

A man in a white shirt and dark trousers is standing in a data center aisle, looking at a tablet. The aisle is lined with server racks on the left and storage units on the right. A large white diagonal graphic element is overlaid on the right side of the image.

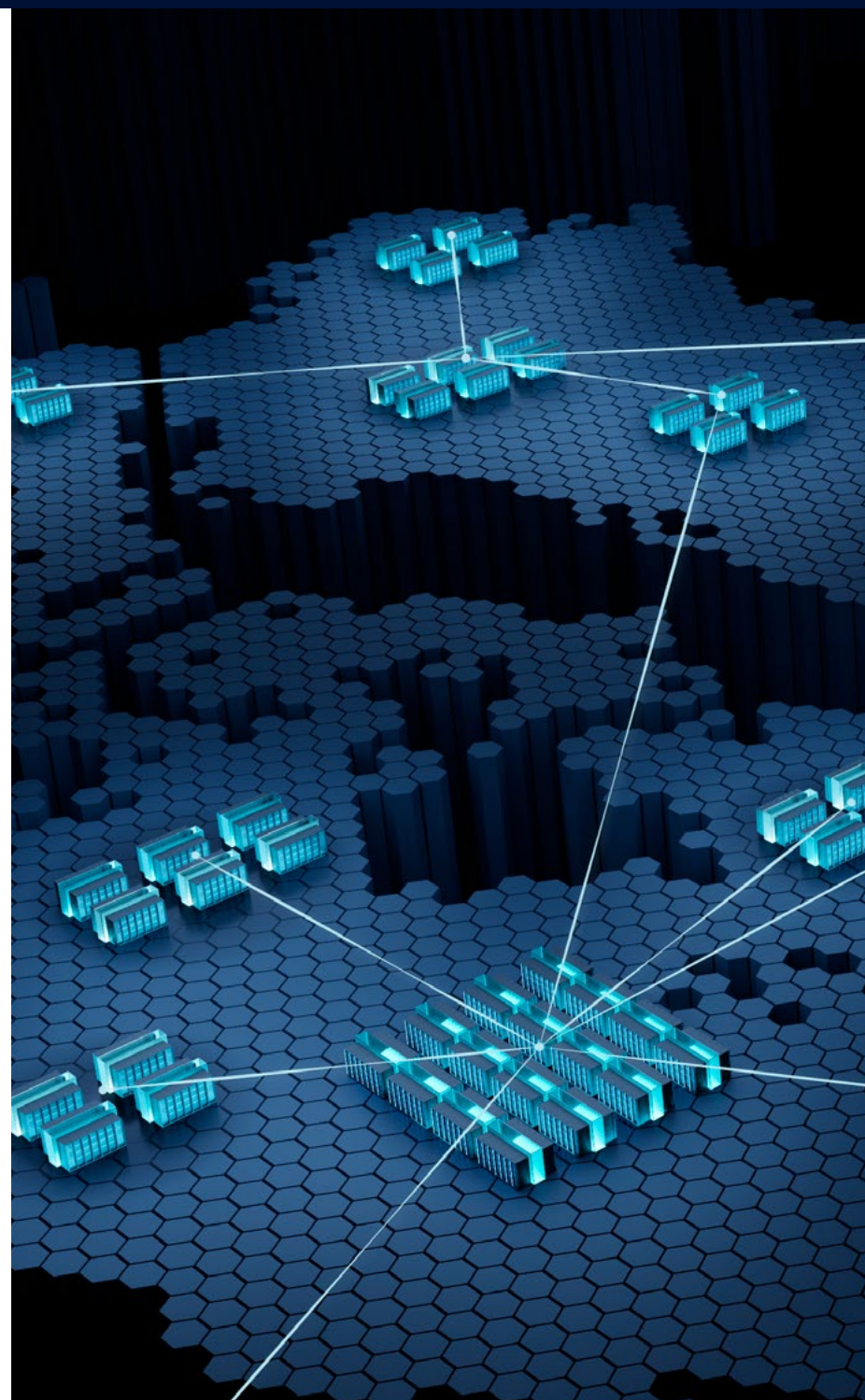
NOKIA

Nokia Bell Labs Data Center Fabric business case analysis

Executive Overview

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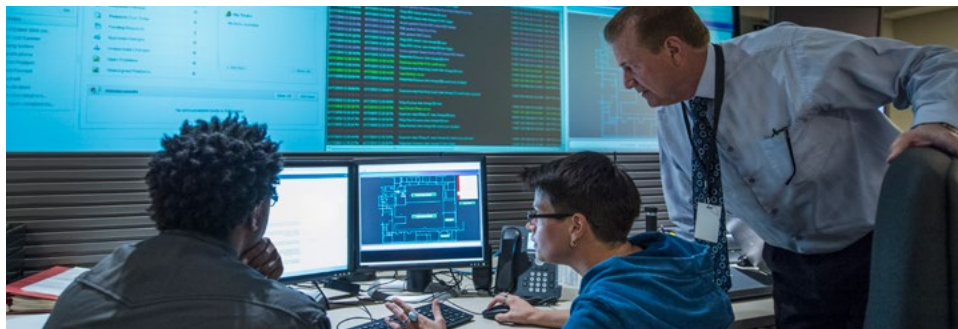


Introduction

Accelerating demand for distributed cloud-based applications is putting immense scaling and operational pressures on data center networks and operations teams. The key challenge for data center operators is to balance the need to constantly scale data center networks against the increasing costs of designing, building and operating them.

The Nokia Data Center Fabric solution addresses this challenge by:

- Enabling more scalable, high performance leaf-spine data center fabrics using Nokia SR Linux - An open, extensible and resilient Network Operating System (NOS) that runs on high performance Nokia data center switching platforms based on merchant silicon.
- Improving operations agility and flexibility using Nokia Event Driven Automation (EDA) - A modern data center network automation platform that combines speed with reliability and simplicity. It reduces barriers to entry for network automation by making it more trustable and easier to use, from small edge clouds to the largest data centers.



The solution provides a number of business benefits that enable operations teams to:

- Increase the reliability and availability of application workloads
- Scale and simplify operations to keep pace with business growth while managing resources
- Meet the increasing need for operational agility, flexibility, and efficiency
- Reduce time to market by completing operational tasks in minutes rather than days
- Automate manual operations tasks that are error prone, repetitive, or complex to perform
- Reduce operational risk when making frequent configuration adds, moves and changes to meet evolving application needs
- Reduce the need for physical test lab equipment by using true network emulation
- Improve operational metrics, such as uptime, performance, mean time to repair and mean time to innocence.

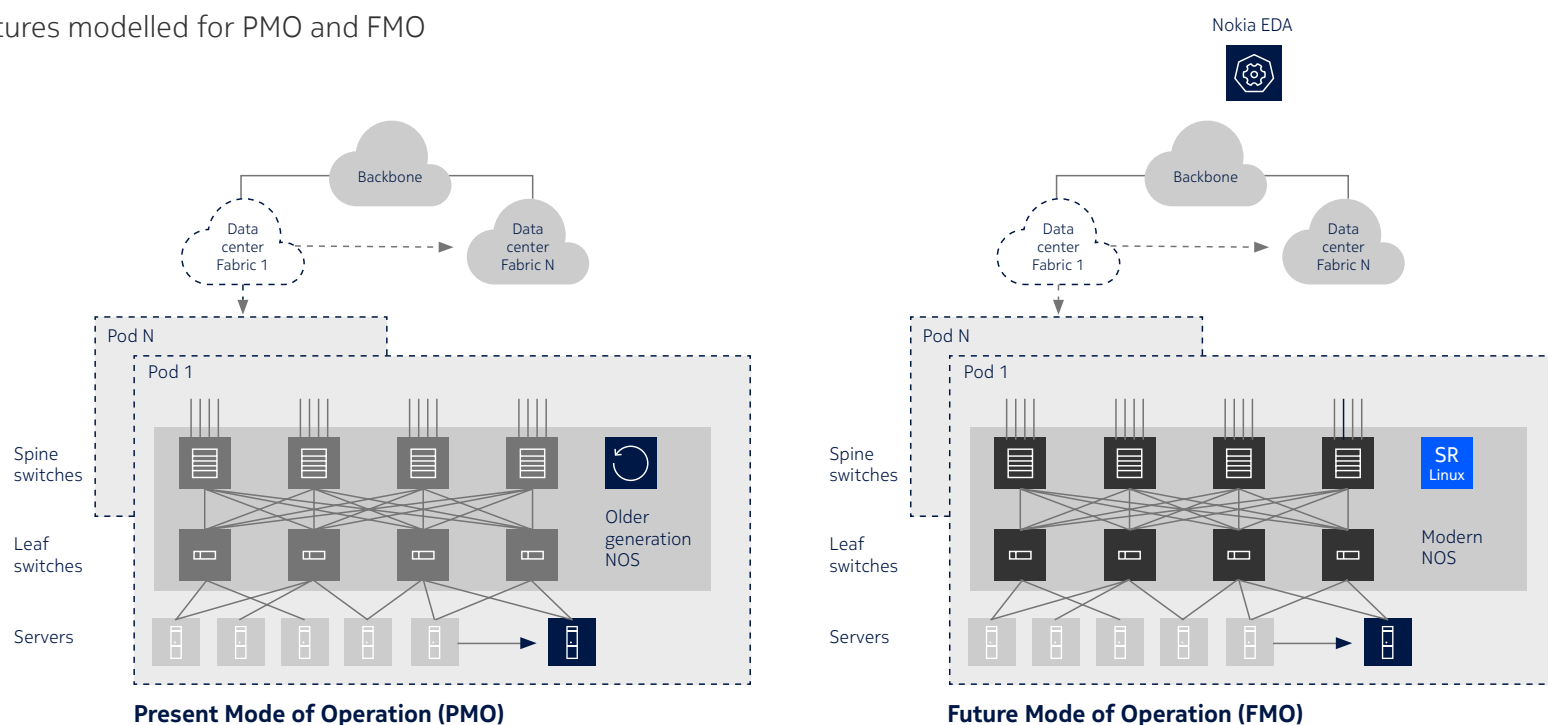
Methodology

Nokia Bell Labs has developed a business case analysis (BCA) tool for the Nokia Data Center Fabric solution. The BCA tool models a migration scenario from a present mode of operation (PMO) to a future mode of operation (FMO). The PMO is a data center network based on a 10GE/40GE or 25GE/100GE leaf-spine architecture, and the FMO is a higher scale and capacity data center fabric based on a 10GE/25GE/100GE or 100GE/400GE leaf-spine architecture, as shown in Figure 1. The FMO is powered by the Nokia SR Linux NOS

running on Nokia high performance data center switching platforms based on merchant silicon and Nokia EDA. The tool models a very comprehensive set of tasks by job function for the Day 0, Day 1, and Day 2+ phases of the data center fabric operations life cycle. It models the operational effort in hours and calculates the effort saved for two FMO scenarios:

- **FMO 1** – Nokia SR Linux only
- **FMO 2** – Nokia SR Linux and Nokia EDA.

Figure 1. Architectures modelled for PMO and FMO



Operational effort savings highlights

Up to 40%

cumulative effort savings over 4 years for all operational tasks

Up to 43%

effort savings for FMO 1 for specific tasks in the operations life cycle

Up to 60%

effort savings for FMO 2 for specific tasks in the operations life cycle

Up to 50%
and 62%

power and space cost savings respectively

2.6x

increase in fabric capacity

Details and benefits of operational savings

The following sections highlight the key operational savings and benefits that can be realized based on the business case analysis.

Cumulative effort savings of up to 40%, over 4 years for all tasks associated with the data center fabric life cycle

Over 4 years, the total effort for the PMO scenario is 104,217 hours. In comparison the total effort for FMO 1 is 83,633 hours, representing 20% effort savings compared to the PMO. The total effort for FMO 2 is 62,728 hours, representing 40% effort savings compared to the PMO.

The Nokia BCA offers a true indicator of cumulative effort savings because it models a complete and comprehensive set of job functions and associated tasks across all phases of the fabric operations life cycle. Existing studies mainly focus on CAPEX savings, and while others include OPEX savings, they often only cover a subset of the operations phases, job functions, and job tasks.

Effort savings of up to 43% with Nokia SR Linux for specific tasks within the fabric operations life cycle

These operational savings are attributed to using Nokia SR Linux in the FMO 1 scenario. SR Linux is a modern and truly open NOS, which features a unique architecture designed from the ground up to enable data center NetOps teams to increase their operational efficiency – for design, onboarding and integration, configuration, change management and trouble-shooting tasks.

Effort savings of up to 60% with Nokia SR Linux and Nokia EDA for specific tasks within the fabric operations life cycle

These operational savings are attributed to using Nokia SR Linux and Nokia EDA in the FMO 2 scenario. EDA additionally provides a set of NetOps tools to automate a wide range of network operations tasks. Implementing both SR Linux and EDA maximizes operational efficiency for data center network design, onboarding and integration, configuration, change management, and trouble-shooting tasks.

Power cost savings of up to 63% and space cost savings of up to 67% with a 3 times increase in fabric capacity

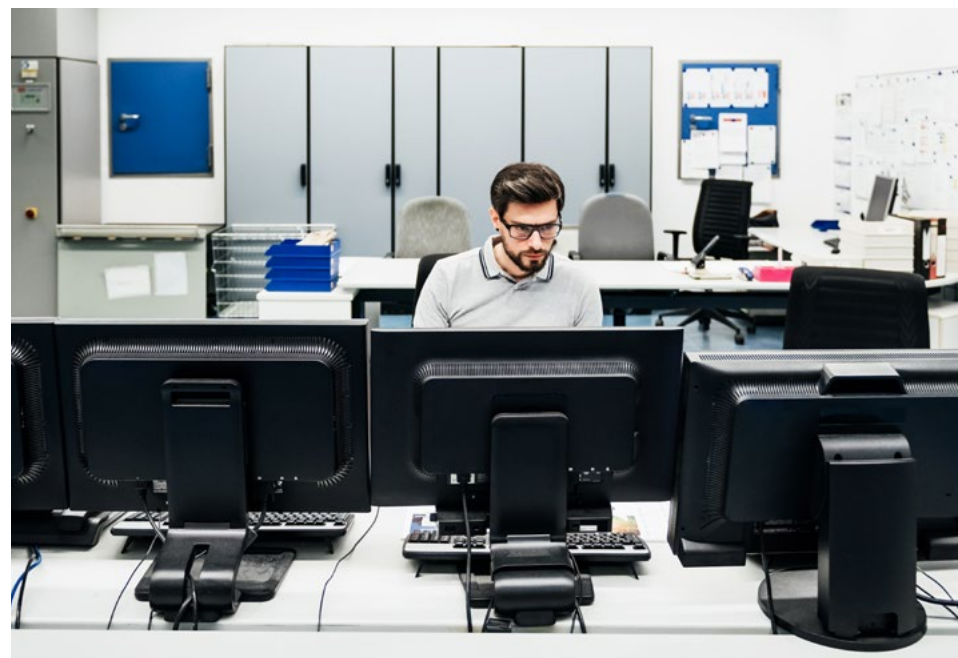
These numbers indicate the power and space savings and capacity increase that can be achieved when moving to a higher scale next generation leaf-spine fabric architecture for a large data center fabric configuration. This information can be helpful as a data point in internal business cases covering CAPEX spend associated with future data center buildouts. The power, space and capacity savings are a result of evolving to new generations of data center switching silicon that are more efficient compared to previous generations.

Key capabilities of SR Linux that enable effort savings and business benefits

Day 0 design – The SR Linux model-driven architecture, data model and a single API ensures High Level Design (HLD) integration is simpler and more efficient. Ubiquitous and consistent access to the CLI and data ensures simpler, faster and more accurate HLD documentation and Low Level Design (LLD) test plans and execution.

Day 1 deployment – The open interfaces and ubiquitous and consistent access to the CLI and system data ensure faster and consistent plug and play integration and less customization with external systems. Self-signed security certificates and customizable zero touch provisioning (ZTP) increase deployment speed and accuracy by eliminating manual per node configuration.

Day 2+ operations – Flexible scripting options and customizable monitoring ensure agile and lower risk changes to infrastructure and services, and faster and more accurate identification of any potential impacts during infrastructure change validation and service change analysis.



Key capabilities of EDA that enable effort savings and business benefits

- **Unique digital sandbox** – Creates a digital twin of the data center fabric, providing a true emulation of the fabric with multiple containerized SR Linux instances. The digital sandbox enables operations teams to increase agility, reduce risk and improve efficiency for planning, test, validation, implementation and trouble-shooting tasks for the Day 0 design, Day 1 deployment and Day 2+ operations phases of the fabric life cycle.
- **Day 0 design** – The secure, automated, and certified integration capabilities of EDA leverage open APIs to ensure faster, secure and flexible HLD integrations. Nokia certified design intents (templates) provide best practice and more accurate LLD documentation. The digital sandbox provides physical and logical design maps, faster testing and clearer interpretation of test results.
- **Day 1 deployment** – The automated intent-based approach of EDA ensures faster, more accurate and more secure configuration deployments. Stateful and filterable topology, intent deviation tracking and notification, and advanced telemetry ensure faster deployment and more capable software integration with external systems.
- **Day 2+ operations** – Digital sandbox validation, certified design intents, deviation detection and notification, and deployment automation enable faster, consistent and more reliable change management and validation for infrastructure and services. Visual and concise object association means faster and more accurate identification of potential impacts when making changes to infrastructure and services.



Summary

The BCA shows significant operational effort saved when migrating to a next generation, higher scale and capacity data center fabric based on Nokia SR Linux and Nokia EDA.

- The tool shows a true indicator of cumulative effort savings because it models a complete and comprehensive set of job functions and associated tasks across the Day 0 design, Day 1 deployment and Day 2+ operations phases of the fabric life cycle.
- These savings are attributed to some key capabilities of the solution – such as the unique digital sandbox, the open and programmable nature of SR Linux and its ground up, model driven architecture, and the advanced fabric management and NetOps toolkit provided by EDA.
- The solution enables a number of business benefits, allowing data center teams to scale and simplify operations to keep pace with business growth while managing resources, meet the increasing need for operational agility, flexibility, and efficiency, and reduce time to market by completing operational tasks in minutes and hours rather than days.

Learn more:

Nokia Data Center Fabric Solution
Nokia EDA
Nokia SR Linux
Nokia data center switching platforms

Nokia Data Center Fabric BCA tool

Nokia Bell Labs has developed a BCA tool that lets you model the operational tasks and effort saved when designing, deploying, and operating a next generation Nokia Data Center Fabric solution.

Try the BCA tool and request a detailed report to see how you could benefit from our solution.

[Try the tool](#)





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About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.

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