The Economic Benefits of the Dell Telecom Infrastructure Blocks in a 5G Core Network Deployment

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EXECUTIVE SUMMARY

Many legacy 5G core systems are based on vertically integrated stacks where the 5G core vendor delivers all components of the stack:

- 5G core software
- Cloud software (Kubernetes and/or VIM)
- Bare metal layer (compute, networking, and storage)

The 5G core vendor takes responsibility for operations and all KPIs associated with the vertical stack, which simplifies the communication service providers' (CSPs') responsibilities. However, as CSPs seek to deploy new virtual containerized network functions in distributed locations, the vertical vendor stack is creating a roadblock. CSPs want to increase revenue with new 5G services, which will require a horizontal cloud-native network where CNFs, VNFs or other applications can be deployed and managed across a common cloud platform without constraints. Many CSPs are challenged by the complexities of software and hardware integration and support.

Dell Technologies recognizes the challenges of deploying horizontal cloud-native network infrastructure and has developed Dell Telecom Infrastructure Blocks, a solution to help simplify deployment and life-cycle management of scalable and distributed cloud-native networks. This allows CSPs to migrate to a desired horizontal architecture more quickly and with less risk. Dell Telecom Infrastructure Blocks provide a fully engineered solution with Dell PowerEdge servers integrated with cloud software platforms.

This TCO analysis of Dell Telecom Infrastructure Blocks for Red Hat deployed in a virtual 5G core network environment shows a five-year cumulative TCO savings of 30%, a CapEx savings of 10%, and an OpEx savings of 40%. The TCO savings are a result of several factors:

- A horizontal cloud-native architecture allows for more efficient sharing of servers; therefore, the number of servers is reduced.
- Dell Telecom Infrastructure Blocks reduce Day 0, Day 1, and Day 2 labor expenses, which reduce network OpEx.

The reduction in servers results in both CapEx and OpEx savings. CapEx reduction includes the cost of servers and all the one-time expenses for standing up servers and one-time expenses for network software licenses. The OpEx reduction includes power, cooling, floorspace, and annual software licenses tied to servers. In addition to TCO savings horizontal cloud-native architectures reduce network power consumption, which will help operators achieve a GSMA goal of reaching net-zero emissions by 2050[1]. We have calculated that moving from vertically integrated stacks to a horizontal architecture results in CO^2 emissions savings of 833 metric tons, which translates to driving 179 gas powered cars for one year or 162 homes electricity use for one year.

Journey to Cloud-Native Networks

The key to 5G revenue growth and the future success of mobile service providers is the rapid introduction of new services targeted at business, residential, and wholesale markets. Examples of new services are:

- AR/VR
- Metaverse
- Massive IoT
- Telehealth
- Private mobile networks
- Fixed wireless (business & consumer)
- Connected vehicles
- Video surveillance
- Video game streaming
- Others

[1] https://www.gsma.com/betterfuture/wp-content/uploads/2022/05/Moble-Net-Zero-State-of-the-Industry-on-Climate-Action-2022.pdf

To rapidly introduce new services CSPs must improve service agility. Cloud-native networks offer the promise of scalability, flexibility, and service agility, in short, bringing the benefits realized in cloud data centers to large-scale telco networks.

Cloud-native networks provide a horizontal network architecture that allows multiple network functions, applications, and vendors to run on a common cloud platform that shares common cloud software and compute, network, and storage hardware. The first place to start with a common cloud platform is addressing the 5G core functions that control the mobile network. This paper shows the TCO benefits of moving to horizontal cloud-native networks using Dell Telecom Infrastructure Blocks for Red Hat to streamline the deployment and management of Red Hat OpenShift.

Current Industry Problem: Vertically Integrated Stacks

Many virtual 5G core deployments, today, use vertically integrated stacks. In a vertical architecture the vendor provides all components of the stack:

- 5G core software
- Cloud software (Kubernetes and/or VIM)
- Bare metal layer (compute, networking, and storage)

In the early days of virtual 5G core deployments, vendors needed to control all the components of the stack to ensure that the system would meet performance specifications and KPIs. Vendors essentially replaced integrated custom hardware platforms with integrated NFV platforms. From the CSPs' point of view there was no difference because both the customer's hardware and NFV systems were black boxes.

In vertical architectures the vendor is responsible for integration, testing, and life-cycle operation of the entire stack. This simplifies the job of the operator and reduces deployment risks. However, the fundamental problem with a vertical stack is that you need to deploy multiple and isolated cloud stacks from multiple vendors, which are complex to deploy and operate. While this is manageable for the 5G core, which has traditionally been centrally deployed with a small set of vendors, this approach breaks down as CSPs move to edge deployments, multiple vendors' applications, and deployment of a wide range of network services.

Another important problem is that vertical stacks do not allow sharing of servers and other resources. This leads to poor utilization of servers, which directly results in increased CapEx and OpEx and incurs many additional expenses:

- Increased server CapEx
- Increased power and cooling expenses
- Increased CO2 emissions
- Increased cloud software expenses (priced per server)
- Increased floorspace expenses
- Increase labor expenses

An additional problem with vertical stacks is that they are frequently overprovisioned to ensure that demand never exceeds server capacity. Overprovisioning of stacks makes the problem of underutilization much worse. In a horizontal architecture it is possible to provide a smaller amount of extra capacity that can be shared among multiple vendors' CNFs and VNFs, which results in better overall server utilization.

An example of the vertically integrated stacks is depicted in Figure 1. In this example each vendor provides a complete stack consisting of orchestration, network functions, Kubernetes, VIM, and hardware. Generally, the stacks are incompatible with each other and do not support any additional network functions or applications.

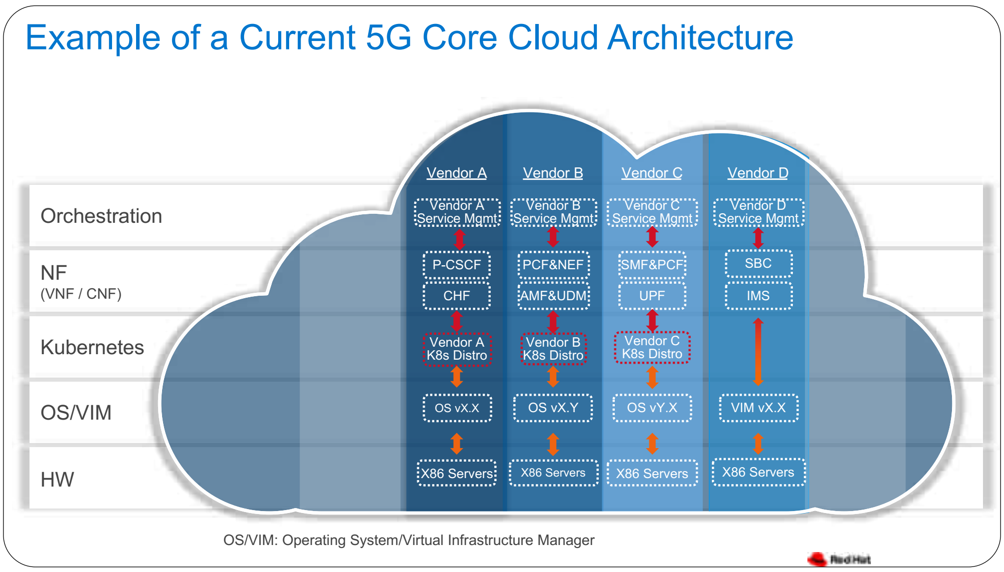

Figure 1. Example of Vertically Integrated Stacks

Solution: Horizontal Cloud-Native Architecture

A horizontal cloud-native architecture is a requirement for a flexible network solution and cloud service agility. Horizontal networks have multiple benefits:

- Better server utilization, which reduces CapEx and OpEx
- Reduced power consumption and CO^2 emissions
- Sharing of compute resources between many vendors, CNFs, and applications
- An agile and scalable network architecture to support the rollout of new services
- Synergy between telco and IT infrastructure

An example of a 5G core horizontal architecture using Dell Telecom Infrastructure Block solution with Red Hat OpenShift Container Platform (OCP) and Red Hat Advanced Cluster Management (ACM) is depicted in Figure 2. In this example the 5G core CNFs, provided by different vendors, run on top of a common Red Hat OpenShift platform based on Dell Telecom Infrastructure Blocks for Red Hat.

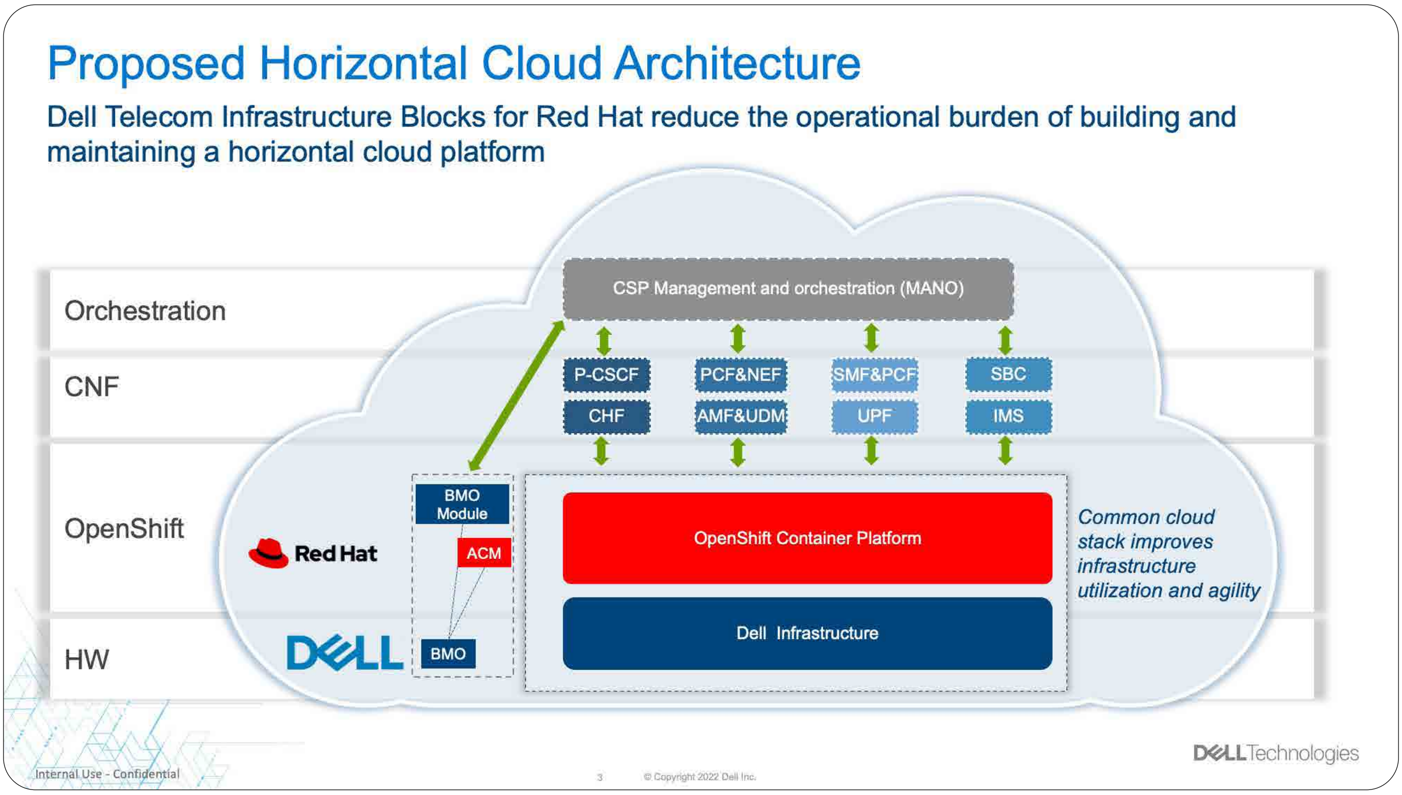

Figure 2. Horizontal Architecture with Dell and Red Hat OpenShift

Cloud-native networks offer scalability, flexibility, and service agility and bring the benefits realized in cloud data centers to large-scale telecom networks. However, these benefits come at a cost:

- CSPs are used to deploying network solutions that are tested and integrated by large telecom vendors, and they depend on those vendors for network deployment and life-cycle management.
- Traditional network solutions are closed systems that do not provide the benefits of a telco cloud, but there is extensive experience that supports Day 0, Day 1, and Day 2 operations tasks. The transition to cloud-native networks will result in an operations paradigm shift, which could be challenging to navigate.
- Cloud-native architectures require operators to integrate and manage multiple, complex components: compute, storage, and networking hardware as well as the cloud-native software platform running on top of the hardware.
- CSPs need to deploy cloud infrastructure in highly distributed networks consisting of central data centers, regional data centers, edge data centers, and cell sites. In such networks there can be tens of thousands of edge locations that operate as mini cloud data centers.
- The management of a highly distributed cloud-native network is more challenging than managing clouds deployed in large, centralized data centers.
- These factors result in requirements for new skill sets for all components of the operation's life cycle, which can be costly and labor intensive.

It is clear to most CSPs that the transition to cloud-native networks is a necessary step to ensure future profitability and growth in an increasingly competitive industry. The question is how the transition to a cloud-native network can be done most effectively. The goals of this transition should be to:

- Reduce risk
- Accelerate rollouts of cloud-native networks
- Decrease network operations expenses
- Arrive at an end state where cloud-native networks enable quick rollout of new profitable services

The Dell Telecom Infrastructure Blocks Value Proposition

Dell Technologies recognizes the challenges of deploying horizontal cloud-native network infrastructure and has developed Dell Telecom Infrastructure Blocks, a solution to help simplify life-cycle management of large cloud-native networks. This solution allows CSPs to migrate to a desired horizontal architecture more quickly and with less risk and provides a fully engineered solution with Dell PowerEdge servers integrated with cloud software platforms. Infrastructure Blocks are targeted at specific use cases, including RAN, edge, and 5G core. A horizontal architecture based on Infrastructure Blocks with Dell Bare Metal Orchestrator (BMO) allows operators to discover and pool resources and reconfigure those resources to meet changing workload requirements to break down silos and improve resource utilization. BMO discovery and automation accelerates the move to a horizontal architecture, which directly improves server utilization leading to both CapEx and OpEx savings. We estimate that server utilization can be improved by 15% or more based on previous research by ACG. The 15% improvement in our TCO analysis is a very conservative estimate, and in practice the improvement in server utilization will be higher. An overview of Infrastructure Blocks is presented in Figure 3.

Telecom Infrastructure Blocks are pre-integrated and tested, shipped to customers, and can be deployed quickly. Dell is building on its Telecom Multi-Cloud Foundations framework, its supply chain operations, customer support, and professional services offerings to develop a portfolio of use case-focused, pre-engineered, pre-integrated, pre-validated solutions with its cloud platform software partners. Dell provides a single point of support for life-cycle operations for both the servers and the cloud platform, eliminating finger pointing and reducing CSPs' vendor management complexity.

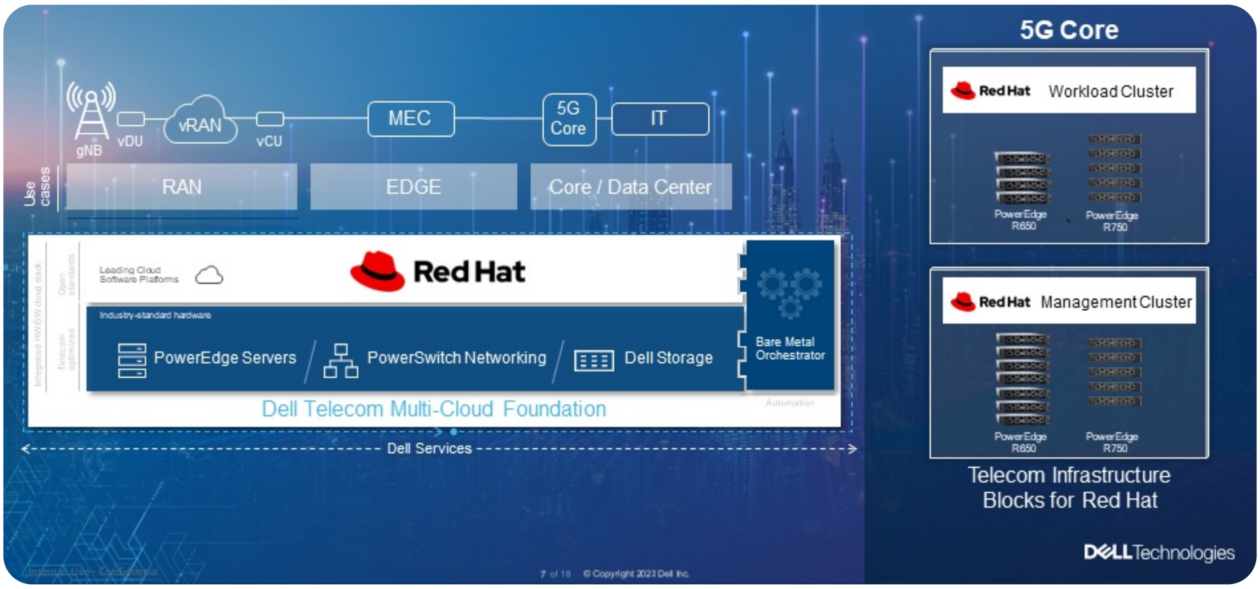

Figure 3. Dell Telecom Infrastructure Blocks for Red Hat

Dell Telecom Infrastructure Blocks reduce risk, accelerate network deployments, and decrease life-cycle operations expenses. Life-cycle operations include Day 0 (design), Day 1 (deploy), and Day 2 (operate).

Day 0 Benefits: Infrastructure Blocks provide solutions for specific use cases, which include RAN, 5G core, and edge. Infrastructure Blocks are pre-engineered, pre-integrated, and pre-validated using field proven design guidelines to meet the requirements of the specific use case. They include design guidance on how to configure Infrastructure Blocks to streamline designing and planning processes across a range of scale points. Dell Services also offers custom lab testing services to validate interoperability workloads on Infrastructure Blocks.

Day 1 Benefits: Factory integration of all hardware and software eliminates the need to configure hardware and software onsite or in a configuration center. Dell Services can also provide configurations to meet unique operator requirements through a Dell Second Touch facility. Network deployment is accelerated by the integration between Dell BMO and Red Hat Advanced Cluster Management and OpenShift, which automates the deployment of Dell's hardware and integrated cloud platform. BMO automates configuration, deployment and life-cycle management of the network infrastructure across national and regional data centers with plans to support edge and RAN sites in a future release. This automation improves the speed of deployment and reduces configuration errors. Integration with Red Hat OpenShift and Advanced Cluster Management with Dell Bare Metal Orchestrator Modules, included with Infrastructure Blocks, automates deployment and life-cycle management from bare metal through CNFs.

Day 2 Benefits: Dell's Bare Metal Orchestrator and Bare Metal Orchestrator Modules and Red Hat's ACM and OpenShift provide on-going life-cycle automation of the cloud infrastructure operations. Some of the key benefits of Infrastructure blocks in Day 2 operations are:

- Release compatibility tracking and governance
- Release testing and integration
- CI/CD pipeline integration and automation

Dell Professional Services can provide custom integration into a CSP's CI/CD pipeline, providing the CSP with validated updates to the cloud platform infrastructure that pass directly into the CSP's cloud-native application development process. Bare Metal Orchestrator automates the detection and remediation of configuration drift to eliminate configuration errors that can impact SLAs and time spent on configuration and performance management. Dell provides on-going technical support with a one-call support model for the full solution, including simplifying fault management and eliminating finger pointing between vendors. Day 0, Day 1, and Day 2 benefits are summarized in Figure 4.

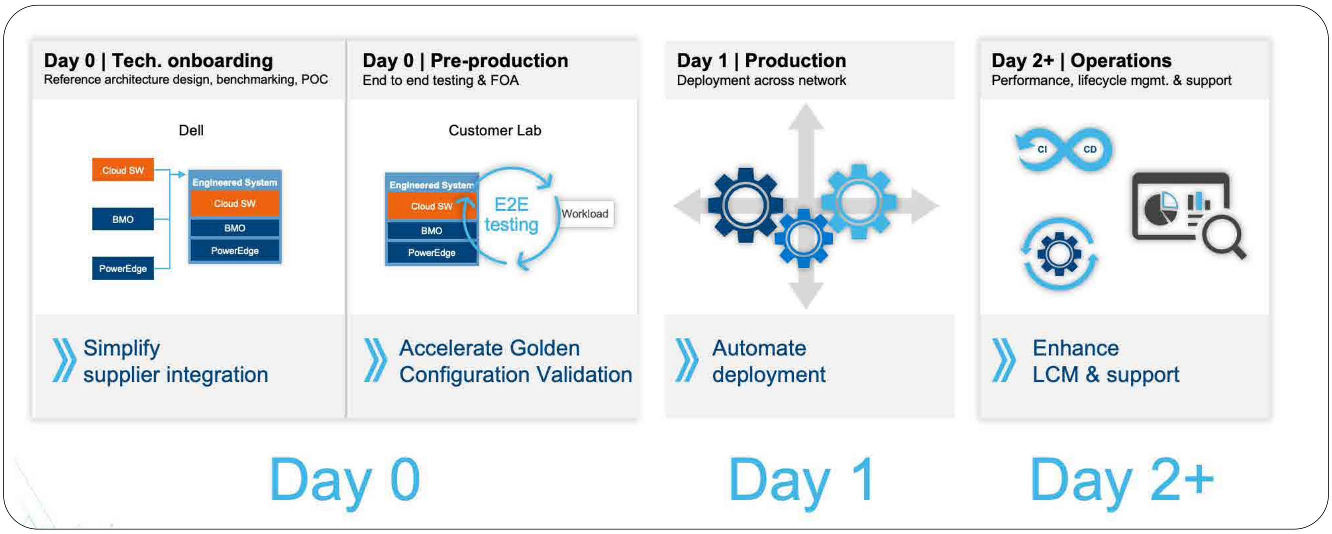

Figure 4. Day 0, Day 1, and Day 2 OpEx Benefits

In addition to the benefits of Infrastructure Blocks automation, Dell also provides a new Lab as a Service offering. CSPs can use the Lab as a Service to do their test and certification processes with Dell Telecom Infrastructure Blocks and their workloads. Lab as a Service can significantly reduce the time required for test and certification, rollout of systems, and new software releases.

Business Model Assumptions

In our business model we compare two scenarios:

1. A vertically integrated stack with a 5G core architecture without Infrastructure Blocks
2. A horizontal 5G core architecture using Dell Telecom Infrastructure Blocks with Red Hat OpenShift

ACG uses its Business Analytics Platform (https://www.acgbae.com/) to compare the TCO over five years for both scenarios. The structure of the model is depicted in Figure 5.

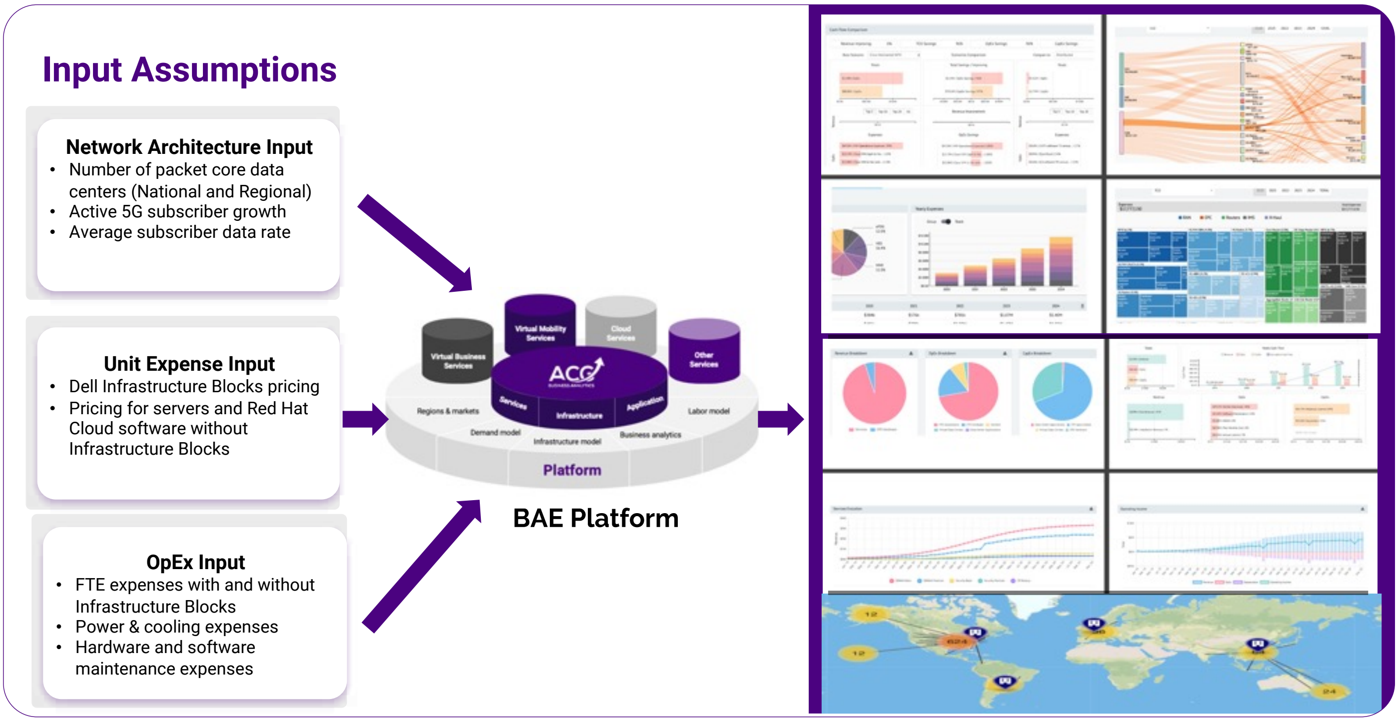

Figure 5. ACG BAE Model Comparing Alternative Scenarios

We are modeling a mobile 5G core network that is typical of a Tier 1 CSP. The network has the following characteristics:

- Demand growth to 40 million 5G SAUs (simultaneous active users) over 5 years
- Average busy period demand at 0.8 Mbps (note: users burst at much higher rates but most of the time they are not transmitting data); traffic growth rate of 23% annually
- 5G control plane and 5G user plane (UPF) with typical capacity constraints
- Network data centers:
    - 1 national data center hosting a 5G core control plane
    - 40 regional data centers hosting 5G core UPFs
    - Red Hat OpenShift Management and Workload clusters operating in national and regional data centers powered by Dell PowerEdge R650 and R750 servers versus Telcom Infrastructure Blocks

Overview of Labor OpEx Assumptions

The TCO model accounts for Full Time Equivalent (FTE) labor hours for Day 0, Day 1, and Day 2 tasks and considers fixed FTEs where the number of hours required for a task is independent of the size of the network and the number of servers managed. Variable FTEs where the labor hours scale up based on the size of the network and the number of servers are also included. This is because some labor tasks are not dependent on the network scale while other activities scale directly with the size of the network. In some categories of FTEs, we model both fixed and variable components because in some cases a fixed number of FTEs is required regardless of the network size; however, FTEs also need to be added as the network scales up.

The categories of FTE labor and the assumptions for fixed and variable hours of effort are presented in Table 1. The descriptions of tasks and the drivers for Infrastructure Blocks savings are presented in Table 2. There are multiple categories of labor for Day 0, Day 1, and Day 2 activities. Table 1 specifies both the fixed and variable components of labor in hours. Fixed FTE hours are functions that require a basic level of effort regardless of the size of the network. For example, lab test and certification or reference architecture design are primarily driven by fixed FTEs. Variable labor hours are tasks that are dependent on the number of servers in the network. These are functions that scale up based on the size of the network. Some categories of labor have both fixed and variable components. In small networks with 50–100 servers, it is important to consider the fixed components of labor that are required regardless of the size of the network. As the network grows and the number of servers increases into the thousands the variable components of labor dominate the labor expenses.

Day 0 and Day 1 activities are nonrecurring. These activities are done once at the time the network is planned and deployed. For example, Day 1 cloud platform installation requires 320 nonrecurring FTE hours and an additional 30 FTE hours per server for the scenario without Infrastructure Blocks. We estimate Dell's Infrastructure Blocks will provide an 80% savings in this activity, which reduces both the fixed and variable hours. The hours are nonrecurring because this is a Day 1 activity, but as servers are added to the network additional one-time labor expenses are needed per server.

Day 2 activities are on-going and are recurring throughout the life cycle of the network. An example of a Day 2 activity is fault management. This activity is dependent on the size of the network and the number of servers and uses variable labor hours of 20 hours per server per year for the scenario without Infrastructure Blocks. Fault management is an on-going activity; it is a recurring task that scales based on the size of the network and the number of servers. These FTE labor assumptions are key to driving the TCO savings of Dell's Telecom Infrastructure Blocks for the Red Hat solution.

	Without Infrastructure Blocks		With Infrastructure Blocks		
	Fixed	Variable per Server	Fixed	Variable per Server	
FTE	Hour	Hours	Hour	Hours	Savings
Day 0 Reference Arch Design	480	0	240	0.0	50%
Day 0 Benchmarking	240	0	120	0.0	50%
Day 0 POC	960	0	192	0.0	80%
Day 0 Detailed Design	1920	0	384	0.0	80%
Day 0 Test & Certificate	10800	0.0	2160	0.0	80%
Day 1 Procurement	240	2.5	120	1.25	50%
Day 1 Hardware Installation	160	4.0	80	2.0	50%
Day 1 Cloud Platform Installation	320	30	64	6.0	80%
Day 1 Network Testing	160	20	32	4.0	80%
Day 1 Documentation	240	0.0	120	0.0	50%
Day 2 Engineering and Planning	480	2.5	240	1.3	50%
Day 2 Procurement	240	0.5	120	0.25	50%
Day 2 Test & Certificate	10800	0.0	2160	0.0	80%
Day 2 Hardware Upgrades	320	0.5	160	0.3	50%
Day 2 Software Upgrades	480	5	96	1.0	80%
Day 2 CI-CD Pipeline Integration	960	0.5	192	0.0	80%
Day 2 Fault Management	0	20	0	7.0	65%
Day 2 Performance Management	0	10	0	3.5	65%
Day 2 Configuration Management	0	5	0	2.5	50%

Table 1. FTE Tasks with Fixed and Variable Labor Hours

Task	Description	Infrastructure Blocks Benefits	Savings
Day 0 Reference Arch Design	High-level design of the cloud infrastructure architecture.	Hardware and software architecture is already predefined in Infrastructure Blocks so architects only need to focus on use case and environmental details.	50%
Day 0 Benchmarking	Initial design work requires benchmarking with alternative approaches.	An integrated Dell/RedHat solution provides engineers and architects with data required for benchmarking, which simplifies this process.	50%
Day 0 POC	Proof of concept requires that systems be tested and integrated in a lab before deployment.	Dell's pre-integration and pre-testing greatly simplifies the POC.	80%
Day 0 Detailed Design	Detailed design specifies detailed configurations for each regional and edge data center based on the use case requirements.	Pre-engineered, preintegrated, and prevalidated Infrastructure Blocks simplify detailed design because engineers only need to focus on the specifics of their network and data centers but not on cloud and hardware design and configuration.	80%
Day 0 Test and Certification	Before initial hardware and cloud software is deployed in the network the configurations need to go through test and certification in the lab before being deployed in the network.	Infrastructure Blocks are pre-tested, which dramatically reduces the time required for software test and certification. Optional integrations with the CSP's CI/CD pipeline processes and offloading of test processes to Dell OTEL further streamline Day 2 test and certification processes.	80%

Day 1 Procurement	Procurement teams are responsible for purchasing and delivering all hardware and software.	A single point of contact with Dell simplifies procurement of cloud software integrated with hardware.	50%
Day 1 Hardware Installation	Installation, wiring, and testing of hardware on site.	Infrastructure Blocks provide turnkey solutions that simply hardware installation.	50%
Day 1 Cloud Platform Installation	Installation and configuration of cloud software on hardware infrastructure.	Pre-engineered, preintegrated, and prevalidated Infrastructure Blocks simplify cloud software installation, which can be complex and time consuming without Infrastructure Blocks.	80%
Day 1 Network Testing	End-to-end testing of the network cloud platform and hardware configurations after installation.	Infrastructure Blocks are pretested before they are shipped, which dramatically reduces on-site testing.	80%
Day 1 Documentation	Documentation of the hardware and cloud platform configuration.	Standard Infrastructure Blocks and Customer Information Questionnaires allow CSPs to simplify documentation using boiler plate text for much of the configurations.	50%
Day 2 Engineering and Planning for Upgrades	Ongoing engineering and planning of the cloud platform to support the network.	Infrastructure Blocks simplify engineering because they are standard units designed for specific network use cases.	50%

Day 2 Procurement	Ongoing procurement of hardware and cloud software.	A single point of contact with Dell simplifies procurement of cloud software integrated with hardware.	50%
Day 2 Test and Certification of Upgrades	All major hardware and software releases need to go through test and certification before being deployed in the network.	Infrastructure Blocks are pretested, which dramatically reduces the time required for software test and certification. Optional integrations with the CSP's CI/CD pipeline processes and offloading of test processes to Dell OTEL further streamline Day 2 test and certification processes.	80%
Day 2 Hardware Upgrades	Ongoing upgrades of hardware.	Infrastructure Blocks are engineered systems with roadmaps that define hardware and software enhancements that will be delivered as turnkey solutions to simplify planning and implementation of hardware upgrades.	50%
Day 2 Software Upgrades	Ongoing upgrades of software.	Infrastructure Blocks provide turnkey solutions, which simplifies software upgrades.	80%
Day 2 CI-CD Pipeline Integration	Ongoing continuous integration and deployment of software.	Infrastructure Blocks are designed to support CI-CD pipelines.	80%
Day 2 Fault Management	Ongoing troubleshooting and remediation of problems.	Dell's extensive design and integration testing minimizes design and interoperability issues to reduce fault and performance management issues for the cloud stack. BMO automates	65%

		the detection and remediation of hardware configuration drift to further reduce fault and performance issues. Dell's single point of contact simplifies support processes when fault and performance management issues occur. When problems occur, zero-touch provisioning from bare metal up to CNF accelerates problem remediation.	
Day 2 Performance Management	Ongoing system performance management and tuning.	Infrastructure Blocks are pre-engineered for high performance. Design guidance simplifies the deployment of the cloud stack at scale. BMO reduces issues due to configuration drift. Dell's single point of contact simplifies performance management.	65%
Day 2 Configuration Management	Ongoing provisioning and system configuration.	Factory integrated Infrastructure Blocks simplify configuration and provisioning. Automated deployment and upgrades that align with an operator's approved configurations and ability of the BMO to automate the detection and remediation of configuration drift ensure a consistent, approved configuration across the CSP's landscape.	50%

Table 2. Key Areas of Labor Savings Due to the Dell Telecom Infrastructure Blocks

Infrastructure Blocks TCO Savings

The results of the five-year TCO analysis of the hypothetical Tier 1 network are presented in Table 3. Our results show a five-year cumulative TCO savings of 30%, a CapEx savings of 10%, and an OpEx savings of 40%. The TCO savings are a result of several factors:

- A horizontal cloud-native architecture allows for more efficient sharing of servers; therefore, the number of servers is reduced.
- Dell Infrastructure Blocks reduce Day 0, Day 1, and Day 2 labor expenses, which reduce network OpEx.

The reduction in servers results in both CapEx and OpEx savings. CapEx reduction includes the cost of servers and all the one-time expenses for standing up servers and one-time expenses for network software licenses. The OpEx reduction includes power, cooling, floorspace, and annual software licenses tied to servers.

	With IBs	Without IBs	Savings	ROI
TCO	**$17.1 Million**	**$24.6 Million**	**$7.5 Million** **30%**	**1367%**
CapEx	**$7.23 Million**	**$8.06 Million**	**$832 Thousand** **10%**	
OpEx	**$9.9 Million**	**$16.5 Million**	**$6.62 Million** **40%**	

Table 3. Five-Year TCO Results Comparing a Network with IB to a Network without IB

A key driver of both CapEx and OpEx savings is because of efficient server utilization. The number of servers with IB and without IB is presented in Table 4. As the 5G packet core load grows the horizontal network with Infrastructure Blocks requires fewer servers than the vertical stack without Infrastructure Blocks.

	Year 1	Year 2	Year 3	Year 4	Year 5
Servers with IB	30	75	186	302	399
Servers without IB	31	87	221	355	467

Table 4. Total Servers Required with IB and without IB

A breakdown of TCO savings is presented in Figure 6. The largest component of savings is due to reduced Day 0, Day 1, and Day 2 labor savings. Infrastructure Blocks deliver pre-tested and pre-integrated cloud software and hardware, which dramatically reduces life-cycle management. Other significant savings are due to a reduced number of servers in the horizontal architecture, which results in CapEx savings, Red Hat software savings, and environmental savings (power, cooling, and floorspace).

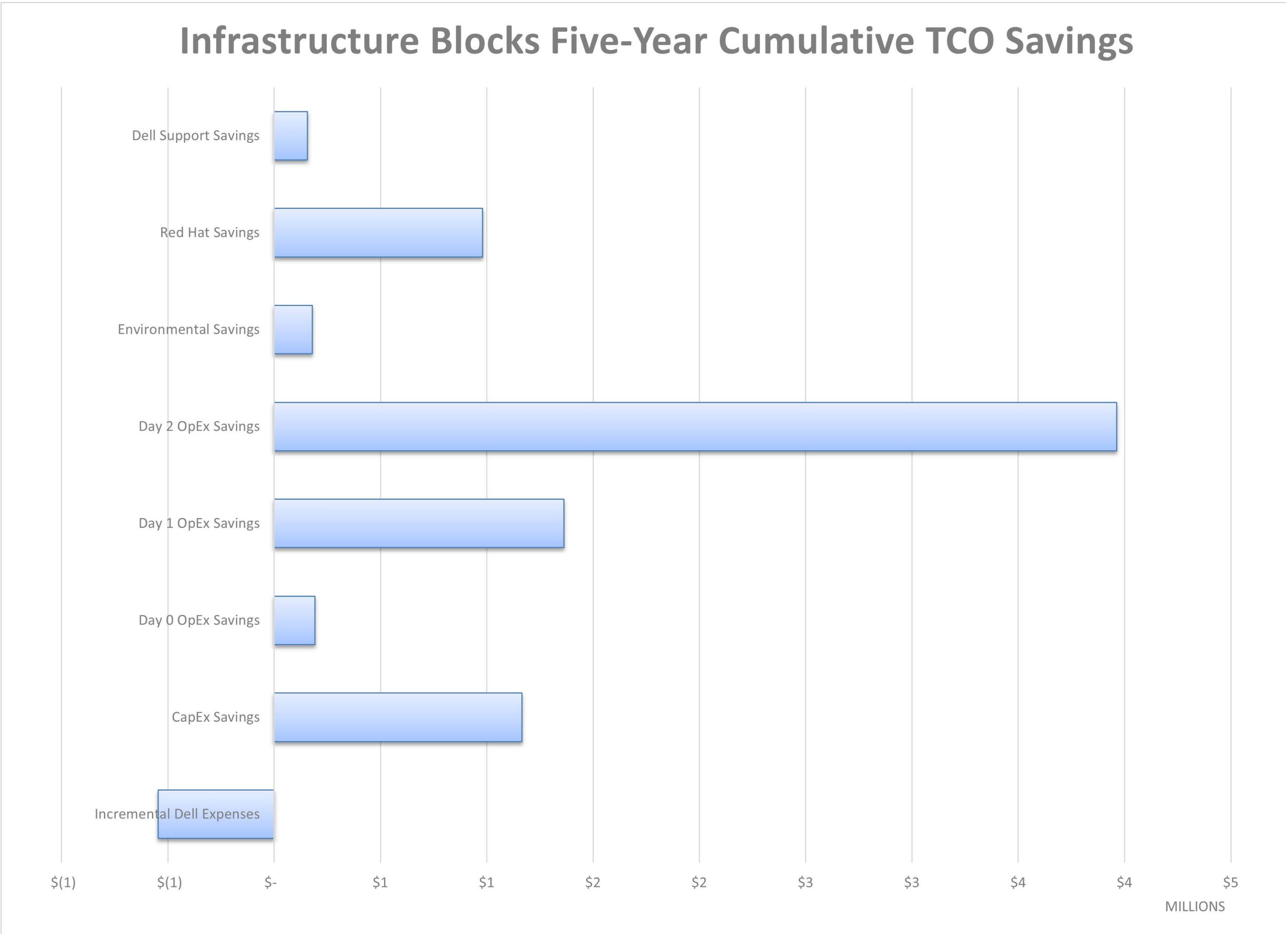

Figure 6. Infrastructure Blocks Breakdown of Five-Year Cumulative TCO Savings

Power and cooling expenses and reduction in CO^2 emissions are another key area of savings. Sustainability has become increasingly important to CSPs worldwide. Last year, the GSMA made the first assessment of how the mobile industry is progressing toward net zero by 2050. A detailed report from GSMA highlights how many mobile operators (50) have committed to reducing their carbon footprint[2]. In the results we assume average North American power expenses. However, we have also calculated power savings in the UK where power rates are significantly higher. The results are presented in Table 5. The CO^2 emissions savings translates to driving 179 gas powered cars for one year or 162 homes electricity use for one year [3].

	Savings
Total Power & Cooling Savings (USA)	**$172.3 Thousand**
Total Power & Cooling Savings (UK)	**$486 Thousand**
Total Kwatt Hour Savings	**1.175 Million**
Total CO2 Emissions Savings	**833 Metric Tons**

Table 5. Five-Year Cumulative Power and Cooling Savings and CO^2 Emissions Savings

[2] https://www.gsma.com/betterfuture/wp-content/uploads/2022/05/Moble-Net-Zero-State-of-the-Industry-on-Climate-Action-2022.pdf

[3] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Conclusion

CSPs worldwide are deploying 5G networks and technology to enable new services and are counting on increased revenue from new 5G services for continued growth and profitability. New services consist of multiple vendors, technologies, and deployment models that require a horizontal cloud-native architecture across all data centers and geographies. Dell Technologies recognizes the challenges of deploying horizontal cloud-native network infrastructure and has developed Infrastructure Blocks, a solution to help simplify life-cycle management of large cloud-native networks. In this study we focused on a 5G core deployment using Dell Telecom Infrastructure Blocks for Red Hat. Our results show a five-year cumulative TCO savings of 30%, a CapEx savings of 10%, and an OpEx savings of 40%.

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Peter Fetterolf, Ph. D. is an expert in network technology, architecture and economic analysis. He is responsible for financial modeling and whitepapers as well as software development of the ACG Research Business Analytics Engine. Dr. Fetterolf has a multidisciplinary background in the networking industry with over thirty years of experience as a management consultant, entrepreneur, executive manager, and academic. He is experienced in economic modeling, business case analysis, engineering management, product definition, market validation, network design, and enterprise, and service provider network strategy.