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INTELLIGENT MODERNIZATION AND MIGRATION

Optimizing Network Infrastructure for a New Networked World

Network and service requirements are changing faster than ever before. In this environment, Communications Service Providers (CSPs) face the challenge of replacing aging and unreliable equipment to stay competitive, reduce CapEx and OpEx, and future-proof their networks as new technologies like SDN and NFV gain acceptance.

This white paper addresses the constraints and issues that CSPs deal with when managing legacy platforms, networks, and communication protocols. It also offers some of the available alternatives for network modernization and outlines what CSPs should be cognizant of when migrating traffic and services to new platforms.

INTRODUCTION

Networks built on TDM, SDH and SONET have been widely deployed across the globe and a good portion of the voice and metro network data infrastructure continues to rely on these legacy technologies. Most Communications Service Providers (CSPs) expect to operate SONET/SDH infrastructures until the end of the decade, before ultimately migrating to IP-centric, SDN-enabled networks. That migration is a major undertaking. For example, estimates predict that tens of thousands of digital cross connect systems (DCSs) are candidates for replacement in service provider networks.

The use of legacy equipment in many of today's telecom networks poses a major risk for the following reasons:

- These systems are unreliable, with increased incidents of failures and breakdowns over time which lead to service-impacting traffic outages

- These systems are expensive to maintain, in many cases with replacement parts that have to be fabricated, ordered from a hard to reach supplier, or salvaged from unused equipment – if they can be found at all

- These systems consume considerably more power and floor space than more modern equipment

- These systems lack the revenue-enhancing features and functionality inherent in more modern equipment

To be competitive, CSPs must provide consistently reliable services while at the same time minimizing overall network expenses. The use of available next-generation technologies with newer equipment can improve network reliability and provide better visibility and control, thus reducing operating expenses. Additionally, newer equipment minimizes the floor space required to support network services, costs less to cool and lowers overall lease and security costs. Newer equipment also may include enhanced features, enabling network operators to generate new revenues.

THE CHALLENGES OF NETWORK MODERNIZATION

Although CSPs realize the importance of network migration and modernization, the challenges can be formidable. The capital expense of new equipment always factors in legacy system migration decisions. Additionally, staff resources, record-keeping updates, record-keeping errors, service-affecting errors, and time needed to migrate off of legacy systems to new systems are a major part of the overall capital and operational expense of legacy network modernization.

Because network migration typically isn't part of regular staff routines, migration processes may be unknown or untested, and operations staff may not be able to focus effectively on the migration task because they are called upon to simultaneously handle other tasks as well (Figure 1). Limited software tools for migration design and implementation can significantly lengthen migration project timelines.
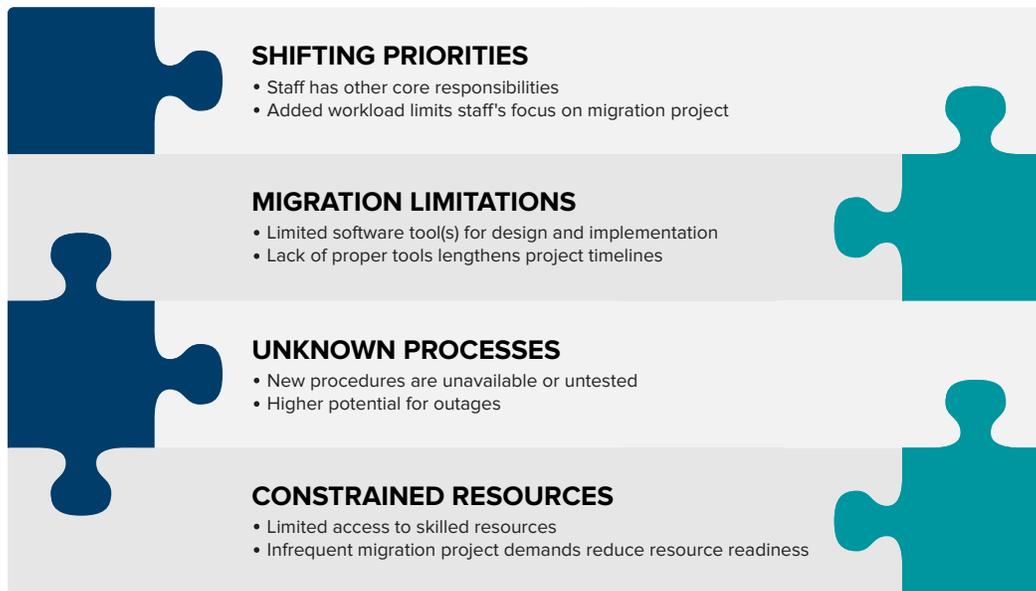
SHIFTING PRIORITIES
• Staff has other core responsibilities
• Added workload limits staff's focus on migration project

MIGRATION LIMITATIONS
• Limited software tool(s) for design and implementation
• Lack of proper tools lengthens project timelines

UNKNOWN PROCESSES
• New procedures are unavailable or untested
• Higher potential for outages

CONSTRAINED RESOURCES
• Limited access to skilled resources
• Infrequent migration project demands reduce resource readiness

Figure 1 – Challenges to Network Modernization

Migrating live traffic further complicates matters. Key issues that CSPs face when upgrading networks carrying live telecommunications traffic include:

- Data integrity management issues such as inaccurate or missing circuit and/or hardware information from existing databases

- Traffic disruptions resulting from inaccurate circuit layout records

- Excessive amounts of time spent evaluating and correcting problems resulting from human error during data entry

- No efficient means of returning to the original circuit path when problems occur

- Maintaining the accuracy of existing database systems when integrating the old information with the new modernized infrastructure

- Major outages, heightened by the lack of robust recovery techniques, can lead to major network outages and result in lost customers and the potential for SLA (Service Level Agreement) penalties being incurred

For all of these reasons, CSPs should consider enlisting a company with network modernization and migration experience and expertise to assist with network updates. The right software tools can improve network performance, manage operational complexity, and accelerate migration timelines, resulting in overall revenue enhancements.

Experienced teams can also help avoid downtime, data loss, and the need to repeat processes. They also provide training to internal resources so staff can participate in the network migration and operate the modernized network most effectively.

TYPES OF MIGRATION

The four main types of network migration or modernization are:

- **Replacement and shutdown** – involves building new infrastructure and shutting down old networks and services, requiring customers to migrate to a replacement network and service

- **Cap and grow** – also involves building new infrastructure but only to support new growth and services; existing infrastructure is maintained but no new investment is made in the technology; migration occurs gradually over time

- **Modernizing the core and maintaining the edge** – customers maintain existing service and edge capabilities, but the core is modernized to reduce operational costs

- **Collapse and optimize** – the customer maintains existing services, but cost is driven out by collapsing the footprint

By working with network migration and modernization experts, CSPs can comprehensively and effectively evaluate the situation and determine which type of network migration is most appropriate for their circumstances.

CORIANT MODERNIZATION & MIGRATION OFFERINGS

Customized solutions are critical when migrating live, revenue-dependent traffic. Coriant Modernization & Migration Services (MMS) include ongoing program management based on a three-phase network migration process that encompasses (1) planning, (2) building, and (3) migration implementation tailored to the specific environment and service needs of each service provider.
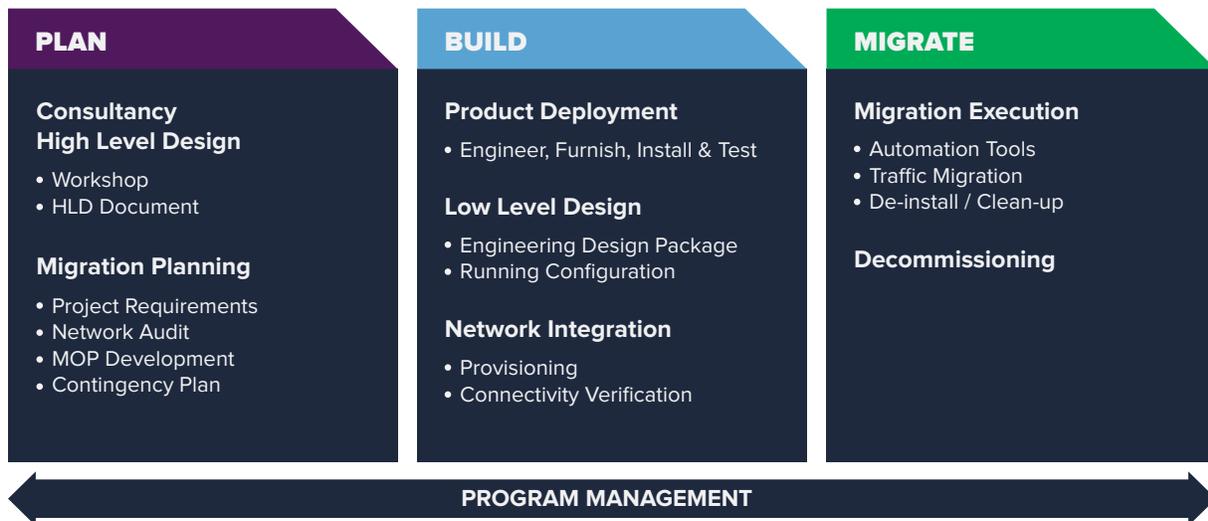
PLAN

Consultancy High Level Design

- Workshop
- HLD Document

Migration Planning

- Project Requirements
- Network Audit
- MOP Development
- Contingency Plan

BUILD

Product Deployment

- Engineer, Furnish, Install & Test

Low Level Design

- Engineering Design Package
- Running Configuration

Network Integration

- Provisioning
- Connectivity Verification

MIGRATE

Migration Execution

- Automation Tools
- Traffic Migration
- De-install / Clean-up

Decommissioning

PROGRAM MANAGEMENT

Figure 2 – coriant's mms offerings
(CUSTOM SOLUTIONS ARE REQUIRED WHEN MIGRATING LIVE TRAFFIC)

The focus of the *Planning Phase* is on consultancy, high-level design, and migration planning. Coriant typically conducts a workshop with the customer to create a high-level design document. Migration planning includes determining project requirements, conducting a network audit, developing a method of procedure, and creating a contingency plan.

Coriant determines if migration is ideal by analyzing four dimensions of the situation. All four dimensions must generate a positive business case before recommending migration:

- **Technology need** – a shift is needed to maintain and increase the quality and value of services

- **Commercial need** – former technology is commercially inefficient because of power consumption, maintenance costs, etc.

- **Technical feasibility** – the migration is technically feasible based on overlay possibilities, legacy protocol integration via emulation, etc.

- **Effort/migration feasibility** – the process to replace equipment and migrate services is feasible

MIGRATION ANALYSIS			
Technology Need	**Commercial Need**	**Technical Feasibility**	**Effort/Migration Feasibility**
A technology shift dictates the need for migration; must maintain and increase the quality and value of end-customer services	Former technology is commercially inefficient for various reasons (e.g., power consumption vs. throughput, space, maintenance costs, etc.)	Migration is technically feasible based on replacement or overlay possibilities, legacy protocol integration via emulation, etc.	A detailed service concept for equipment, protocol and service migration is attainable

Figure 3 – A NETWORK MIGRATION ONLY HAPPENS WHEN THE RESULT IN ALL PARTS OF THE MIGRATION ANALYSIS GENERATES A POSITIVE BUSINESS CASE

In the *Building Phase*, Coriant focuses on low level design, product deployment and network integration. Low level design includes an engineering design package and the running of configurations. Product deployment includes engineering, furnishing, installation and testing. Network integration includes provisioning and connectivity verification.

The *Migration Implementation Phase* includes migration execution and decommissioning. As part of project execution, Coriant draws on advanced automation tools and more than 20 years of expertise when migrating live traffic. Decommissioning includes de-install and clean-up of the legacy equipment.

The Coriant MMS offering is vendor agnostic. The company has conducted a broad range of migration scenarios involving equipment from diverse telecom equipment vendors.

BENEFITS OF USING CORIANT MMS

Coriant is a global company with more than 700 service professionals worldwide, including in-house resources dedicated to helping service providers cost-efficiently evolve their network infrastructure and decommission legacy systems while maximizing operational efficiencies. The company has a direct local presence in more than 30 countries.

Forty-four of the top 50 CSPs globally are Coriant customers – and many are repeat customers. Typically customers give Coriant customer satisfaction scores of 5 out of 5.

Coriant has migrated more than four million circuits for various customers, with over 99% of the circuits experiencing no unplanned traffic disruptions.

Based on its experience in this area, Coriant has developed valuable best practices and implementation tools that mitigate risk, bypass the learning curve, proactively identify potential issues before they affect project schedules, and avoid costly rework.

The Coriant MMS solution meets the migration requirements of CSPs and addresses a broad range of modernization and migration applications in mobile and fixed line CSP environments, including:

- Narrowband DCS upgrade/replacement

- Wideband/broadband DCS or MSPP upgrade/replacement

- TDM use of advanced PTN overlay for transparent DS1/E1 or SONET/SDH transport

- OTN overlay peer support to SONET/SDH switching and protection

- ATM to IP centric (Ethernet) network migrations

- Flat to hierarchical network architecture migrations

- New service introduction (e.g., Business Ethernet, IP/packet-based mobile backhaul)

Coriant customer migration/modernization plans typically pay for themselves in two years through operational savings and by enabling new revenue sources. Average OpEx savings are in the range of 50% to 70%.

By using Coriant MMS, network migration can typically be completed in 40% to 60% less time than an internally-conducted migration would require with minimal impact on existing customer services.

Some CSPs that work with Coriant to migrate their networks have seen the amount of infrastructure in their networks decrease by up to 70%. Customers have also seen power and HVAC requirements decrease by up to 35% and empty floor space increase by as much as 50%.

SUMMARY

Communications Service Providers can experience numerous benefits from migrating legacy systems to IP-centric, SDN-enabled networks, including greater reliability, lower cost maintenance, and greater power and space efficiency. Additionally, more modern equipment can generate new revenue opportunities by increasing features and functionality.

In making the decision about network migration, CSPs should consider working with a strategic partner such as Coriant that brings the proven experience, expertise and commitment required for seamless and successful network migration.

Coriant's MMS solution offers numerous benefits including:

- **Improve** overall service performance while simplifying network operations while expanding new revenue opportunities

- **Reduce** cost and complexity by efficiently and cost-effectively integrating diverse technologies and multi-vendor network elements while lowering power and space requirements

- **Optimize** migration to new technologies and platforms with customized service and support plans tailored to specific technical and commercial requirements

- **Minimize** time-to-deployment for new services without any unplanned impact to existing customer traffic or operational systems

- **Ensure** carrier-class service integrity and ongoing network availability with detailed MOPs and best industry practices

ABOUT CORIANT

Coriant, founded as an independent company in 2013, is an industry-leading supplier of dynamic metro-to-core transport solutions. We serve over 500 customers globally, including 90% of the world's top 50 service providers. Our packet optical, edge router and Software Defined Networking (SDN) solutions enable mobile and fixed line operators to reduce network complexity, increase service velocity, and improve resource utilization as transport networks scale in response to a new generation of high-bandwidth services and applications. Coriant was formed from the distinguished technology heritage and proven networking expertise of Nokia Siemens Networks Optical Networks, Tellabs, and Sycamore Networks. The company operates worldwide in more than 48 countries, with R&D centers in Asia, Germany, Portugal, Finland, Canada and the United States, as well as a state-of-the-art production center in Berlin, Germany.

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