



SWITCH CONSOLIDATION: IS THE TIME RIGHT?

In today's telecommunications marketplace, the need for efficiency, scalability, and cost containment have never been more important. The ongoing transition to an all IP network and the changing regulatory environment demands that local telecom service providers, especially smaller regulated rate-of-return providers, examine their network to determine how they can streamline operations to increase efficiency and profitability. One good candidate to explore is switching.

Switch consolidation, where single or multiple providers consolidate their individual switching operations into one or more consolidated switching environments, can provide significant gains in efficiency and scalability. Many service providers have already moved in this direction with initial success.

This whitepaper provides an overview of the switch consolidation trend and offers key considerations for carriers who may want to explore this option. It should be noted that there can be significant regulatory implications for rate-of-return providers. Any switch consolidation exploration should include consultation with appropriate regulatory counsel and/or financial consultants to determine individual regulatory and financial implications.

Why Look at Switch Consolidation?

There are a variety of factors in play today that encourage the exploration of switch consolidation is relevant for many telecom providers. Many of these factors revolve around efficiency gains and cost-cutting measures that help improve overall profitability; essential in today's competitive environment which demands efficiency and scalability to achieve maximum profitability.

It's much more efficient and potentially less costly for multiple service providers to operate a consolidated switch together, than for them to individually maintain and operate their own switch. Operational and regulatory considerations that make switch consolidation potentially appealing include:

- **Freeze in Switching Revenue** – existing and potential future regulatory reform for the rate-of-return environment are affecting revenue streams in different ways. One impact is a potential freeze on switching revenue that historically created a reliable revenue stream.
- **Switch End-of-Life** – many carriers are facing end-of-life scenarios for their current switching platform, which can include both legacy digital switches and first generation softswitches. End-of-life scenarios create an optimal time to explore switching consolidation.
- **Savings in Power and HVAC Costs** – one of the most identifiable cost savings for switch consolidation is the power and HVAC savings that result from collapsing multiple switching environments into one or more.

- **Equipment Cost Savings** – in a consolidated environment, there is less equipment to purchase and maintain. The decrease in capital expenses for purchasing equipment, maintenance, and support can be spread as cost savings throughout the participating providers.
- **Staff Savings** – there are multiple positive impacts on staffing costs that can come from switch consolidation. They include less need to replace retiring technical staff, and reduction in the amount of after hours and overtime costs associated with the duplication of each entity maintaining their own switch.
- **Obtain Advanced Services at Lower Cost** – next generation switching provides a variety of potential advanced services, some of which can be costly to deploy for a small number of subscribers that need the feature. By consolidating switching efforts, those costs can be spread across a much larger subscriber base, lowering the costs for all participating providers.

Historical Context

In some ways, the telecom industry is already used to switching migrations and has learned lessons from the past which can be applied to switch consolidations today. The move from mechanical switching to digital switching, and from digital switching to softswitching, prepares us for this next iteration of switching migration.

In the first iteration of switch migration, from mechanical to first generation digital switching, consolidation taking place at the hardware level was very evident; many racks of equipment within a central office were able to be consolidated and floor space was gained, even though digital switching still maintained dedicated line bays with individual line cards. Further generations of digital switching allowed even more consolidation as line bays were replaced by digital loop carrier equipment.

The next evolution of switching migration moved from several evolutions of digital switching to first generation softswitching. These transitions were a little more complicated as numerous switch features had to be accounted for in the transition.

Fast forward to today, the next evolution of switch transition is taking separate sites with multiple switches (potentially of different technologies and platforms) and consolidating them down into one or more locations, either within a single service provider or among multiple providers. The result is a switch network where the intelligence resides in a centralized, consolidated switch, feeding multiple subscriber access gateways. In many ways, today's discussion of switch consolidation flows from a rich history of switching transition.

Beginning the Exploration

Assuming the regulatory and financial factors support the need to evaluate consolidation, before the technical and operational issues regarding switch consolidation can be tackled; there first must be a serious examination of some important questions for any provider(s) interested in consolidation. Among these questions, Finley Engineering has found several crucial points that should be addressed at the very beginning. They include:

1. Who do you consolidate with?

Seems like a simple question, but it's sometimes harder to answer than one may think. Switch consolidation can occur within a single company, and we'll discuss more on that later. But a multiple operating company (at least two) scenario can deliver significant efficiencies and cost savings. The conversation has to start somewhere and with someone. Operating companies in close proximity with each other make sense, but that factor alone doesn't ensure compatibility. There are many details to be worked out, operationally and politically, between potential consolidation partners. Determining who to partner with and how is an important first step in the process. Secondly, there may already be an available consolidation provider, negating the need to create a new consolidation partnership.

2. Where do you put the consolidated switch?

Following closely behind the first question is an imperative number two – where do you physically locate the consolidated switch. There are key factors to weigh here beyond just the typical business partner discussion, including access to local and regional transport facilities for the consolidated switch and the costs they require.

3. How many times do you want to consolidate?

One pitfall to avoid is going down the consolidation path, only to find out that your consolidation effort was inadequate, and additional consolidation is necessary. In other words, you need to ensure that the end consolidated switch is large enough to gain the levels of efficiency required to make the effort worth it. You want to get this right the first time. Consult with qualified professional engineers to ensure your consolidation effort makes sense.

Types of Consolidation

There are two main forms of switch consolidation – consolidating switching functions within a single company and across multiple companies. While consolidation in both cases tends to follow a similar process, the addition of multiple providers changes the game.

Within a Single Company

Consolidating the switching function within a single company is a more simplified approach than across multiple companies, although it could also include bringing the equivalent of multiple

companies together because of merger and acquisition activity. Many single companies operate multiple exchanges, which in some cases utilize separate switches within those exchanges.

Single company consolidation can include different switching platforms, but you may get lucky and have an opportunity to consolidate multiple switches from the same platform. Regardless, the goal is the reduction of multiple switching sites/centers into the same single platform and establishing a common method for switching company-wide.

Depending on the individual circumstance, new additional hardware may not be necessary in a single company consolidation if you already have a current second generation soft switch.

While consolidation with an individual company may be slightly more straightforward with the ability of management to set and encourage unified goals, it is very likely a single company merger may still experience many of the technical issues discussed in the following multiple company discussion.

Across Multiple Companies

As multiple companies explore switch consolidation, the complexity can multiply. Different companies may be using different platforms and have diverse processes that impact the consolidation effort. This added complexity requires a comprehensive evaluation of the project and its outcomes to ensure the costs associated with addressing these complexities do not outweigh the benefits achieved through consolidation.

There are a number of unique circumstances that may need to be addressed in a multiple company consolidation. Some of the more critical factors include:

- **Root Provisioning Permissions** – the addition and subtraction of subscriber gateways and call routing changes are good examples of why this will need to be addressed.
- **CPNI Compliance** – the inclusion of multiple switches may reveal CPNI data.
- **Updated CALEA Practices** – how will you manage CALEA and who will be responsible for compliance.
- **Tandem Rehome Requirements** – at least one if not more will be rehoming a tandem, which adds a level of complexity.
- **AMA Records for Billing** – AMA files and streams may require third party management because consolidation of back office systems may not be practical.

The coordination and planning involved with a multi-company consolidation should not be underestimated.

Regardless of type of consolidation, there are always key considerations to recognize. Planning and preparation are essential to ensure a proper timeline is established and adhered to. Some key preparation considerations include:

Documentation

Before beginning any consolidation project, proper documentation must be present. This documentation should thoroughly outline how calls are currently being routed. If best practices for call routing are not currently being adhered to, they should be evaluated to determine if they need to be brought up to today's standards and documented prior to the consolidation effort. Feature codes will also need to be documented and special attention should be paid to any non-standard feature codes that are in use.

Services Matrix

A services matrix should be established, and should outline and define all service types offered on the legacy switching platform(s). Equivalents for all service types for the new consolidated platform will have to be created.

Trunking

Special attention to all trunking methods and processes will be needed. All parties will need to verify and document their ASR call types. Additionally, signaling formats and requirements (DS-1 Format, SS-7 Requirements, SIP Signaling type, etc.) will need to be documented. Be sure to ask the following questions:

- Are point codes allowed in STP and SCP?
- Is there transiting traffic?

Underlying Support Network

The condition of the underlying support network is critical as you consider transitioning from one office to the next. A solid and secure data network will be essential for the project.

Proper preparation will help ensure an orderly timeline, to a degree. Companies should plan for the timeline to take longer than expected; it always does. There are simply too many parties involved in the project which means there are factors you may not have control over. Examples include staff vacations, regulatory filings and approvals, LERG updates, interactions with Inter-Exchange Carriers, supporting network upgrades, system testing, etc. Important points for timeline accuracy include:

- Will you be required to re-arrange meet points with Carriers, PSAP(s), or Tandem(s)?
 - Is LERG notice required? Minimum notice is typically 180 days.
- Staged migration or flash cut – what gets moved over first, subscribers or trunking?
- Number of advanced services and features offered today – these are difficult to move, even within a single platform.
- Ability to commit staffing to maintenance window work.
- Time of year – holidays and end of year can be problematic.

Key Lessons Learned

Finley Engineering has managed several switch consolidation projects and they have documented some essential lessons learned as a result. Understanding the implications of these key considerations can help companies achieve a more successful switch consolidation project, meeting expectations and within budget. There are numerous factors to consider, but we've found the impact of the data network; call completion implications; and feature integration and operations, to be critical.

Data Network Implications

Traditional data networks supporting a single company include elements like session border controllers, firewalls, and core routers which are used to create a walled garden, protecting the core switching network. In a single company consolidation, you must still pay attention to details, but extending this data network to support the consolidated switch can be more clear-cut. A phased and controlled effort can be used to migrate the data network integration with the new single company consolidated switch.

For multiple company consolidations, the complexity can increase significantly. Different companies have different ways of doing things and use different data network topologies and platforms. Multiple devices and network elements in different locations throughout the network need to be talking with each other, yet still prevent an issue in one network from impacting another network.

Extending data network integration from multiple companies into a consolidated switch, all while maintaining security and functionality, from one walled garden to another, can be extremely complex.

Achieving this through Layer 2 protocols can be very problematic. Multiple media gateways and call agents across multiple switches can create significant challenges through Layer 2 protocols alone. Finley Engineering has found using Layer 3 routing functions is a preferred method, setting up separate VLANs for the different types of signaling. This requires a great deal of advanced planning and preparation.

Call Completion Challenges

Unfortunately, many operating companies are quite familiar with the rural call completion problem that has plagued the rural industry for several years. Poor call quality and in many cases, non-existent termination of calls into many rural markets dates back to 2010. Strides have been made to address this issue with some encouraging, although not comprehensive, results. IXC call routing tables have been adjusted, often times blocking least cost routers (LCRs) who were causing some of these quality problems.

A switch consolidation project that also includes a Tandem Re-home or point code change may bring these call completion issues back. With new routes to destinations, the Tandem re-home or point code change may upset the strides made with IXC carriers and their LCR partners to address call completion issues. Operators will need to anticipate this and pay very close attention to call completion issues that will re-appear in the first days after the Tandem Re-home, to the extent they can.

Feature Integration and Operations

When switch consolidation involves multiple companies, different switch translations may be present. This affects feature integration and operation. For example, different access numbers are probably used for voicemail. Most switches allow for only one digit strings for feature activation, but these digits may be different across different companies.

This will require some standardization and possibly customer education and notification. There will certainly be feature changes and this can cause end customer disruption and pain.



Dean Mischke, P.E.
Vice President, WI
715-930-7255

About the Author

With more than 17 years of experience at Finley Engineering, Dean Mischke brings extensive knowledge and expertise to the Wisconsin Division. As a Vice President, Dean is responsible for the day-to-day operations of the entire department, overseeing and managing advanced communications networks, including PE plan approvals. Starting in the Air Force, Mischke worked as a flight simulator technician, where he trained in electronics and as an instructor for pilot and navigational students. He then attended California State University receiving a Bachelor's of Science in Electronics and Electrical Engineering.

He started with Finley in 1990 as a staff engineer and after receiving his Professional Engineering License in 1994, has worked his way to Vice President. Over the years, Mischke's main focus has been designing and building advanced communications networks capable of cost effectively meeting the demands of tomorrow's consumer.

Conclusion

Several factors are coming into play, including the transition to IP networks, which make switch consolidation a potentially attractive strategy for telecom carriers. Momentum is building as carriers look to build efficiencies, lower costs, and improve profitability.

While switch consolidation may look attractive in theory, it is a complicated project with many moving parts. The benefits can be substantial, but proper planning, preparation, and execution are required to ensure the benefits outweigh the risks. There are also regulatory implications that need to be fully understood.

Finley Engineering has developed extensive experience in the technical and operational aspects of successful switch consolidation, both within single companies and with multiple companies. The technology and market drivers make switch consolidation attractive. Let Finley Engineering help you evaluate the opportunity and execute a well-planned consolidation project.