web services are listed below:

- Allows lightweight integrations
- API calls as URIs:
  - Uses standard HTTP methods for create, read, update, and delete (CRUD) operations
  - Uses HTTP to allow inline authentication
  - Utilizes HTTP caching mechanisms in place
  - Works with standard firewalls deployed
- Each call returns:
  - URIs for "deeper" API calls
  - Metadata on each "deep" API call
- Facilitates rapid prototyping:
  - API versioning built in
  - Allows backwards compatibility and future proofing
- Libraries available for lots of languages

Using the RESTful APIs, Android developers can easily retrieve the data connecting to Junos Space in their organization and collect the required data to build an Android-based application. These could include finding and displaying things such as list of alarms, list of discovered devices and their status, etc. The beauty of this Junos Space for Android application is that it can be built to the needs of network administrators, and customized to their needs as well.
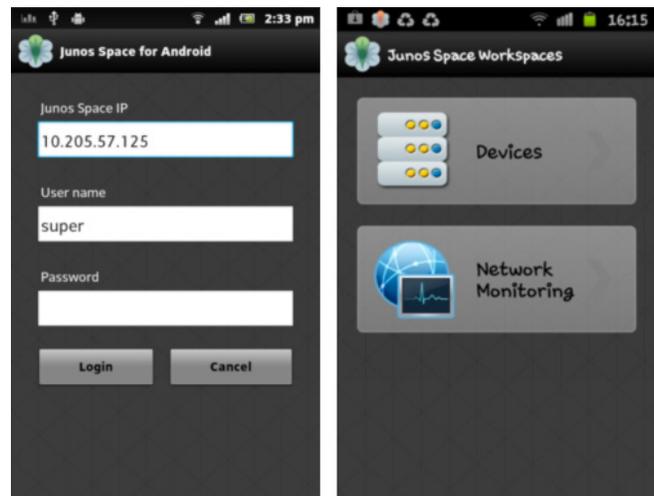

Figure 2: Login screen and workspaces on Android phone

Here are some use cases for this kind of application on Android. The illustrations and snapshots are from a sample application built on Android using Junos Space REST APIs.

Use Cases

View the List of Devices and Status

Figure 3: List of devices and status

Users can see the list of devices discovered in Space and their status on their Android screen. This view gives a quick glance of devices, IPs, model, status, and version. It makes devices that are down easy to track. You can also add an option to search the device of your choice in order to take some action. For example, if you are in the lab and want to know the IP and status of a particular device, it is just a simple phone search.
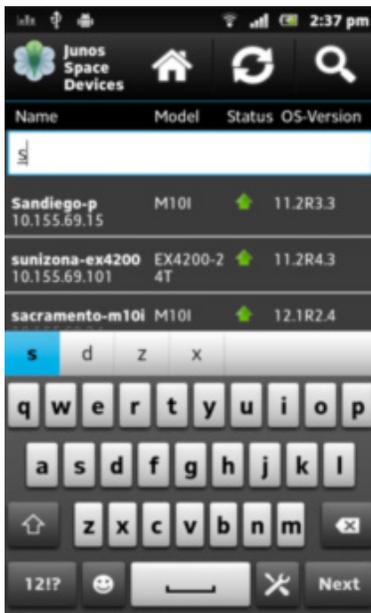
Figure 4: Search devices

Actions on Devices

Junos Space for Android can also be used for simple actions like viewing inventory, interfaces, and alarms.
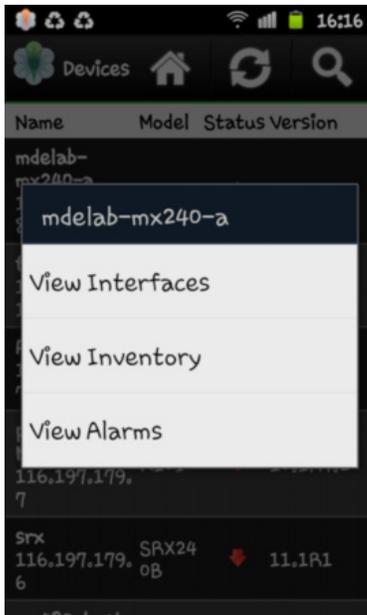

Figure 5: Device actions

View Interfaces and Status

Imagine that you receive a report of a link down. You go to check and you see that cable is damaged or someone has pulled it. You fix the problem and want to check if the interface and link is up. You can do it on your phone. Just search for the device and view the interfaces and their status.
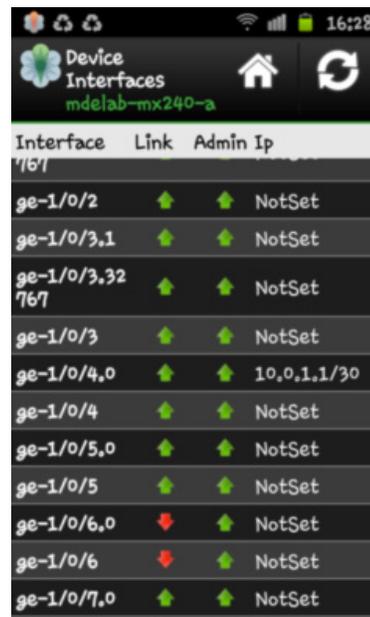

Figure 6: View interfaces and status

Inventory Details

Consider the pain of doing inventory tracking manually in Excel spreadsheets. Wouldn't it be nice to be able to see and track inventory details on your phone? The Junos Space for Android solution can optionally share via mail or export it into Excel/CSV format.
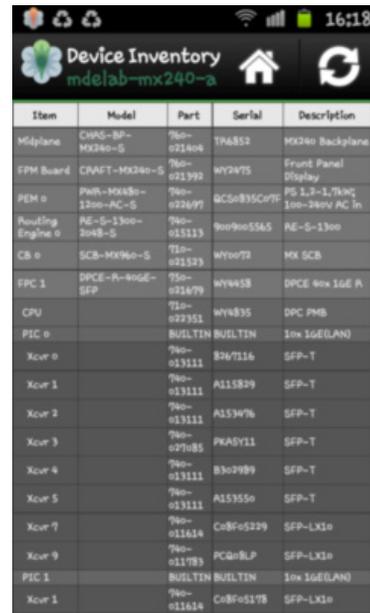

Figure 7: Device inventory view

View Alarms and Details

Now you are on the move and there is a critical alarm e-mail alert. You want to see the details without having to run back to the system to do it. With this app, you are able to view alarms and related details on your phone or tablet.
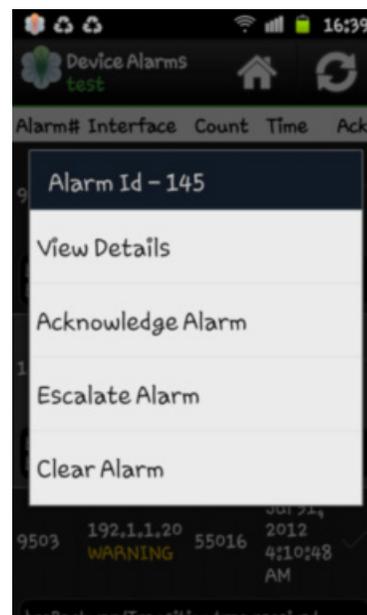
Figure 8: Alarm view

Figure 10: Action on alarms

Features and Benefits

- **Productivity**—The Junos Space for Android solution increases the productivity of administrators and network operators. They do not have to run back to their system every time they need to take some action. Instead, their mobile device can alert them to any issues and enable quick resolution.

- **Smart Management**—Allowing access to Junos Space Network Management Platform via mobile devices facilitates the smart management of networks. Administrators can take quick actions, view details, and update alarm status whether they are at work or away.

- **Simplicity**—Using REST API makes it possible to transmit HTTPS requests back to the Junos Space server for network and device details. This makes it simpler to access and manage the network. With a well-defined UI on Android, it is very simple to use this application on mobile devices.

- **Security**—Since the applications accesses Space over HTTPS with basic inline authentication, administrators can be assured of secure access to the network. Plus, Space has a strong RBAC functionality which requires users to have the capabilities and roles associated with them to take any action. Of course, the Android application itself can implement its own security features.

- **Flexibility**—Since this application can be a lightweight integration using Junos Space APIs, it allows complete flexibility for Android developers to add/modify/delete features on the app. Also, accessing the Space versioned APIs means that the app will be compatible with Space even if Space changes the behavior of an API as it adds a new version of it.

Figure 9: Alarm details

Action on Alarms

You see an alarm and want to acknowledge that you will have a look at it. Or, you want to escalate an alarm. Or, you are done with an issue and need to clear the alarm. You can do all of these things on your phone with this app.

Solution Components

- Junos Space Network Management Platform
- Junos Space SDK
- Android SDK

Summary

Junos Space SDK and Android SDK make it simple to develop an Android-based application for Junos Space. This powerful combination gives a boost to network administrators on the move, and it enables smart and easy management and monitoring of the network.

Next Steps

To learn more about Junos Space, Junos Space SDK, and the Android-based application for Space, please visit Juniper Networks at www.juniper.net. To join the Juniper Developer Network and start innovating with the Junos Space Network Management Platform for Android application, please go to https://developer.juniper.net/content/jdn/en/develop-overview/junos-space-sdk/getting-started.html

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

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