

Reducing Network OpEx by Simplifying Networks

BOOSTING PROFITABILITY USING SOFTWARE PLATFORMS

What are the operational and time to market benefits of simplifying your network? In order to get an answer to this question, we recently did a financial modelling exercise with inputs from service providers. This study quantified benefits a service provider would realize by simplifying their network using a modular, stateful, hardware and service abstracted software platform and converging multiple central office functions onto a single system. The study showed that this software-centric network architecture dramatically simplified the network and its operations, reducing operating costs by 42 percent and reducing time to market from many months to just four weeks. The operational benefits are based on a modelling exercise with a service provider building a new GPON fiber access network for 25,000 subscribers. The time to market advantage measurement is based on an actual customer deployment.

INTRODUCTION

As Internet usage continues to evolve, subscriber demand for bandwidth is skyrocketing. A key driver is the availability of a wide variety of increasingly sophisticated connected devices, such as laptops, smartphones, tablets, wearables, and a growing list of “smart home” devices and sensors. By 2022, it’s expected that the average household will have 50 connected devices.¹ Many applications now require always-on connectivity and most users expect it.

For service providers, the large-scale adoption of these new technologies presents enormous growth opportunities, but also poses significant challenges. One key challenge is to seamlessly scale and operate a network that is increasing in complexity as a result of standalone network elements for access, aggregation, subscriber management, lawful intercept and routing. Each standalone network element adds to operational costs, points of failures, time to market and latency. Many service providers have separate access networks for residential, business and mobile networks, further adding to this complexity.

Subscriber traffic is increasingly unicast and local in nature. This unicast traffic from millions of users is putting tremendous strain on the transport network as opposed to the multicast traffic used in the IPTV.

...Software-centric network architecture dramatically simplified the network and its operations, reducing operating costs by 42% and reducing time to market from many months to just four weeks.

¹GSMA: The Impact of the Internet of Things.

MEETING THE NEEDS OF TOMORROW

To meet these challenges head on, service providers need to architect a next-generation network that enables them to:

- Simplify the network and its operations by reducing network elements
- Simplify service creation by abstracting it from physical layer and hardware complexities
- Build a network that is “always on”
- Unify residential, mobile and business access networks
- Automate and accelerate systems integration and network operations
- Deliver sensational experiences and also reduce transport costs by moving relevant content closer to users

One proven strategy for simplifying the network and reducing operational costs, involves collapsing multiple network elements into a single system and then using software modules to add or remove functionality. The Calix E9-2 Intelligent Edge System, for example, consolidates subscriber management, aggregation, routing, and the optical line terminal (OLT) into a single system.

A second essential requirement for the next-generation network is an embedded software platform that helps service providers accelerate the delivery of new services to subscribers. The Calix AXOS platform simplifies workflows, provides the ability to automate critical network functions and provides a platform for collaborative development with ecosystem partners.

Figure 1 shows how the Calix E9-2 Intelligent Edge System, powered by the AXOS platform, consolidates multiple network functions into a single system.

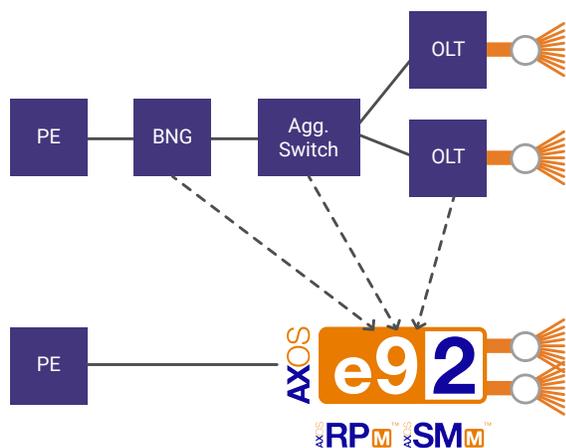


Figure 1: Collapsing multiple network functions into Calix E9-2 Intelligent Edge System

This simplified network has numerous benefits:

- Reducing OpEx by consolidating multiple workflow functions to simplify operations
- Driving CapEx efficiencies by integrating central office routing, switching, and optical line terminal (OLT) functions
- Increasing network performance by distributing network intelligence closer to the subscriber and removing network latency
- Building business agility and accelerating time to revenue by reducing coordination between systems and adopting a DevOps based software-first approach

SERVICE PROVIDER STUDY: REDUCING OPERATING COSTS IN THE ACCESS NETWORK

Calix recently completed a business benefit modelling study to quantify the operational benefits a service provider would realize by simplifying their network with the AXOS software platform on the E9-2 system. Benefits that could be derived from increased network performance were not included.

The study is based on the service provider building a new GPON fiber access network for 25,000 subscribers. Calix collaborated with the service provider’s Operations team to understand the baseline costs and then used them as input to calculate potential areas of savings.

REDUCE OVERALL OPERATING COSTS BY 42 PERCENT

While the study projected a one-time reduction in capital expenditures of 12 percent, the bulk of the savings come from a substantial reduction in operating costs. Overall, the study found that by simplifying its network, the service provider reduced overall operating costs by as much as 42 percent compared to conventional central office architectures.

The study found that the service provider could realize a recurring annual OpEx savings of \$860,000, for a total of \$2.6 million in savings over three years. These savings were realized across Network Planning, Systems Integration, Network rollout and Network Maintenance (see Figure 2).

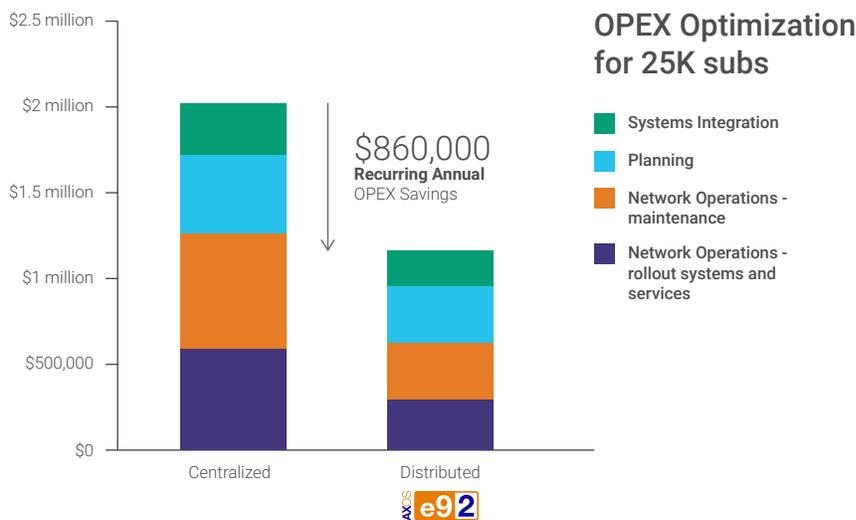


Figure 2: OpEx Optimization for 25K subscribers

REDUCE PLANNING COSTS BY 50 PERCENT

Network planning emerged as a key functional area in which service providers can reduce costs by as much as 50 percent by deploying the AXOS software platform and the E9-2. The study analyzed two specific planning scenarios: integrating a new service into the network and delivering existing services to a new area.

When integrating a new service into the network, multiple network elements, including subscriber management, aggregation, routing, and the optical line terminal (OLT), collapsed onto a single AXOS E9-2 system, reduced configuration steps and simplified

configuration workflows. Overall, the Network Planning team only has to coordinate a single system for capacity planning, market availability, and operations readiness, which resulted in reduced effort and cost.

When delivering existing services to a new area, planning effort and costs were similarly reduced. Each new market requires planning and coordination of systems and network capacity. Because it has fewer interdependencies, the E9-2 system reduces the coordination and system acceptance testing typically required as each new service area is brought on line. One integrated system provides all services, with capacity planning done in a linear fashion with subscriber growth.

REDUCE SYSTEMS INTEGRATION COSTS BY 35 PERCENT

The study also identified Systems Integration as an area where service providers can reduce costs by 35 percent. These savings can be realized during the initial integration of the AXOS E9-2 into the network and also when certifying new software.

The AXOS software platform has several characteristics which help service providers reduce systems integration costs. For example, each object model in the AXOS system is fully addressable using the NETCONF/YANG API, and REST interfaces. Also, all objects and FCAPS operations are supported via standard APIs, so no proprietary scripts or legacy interfaces are required. The AXOS production system software is also available in the AXOS Sandbox virtual machine environment, allowing IT teams to work in parallel with the system hardware and software certification teams.

GLDS, a leading customer management and billing solutions provider, [announced in July 2018](#) that the AXOS and the E9-2 system enabled them to dramatically accelerate time to market and deliver new services by streamlining OSS/BSS integration. The timeline for OSS/BSS integration typically stretches from many months to up to two years. However, GLDS completed its first AXOS integration with the Calix AXOS G.fast systems in only four months. Once the first AXOS integration was complete, GLDS was able to complete its next integration with a new system, the Calix AXOS E9-2 Intelligent Edge System, in only four weeks

REDUCE NETWORK ROLLOUT COSTS BY 50 PERCENT

The costs associated with network rollout were also reduced by 50 percent with the deployment of AXOS-powered E9-2.

The savings were realized in three areas:

- Adding new systems and capacity to the network
- Performing system upgrades (including troubleshooting)
- Installing, turning up and testing systems in the network

Network rollout costs are reduced by consolidating subscriber management, aggregation, routing, and optical line terminal (OLT) into a single system. This eliminates cascading dependencies and service chaining linkages and simplifies the process of adding new capacity to the network. In addition, system-wide topology, IP address space, VLAN management and configuration are all simplified.

AXOS likewise drives cost out of the process of performing system upgrades. Its modular architecture supports in-service upgrades, requiring only the upgraded modules to be restarted. As a stateful platform, AXOS retains the operational context during upgrades and ensures there is minimal impact on the customer experience. This approach reduces the re-certification effort and eliminates maintenance windows.

REDUCE NETWORK MAINTENANCE COSTS BY 50 PERCENT

Network maintenance is another area where the study uncovered 50 percent reduction. Advanced remote debugging capabilities like Video Channel Analyzer, Packet Capture, and Programmable Diagnostics make field staff more efficient and eliminate the need for expensive truck rolls to resolve complicated network-related issues.

Advanced remote debugging capabilities and common methods of procedure (MOPS) provide Operations personnel with powerful tools to resolve issues remotely. The same tools provide NOC and CO staff the ability to support the field technicians more effectively.

The modular and stateful nature of AXOS software also reduces network maintenance costs by simplifying the process of certifying new software. Certification testing of any new software can be targeted to the relevant software modules and their associated data objects. When combined with the reduction of router and switch network elements, the time needed to certify and integrate new software loads is dramatically reduced.

ABOUT THE AXOS E9-2 INTELLIGENT EDGE SYSTEM

The Calix AXOS E9-2 Intelligent Edge System is at the center of the next-gen central office. It consolidates network access

Our research suggests that service provider savings will approach or exceed the 42% achieved by the service provider in our study.

and edge functions into a centralized datacenter-style architecture, helping service providers remove access bottlenecks and deliver an unmatched subscriber experience. You can read more about the E9-2 by visiting the [E9-2 webpage](#) on the Calix website.

ABOUT THE CALIX AXOS PLATFORM

Calix AXOS is an operating system optimized for the access network. With all the best attributes of cloud and enterprise software, AXOS is an embedded software platform that brings together a robust network operating system, independent modular applications and an ecosystem of third-party developers.

As the only software platform designed specifically for access systems, AXOS separates the management, control, and data planes, while a service abstraction layer provides a common operating environment for all networking applications. In addition, a unique hardware abstraction layer isolates the physical technologies from the application software above.

The AXOS platform has five key attributes, which help service providers deliver new solutions and services to their subscribers at an unprecedented pace:

Hardware Independence

Service Abstraction

Modular Architecture

Stateful Operations

SDN Interfaces

AXOS
The Only SDA

You can read and watch more details about these on the [AXOS architecture page](#).

CONCLUSION

The explosive growth of connected devices and the wholesale adoption of bandwidth-intensive applications mean service providers need to move beyond conventional access network models to exceed subscriber expectations and stay ahead of the competition.

By simplifying their networks and building a next-generation central office model in their networks, they can increase the speed with which they deliver new services to their subscribers, and provide them with sensational experiences, superior performance and minimal downtime. Not only that, in implementing a system like the AXOS E9-2 Intelligent Edge System, service providers can also substantially reduce their overall operating costs through a combination of operational efficiencies spanning network planning, systems integration, network rollout and network maintenance. While these savings will vary for each service provider, our research suggests that service provider savings will approach or exceed the 42% achieved by the service provider in our study.

To get more details on how these cost savings were calculated and to learn how Calix can help you architect your network for the future, contact your Calix Sales Representative.