

UNLOCKING NEW REVENUE STREAMS WITH CPE CONTAINERS

As every telco knows, introducing new services and improving the customer experience are important factors in increasing the revenue curve. For too long, both have been much easier said than done. However, advances in software and standards for CPE devices are changing the scenario. For forward-thinking telcos and router manufacturers who are willing to explore new ways of deploying CPE software, the ability to quickly and easily add new customer-centric services that lead to increased customer loyalty is becoming a reality.

THE STATUS QUO

Traditionally, the monolithic nature of CPE firmware makes developing and deploying any new service a laborious process that takes months, if not years. For service providers to offer their subscribers new value-added services, any new functionality must be baked into the CPE firmware as part of the hardware manufacturer's firmware update. The update is then tested with the service provider before it can be pushed out to subscribers. Thus, the deployment of any new features to the gateway involves the effort and collaboration of three parties: The service provider, the hardware manufacturer, and any third-party software vendor.

Consequently, adding new software is a risky endeavor that requires a long QA process involving multiple stakeholders to ensure that the firmware will operate as intended when the new functionality is added. Once a new service is finally rolled out, there's no room for continuous improvement of individual services, as any improvements would again require a complete firmware update.

Adding to the challenge is the fact that gateways are difficult to build software upon because of varying

standards across hardware. Different chipsets, different vendors and different standards make it impossible for third party software vendors to build a single application that works universally across devices. Software must be adapted and tested for each individual purpose-built piece of hardware.

A third complexity is the fact that in order to provide useful capabilities such as Wi-Fi optimization, cyber security functionalities or other personalized services, service providers need to be able to extract bulk Wi-Fi data for analytics and machine learning. But most gateway devices today are limited by their use of TR-069, a management protocol that, while good for firmware updates, is lacking when it comes to the need to gather this data.

No wonder then that most telcos are not yet realizing the benefits of value-added services on CPE devices. No wonder that the "dumb pipe" is still an unfortunate reality for too many. But the good news is, evolutions in technology and standards are paving the way for a brighter, smarter future.

WHAT'S CHANGING

Much has changed in recent years and the obstacles that have stood in the way of smarter CPE-based services are becoming less relevant. Service providers who are ready to embrace these changes will be entering a world in which they can innovate quickly and unlock new market opportunities that have previously been impossible.

First of all, improvements are coming in the standardization realm. The prpl Foundation is working on defining new standard APIs and services to harmonize the way applications integrate across CPE devices. The group has just announced the release of prplWrt, a platform-independent software stack that standardizes software deployments across CPE architectures. PrplWrt will enable software vendors to build new services that will work the same on every manufacturer's CPE device, minimizing platform integration efforts. Service

providers will be able to easily and efficiently deploy these new services.

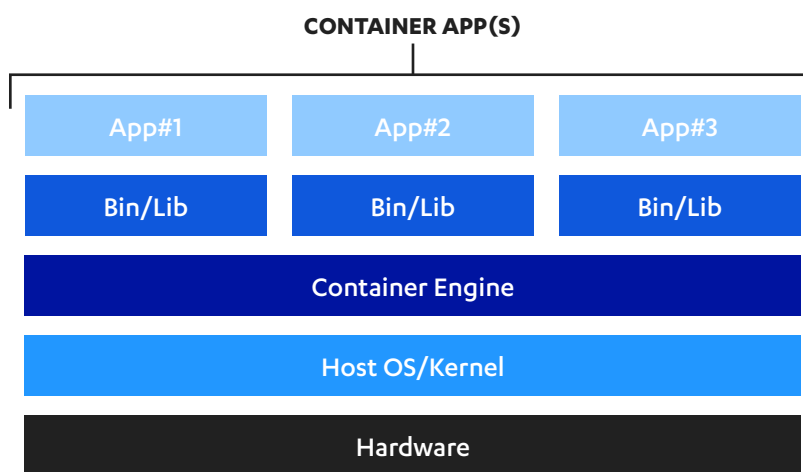
Secondly, the arrival of TR-369 USP, the Broadband Forum's standardized protocol for managing, monitoring, upgrading and controlling connected devices, is the welcome evolution of TR-069. The new protocol makes bulk data telemetry a reality, enabling machine learning for new capabilities such as WiFi management, IoT control, security and other router-based services.

These external developments are vital for enabling new functionalities and value-added services. But without changes in how manufacturers deploy software on gateway devices, we are still faced with cumbersome monolithic firmware images that preclude fast, flexible delivery and seamless updates of these new services.

CONTAINERS

That's where CPE containers come in. CPE virtualization makes it possible to deploy containers, lightweight packages of software containing everything an application needs to run on a host, including all its dependencies, libraries and other binaries, and configuration files. With containers, the VAS application is decoupled from the gateway device firmware and is easily moved from one computing environment to another. It's a model that is more on par with how smartphones work: Apps and their updates are independent of the phone's OS and its updates.

This means that container-based services need not rely on the update cycle of the hardware manufacturer. Container-based applications can be deployed much more easily without intensive collaboration between multiple parties, and they can be improved with frequent update cycles. Nor do containers need to be QA-tested for months to be sure they won't crash the firmware. With containers, if a service works poorly or crashes, it can be easily uninstalled without impacting core gateway functions.



A containerized application is given an allotment of how much memory, storage, and CPU and network resources it can use. The types of data the application can access is defined, as are the functions the application can perform. Containers are managed and run by a container engine such as Docker or LXC.

Adoption of containers on CPE devices will enable service providers to fully realize the benefits promised by improvements in standardization and data gathering. Namely, service providers will be able to provide fast,

flexible deployment of new revenue-increasing services that increase customer stickiness. The list of possibilities is long: parental controls, improved detection of cyber threats, home security, speed tests, game servers, Wi-Fi management, IoT, and a host of other functionalities can be added right into the gateway and into customers' monthly subscriptions.

For router manufacturers, the plethora of services that containers enable will drive a demand for new and better hardware to replace legacy hardware.

CONTAINERIZED VAS IN ACTION

F-Secure is collaborating with the prpl Foundation in contributing to new standards to help ensure APIs and platforms are secure. But we are also involved in realizing the future of connected services in an even more practical way, with our own container-compatible application, F-Secure SENSE router SDK. SENSE monitors the home internet connection, detects and blocks online threats and secures all the home's connected devices against cyber attacks. Once the prpl Foundation's security container standardization is complete, SENSE will be easily portable to different computing environments.

SENSE is just one example of an application that service providers can offer in the new world of smart CPE services made possible by standardization and containerization. Service providers who are interested in deploying innovative new services to their customer base should initiate a conversation with their hardware manufacturer about the adoption of these important technologies on the gateway devices they provide in their customers' homes.

ABOUT F-SECURE

Nobody knows cyber security like F-Secure. For three decades, F-Secure has driven innovations in cyber security, defending tens of thousands of office, homes, and millions of people. F-Secure shields enterprises and consumers against everything from advanced cyber attacks and data breaches to widespread ransomware infections. F-Secure's AI-driven solutions also help to protect the connected devices and homes of your customers. The unique combination of technology and world-class Business Services supporting the entire customer lifecycle is what makes F-Secure an excellent fit for the service provider channel. F-Secure's products are sold globally by more than 200 service providers and thousands of resellers.

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