White Paper

Rethinking Solution Management & Fulfillment for Complex Enterprise IP Services

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I. Executive Summary

A rapid evolution in enterprise requirements for Internet Protocol (IP)-based services is being accompanied by a shift in the way these services are delivered and managed. Enterprises are getting more comfortable with relying on communications service providers (CSPs) to manage their networking and communication services instead of leveraging their in-house IT organizations for their communications needs. However, a major challenge involves bridging increasingly sophisticated enterprise requirements with a CSP’s ability to quickly and accurately deliver advanced custom services.

The importance of accurate and error-free designs is best illustrated by industry research which shows that on average, 30 to 40 percent of IP Multiprotocol Label Switching (MPLS) orders cannot be deployed as sold. The costs incurred when errors are introduced can add up quickly and can negatively impact a CSP’s bottom line. This white paper will explain in detail how a CSP with 1 million orders per year can experience $18.8 million in annual costs resulting from design errors. Such costly errors can continue to mount for CSPs unable to efficiently design, redesign, sell and implement custom solutions within shorter timeframes.

Operational excellence has become a critical success factor for CSPs. Achieving greater efficiencies in the processes that link service design with provisioning has become essential to achieving quality and performance in service development and deployment. As a result, a fresh approach that utilizes greater levels of automation and integration is needed to manage this increased complexity and improve the fulfillment process as a whole, as part of a complete solution management process.

In order to remain competitive, today’s CSP customer-facing organizations must rethink solution management and the underlying fulfillment processes for complex enterprise services. Highly iterative and phased-approach proposals may cater to customer needs and provide more options, but they also create the potential for more errors. To produce on-target proposals, customer-facing organizations must become more efficient in understanding customer requirements and developing fully implementable solutions.

By applying automation to the requirements-to-order process, CSPs can easily achieve higher accuracy in solution design while dramatically accelerating the entire sales cycle. In Heavy Reading’s opinion, within the context of enterprise IP service provisioning, the process of design should be much better integrated with the service provisioning process. We believe it is time for a new breed of solution to evolve that can efficiently bridge the gaps between pre-sales and the service delivery/fulfillment domains.

This white paper discusses the key issues that are involved in today’s rapidly evolving enterprise IP marketplace, including:

- New and existing market growth drivers
- Increased complexity in solution design and fulfillment
- Solutions for CSPs to efficiently manage design, delivery and maintenance of advanced services
II. IP Services Market Drivers

2.1 Drivers of Growth in the Enterprise IP Market

IP-based services offer tremendous benefits and opportunities for both CSPs and their customers because the same transport and technology elements can be used to provide enterprises with voice, video and data over a common network infrastructure. This translates into improved features and better economics. As the appetite for bandwidth-intensive services has grown, IP’s ability to deliver cost-effective solutions has found favor with enterprises. Heavy Reading believes that as CSPs continue to close the quality gap between conventional data and emerging IP-based services, IP’s evolution in the enterprise data market will continue to grow at a steady pace.

Higher quality and less expensive networking solutions have driven significant growth in the demand for MPLS, which in turn is requiring CSPs to invest in and optimize their IP Virtual Private Network (VPN) and IP MPLS capabilities. The biggest advantages of IP MPLS stem from the fact that CSPs can cost-effectively use the technology to provide enterprises with voice, video and data over a common network. Most enterprises today are looking for flexibility of service provisioning, wide geographic availability, and the ability to segment operating units, services and applications within a secure, single network. Such enterprises are motivated to take advantage of the benefits of their core MPLS networks, which are far more advanced relative to their data and private line services.

The proliferation of cloud services represents a new force in the IP era that has sparked innovation and creativity in the IT world. New on-demand computing models are at the heart of every cloud participant in the IT ecosystem, ranging from IT veterans such as Oracle, HP, IBM and SAP; through network-centric CSPs such as AT&T, Verizon Business and Savvis; to a new breed of web application providers such as salesforce.com, Amazon Web Services and Google. This multi-billion-dollar market is stimulating providers to chart their game plans with great enthusiasm.

For large enterprises, performance remains the biggest concern for running specific applications in a virtual environment, followed by stability, security and manageability. CSPs that are aiming to run IT operations in the cloud for enterprises must convince their customers about the stability, flexibility and manageability of their cloud infrastructure. CSPs must also position their professional services expertise with the promise of delivering greater value and improving control over the delivery of information systems and services.

In an effort to diversify their revenue streams, CSPs are adopting a consultative and advisory approach, with the objective of bringing efficiencies to their enterprise customers. This consultative approach, with a combination of their partner technologies, is tailored to meet objectives for return on investment (ROI) and total cost of ownership (TCO) metrics across their diverse customer base.
Echoing traditional outsourcing models, CSPs are becoming prime contractors, trusted to provide operational integration – and often selection – of various vendors. Key functions include overseeing service delivery, data storage, unified communications (UC) services, federation activities, orchestration, security, governance, billing and settlement.

CSPs such as BT, AT&T, Verizon, NTT and others are positioning themselves as managed service providers for the enterprise. BT’s Engage IT initiative, Verizon’s CAAS initiative, and Orange Business Services are all examples of a solutions-oriented approach to meeting the demands of enterprise customers. CSPs are now providing consulting and planning services that in the past were handled by in-house enterprise IT teams.

CSPs have also realized customer’s adoption of cloud architectures provides major opportunities. As a result, CSPs have carved out a leading role for themselves as trusted partners. Ongoing service outages and disruptions from Amazon Web Services, Google and others illustrate how many alternate cloud services are not yet up to par. Today, CSPs are in a superior position to capitalize on cloud services. Because CSPs own the network, they can provide enterprises with security, scalability, guaranteed quality of service (QoS) and service management capabilities while providing sophisticated management portals to monitor service performance.

With their significant enterprise and public sector customer base, CSPs have already had to certify their skills in data security, business processes and governance practices through external audits. That is why CSPs such as BT, Deutsche Telekom, NTT, Orange Business Services and SingTel are leading candidates to become trusted cloud intermediaries. Being a cloud intermediary means being able to facilitate, mediate and manage delivery of cloud service components, including hot-swapping between cloud providers based on business rules for cost and performance. As trusted intermediaries, these CSPs will not only market their own cloud services, but also provide converged management of private and third-party services.

2.2 Drivers of Greater Complexity in Service Design & Fulfillment

Fulfillment has traditionally encompassed the concepts of order management, service activation, network inventory and configuration management, without sufficient emphasis given to the design process. One reason for the lack of emphasis on design is fulfillment’s traditional focus on consumer and less on enterprise services, which were previously much less complicated. In today’s new world of enterprise IP-based services, customers have become much more demanding and are asking for more complex and customized solutions. The traditional borders of service fulfillment are being challenged, and an evolution of service fulfillment is being demanded today.
Figure 1 illustrates the process flow for the introduction of complex enterprise IP-based services, where the solution design and development tasks take maximum time in the context of service design and deployment.

![Figure 1: Process Flow for Complex Enterprise IP Services](image)

Challenges in service fulfillment include:

- Increased number of departmental involvement
- Complex product and services lifecycle management
- Inaccurate design process
- Disparate product and service catalogs
- Non-collaborative, manual approach to product management and service fulfillment
- Lack of real-time synchronization of the network database view and network resources for the fulfillment of solutions

Customers are no longer satisfied with cookie-cutter legacy services that rely on a one-size-fits-all approach. Though IP MPLS provides tremendous economies of scale and has the potential to provide a wide variety of services on a common IP layer, the design, delivery and maintenance of those services has become more complex and time-consuming. This evolution has resulted in the urgent need for a new category of software solution designed to address this “white space” in the context of enterprise IP service fulfillment.

Pushed by competitive pressures and market demands for efficient services, enterprises across a wide array of vertical industries are pursuing the use of third parties to provide information and communications technology (ICT) services. By outsourcing the planning and operations of communication networks and service delivery, enterprises in mature, competitive industries are streamlining business processes, which allows for the more agile execution of core operations. This trend provides an important opportunity for CSPs that can fulfill an enterprise’s IP needs with a competitive managed services option.
The managed services provided by CSPs include equipment management, planning, design and implementation of LAN networks, equipment reselling, day-to-day IT support and other services. CSPs are now steering away from taking the one-size-fits-all approach, as they know it limits the true business value and efficiencies they can deliver to their enterprise customers.

As enterprise IP-based services have grown more complex, a gap has developed between what enterprises are demanding and what CSPs can efficiently provide. This gap will continue to widen as long as CSPs are unable to efficiently design, redesign, sell and implement custom solutions within shorter timeframes.

Standards bodies such as TM Forum and others, vendors, CSPs and industry stakeholders all need to recognize the existence of an unaddressed “white space” in the solution management fulfillment process and take steps to define, name and create subcomponents to formally circumscribe this critical space. This pivotal, albeit undefined area focuses attention on network discovery and managing the end-to-end lifecycle of the solutions design process.

Addressing these issues will deliver significant benefits to the enterprise IP-based service fulfillment process. It will aid in the discovery of network resources, automate the iterative design process, help pre-sales to generate faster, accurate, winning bids, and increase the quality of the overall fulfillment process by minimizing order failures rates that result from inaccurate design processes.

The TM Forum Application Framework (TAM) categorizes Design as part of Solutions Management, which is under the broader category of Marketing/Sales Management. There is no doubt design plays a critical role in the pre-sales process for CSPs. CSPs are bidding for enterprise managed services deals by deriving precise cost calculations and generating accurate and competitive quotes for proposals.

Solution Management’s design function is focused on defining solutions to translate customer requirements into products and services, including a detailed description of the quantity of products and services at each location. The pre-deployment design stage must produce accurate and focused designs based on customer requirements, in order to streamline the fulfillment process.

A best practice would be for the fulfillment team to supply feedback to the designed system, providing information about what is implemented so that the designed system can maintain the as-built information for future reference and for growth of the network and additional services. In reality, this feedback typically does not happen, which results in another major gap between what has been designed and what has actually been built. The effect over time is a significant increase in operating expenses (opex) for CSPs as a result of provisioning errors or order failures.
III. Designing & Delivering Advanced Services

CSPs are becoming more responsible for end-to-end design and provisioning processes as fewer in-house IT organizations can afford the resources and skills required to support advanced services. Simultaneously supporting game-changing technologies such as unified communications, telepresence, web conferencing, advanced mobility and others is a challenge. Compounding the problem for most enterprise IT organizations is the need to operate with smaller budgets.

In the legacy environment, enterprise IT organizations would purchase software components and were responsible for their deployment and operation. Now, because enterprises are operating on reduced budgets and service requirements are becoming more complex, there is a significant trend of enterprises opting for a managed services approach. Enterprises are becoming dependent on CSPs to design, deliver and manage those services, which represents a dramatic shift from designing and managing these services in-house.

Implementing an efficient, accurate and automated requirements-to-order process is at the heart of addressing complex IP-based services. Because enterprises want tailored solutions, it should be no surprise that a dynamic and deployable design that meets the needs of the customer becomes a critical aspect of the sales process.

CSPs bidding on managed services projects have little choice but to use automated processes to develop a competitive bid that is based on real-time network and resource information. In today’s solutions-oriented approach, the entire design process involves multiple iterations, spread across various phases.

Figure 2 illustrates the key differences between yesterday’s cookie-cutter legacy approach and today’s solutions-based approach.

<table>
<thead>
<tr>
<th>Time</th>
<th>Legacy/PRODUCT APPROACH</th>
<th>Solutions-BASED APPROACH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cookie-cutter approach with limited flexibility to meet custom requirements; short sales cycles with little to no sales engineering</td>
<td>Tailored to customer requirements; requires longer lead time to design &amp; implement</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engagement Model</th>
<th>Legacy/PRODUCT APPROACH</th>
<th>Solutions-BASED APPROACH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increasingly commoditized bandwidth &amp; services with price as a differentiator; simple with straightforward activation</td>
<td>Trusted advisor relationship with premium value placed on expertise; complex with project-based delivery</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
<th>Legacy/PRODUCT APPROACH</th>
<th>Solutions-BASED APPROACH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sold “as is” or with pre-packaged selected options; limited ability to enhance/evolve services based on needs; predefined fulfillment processes</td>
<td>Requires design to address requirements &amp; leverage best practices; implies the ability to adapt to changing needs: new services, new locations etc.; unique implementation for each customer</td>
</tr>
</tbody>
</table>
The design process evolves as the customer's business priorities change, making it practically impossible for manual design processes to keep up with evolving requirements. Errors also plague manual design processes, as there is no mechanism for design rules enforcement and system-level validation. Other shortfalls associated with today’s commonly used manual design processes using disparate tools include:

- Tedious and time-consuming approach to producing a solution for a large enterprise.
- Multiple iterations make adjustments difficult, and in most cases results in a redo of a significant portion of the design, or even the entire design.
- No formal, automated way of communicating among participants and stakeholders inhibits collaboration across departments and experts.
- Impossible to effectively enforce best practices or repeat successes.
- Every designer must have a high level of expertise because he or she has to craft every design in the absence of an automated knowledge base.
- Accurate pricing becomes very difficult to achieve.
- Providing a scalable design is more difficult to achieve.
- Design complexity can reach such a high level that a deployable solution is simply not possible using manual processes and disparate tools.
- Collaboration across various teams and across suppliers/delivery partners is not effective when relying on email and static documents.
- Any changes can introduce errors across the various documents, which can easily ripple through a proposal, leading to invalid solutions.

For managed service projects, efficient and accurate requirements-to-order mechanisms typically play a critical role. Enterprise or wholesale network bid responses have short response time frames, and often CSPs must provide detailed cost plans for proposed networks, which can include various network design and customer service fulfillment options. As a result, CSPs must be accurate, fast and agile in their design, costing and bid-generation process to compete and win against more nimble competitors. Additionally, proposals must be professionally presented and exhibit a level of quality that inspires confidence in the customer. Without automated processes to generate these proposals, the effort is labor-intensive, time-consuming and does not allow for efficient reuse of past designs as a starting point for new customer solutions.

For CSPs, an efficient bid design process relies upon a combination of lower-cost yet accurate design processes, efficient use of existing network capacities, and the ability to present the customer with a greater level of detail in a shorter time frame, and with a high degree of accuracy. CSPs that can efficiently link the iterative design process to the provisioning process will clearly be able to meet their customers’ demands more efficiently. Therefore, adoption of end-to-end automation in service design and provisioning is central to the success of CSPs aiming to increase their profitability in enterprise IP-based solutions.
It is also vital for CSPs to model various forecast scenarios and predict congestion points based on historical network performance data. Therefore, an efficient design solutions must transcend business and IT boundaries by providing the needed support to financial, IT and network departments responsible for build cost and asset utilization.

In an era where CSPs are looking to serve enterprises more efficiently and become their trusted managed service partners, the task of automating end-to-end processes is increasingly important. Being able to turn customer requirements into accurate designs in a timely manner helps CSPs to increase their sales productivity and decreases overall requirements-to-order time.

Achieving greater efficiencies in the processes that link service design with provisioning has become essential to achieving quality and performance in service development and deployment. This provides an opportunity for CSPs to take costs out of the enterprise by providing and managing IT and IP networks for the enterprises via an outsourced model.

The use of automated processes, reusable templates and advisor-based designs enable CSPs to rapidly respond to customer changes involving variables such as the number of locations to be addressed, the number of users to be supported and other factors. Customers also often want to use a phased approach when implementing services, so future requirements must be considered in the current design. To efficiently meet such needs, customer-facing teams involved in defining requirements, developing designs and generating proposals all need to collaborate seamlessly. The only solution to this challenge is automation, since the cost of relying on manual processes – or on non-integrated, standalone tools – can be high.

**Figure 3** highlights the key benefits and business objectives that are delivered through an efficient and streamlined design process.

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**Figure 3: Role of Design in Enterprise Service Fulfillment**
For example, industry research has shown that an average of 30 to 40 percent of IP MPLS orders cannot be deployed as sold. And typically, those order failures lead to spiraling support costs. The following example illustrates the costs that can be incurred when errors are introduced into the requirements-to-design-to-quote process:

- Order fallout requiring engineer time: Approximately $45 to $50 per incident
- Truck rolls as a result of incomplete provisioning: Approximately $150 per incident
- Ongoing support resulting in customer calls: Approximately $12 per incident

For 1 million orders per year, with an approximate estimate of a 40 percent order fallout rate:

- Average fallout rate that results in engineer intervention is estimated about 40 percent of the time – $50 x 160,000 = $8 million
- 10 percent provisioning errors will lead to truck rolls – $150 x 40,000 = $6 million
- 40 percent of customers have ongoing minor problems – $12 x 400,000 = $4.8 million

To achieve error-free provisioning of the network, which includes ordering the correct inventory and ensuring accurate service qualification, the solution design process should play a critical role in bridging the communications gap between the pre-deployment/pre-sales team and the fulfillment team. The example above shows how design plays a pivotal role in the process and should be considered an integral part of the IP service fulfillment category. Some of the reasons for Heavy Reading’s thinking are as follows:

**Flexible and accurate design is a key differentiator:** For simple consumer services, requirements-to-order and order-to-cash processes follow a simple linear path, which is not the case when it comes to enterprise IP-based services. For customized enterprise services, the design process becomes highly iterative and complex, which introduces the potential for configuration errors. This is because enterprise business requirements constantly change. For example, budget limitations are imposed and eligibility rules get incorporated, which results in a constantly evolving design process. In order for CSPs to successfully bid for enterprise business, they need a flexible design solution that can help them through the entire process and reduce the possibility for design errors. It should allow them to quickly design a solution based on enterprise requirements, discuss design details with the customer, incorporate rules, make requested changes, validate configurations at every step, and move the design to the customer for approval.

**Knowledge-as-a-service for validation:** Designed solutions should be able to incorporate changes and match customer requests with a rules database or knowledge base to instantly validate whether customer requests can be provisioned or not. The knowledge base is a critical component of any design solution, and it needs to include solution, topology, equipment manufacturer’s
specifications, and CSP provisioning and availability rules. A good knowledge base helps to enforce design rules, validates designs and helps to guide design processes by enabling best practices for network deployment – all based on a past best-practice repository. To exploit its full potential, the knowledge base needs to be kept up-to-date with the latest rules, product catalog, price list, device configuration information and other variables.

A well maintained knowledge base can become the cornerstone of any design solution, and will typically consist of critical design rules, including:

- **Solution-level rules**: Includes capacity and optimization rules, security rules, rules for application awareness and power consumption rules.
- **Topology (e.g., VLAN, IP) rules**: Includes connectivity matrix (full mesh, hub-spoke, others), VRF/Multi-VRF rules and rules for redundancy.
- **CSP-defined rules**: Includes provisioning rules, network resource or inventory availability rules and eligibility rules.
- **Equipment manufacturer design rules**: Includes relationship, connectivity and engineering rules.
- **Implementation rules**: Includes install times, deployment time frames and costs.

Prior to the design process, a collaborative project management process is required where various activities can be coordinated with suppliers and internal stakeholders. This includes scoping the implementation strategy based on the accepted design. Today, implementation is typically done via a phased approach, and only after its acceptance will the provisioning of enterprise-specific services be performed.

In the context of enterprise IP-based services, where CSPs are looking for an approach to serve their enterprise customers with advanced services, the task of design brings about congruence between the pre-deployment and fulfillment stages. For complex, customized enterprise services, the process of accurate, iterative design helps shorten requirements-to-order time, resulting in increased productivity and minimizing provisioning rejection.
IV. Vendor Analysis: Netformx

In the context of enterprise IP-based services, there is a critical need for automating pre-sales processes and for bridging the gap between pre-sales gathering requirements to design solutions and the ensuing orders that drive fulfillment processes. It is time to bring about convergence between these seemingly disparate activities and stakeholders by automating end-to-end processes and creating provisioning plans that feed into fulfillment systems. To meet this challenge, we believe the market demands a new category of solution to evolve and address the “white space” that has been discussed in this paper.

Playing a revolutionizing role in effectively addressing this area is a company called Netformx. Its solution sets not only enable end-to-end automation, but also help to bridge the gap between the pre-deployment and fulfillment stages. Netformx offers the following:

- **Netformx DesignXpert**: An integrated desktop platform for discovery, design, quoting and proposing network and communications solutions. DesignXpert transforms the process of network design into an efficient, collaborative process that results in a comprehensive and accurate enterprise network design blueprint.

- **Netformx Discovery**: An SNMP/SSH/Telnet-based audit and multi-vendor network discovery feature of DesignXpert that enables design professionals to capture an accurate baseline of existing IP and SNMP-enabled devices in any network.

- **MPLS Designer**: A solution that streamlines and validates the process of converting MPLS requirements into designs and proposals that can then be provisioned and implemented successfully.

- **SalesXpert**: An online, guided solution used to quickly design, quote and propose IP-based solutions, specially designed for network sales professionals.

- **DesignCentral**: A centralized, structured and automated opportunity-to-management platform that helps to connect people, information and processes, thereby reducing the inherent risk associated with complex network designs.

- **Netformx KnowledgeBase**: A rules-based, comprehensive, multi-vendor database of more than 338,000 devices and more than 2 million design rules for configuration and error correction that includes specifications from major network equipment vendors such as Cisco, HP, Avaya, Juniper and many others.

As enterprise IP-based service requirements become more complex, CSPs must to be able to provide custom solutions for their customers with much greater efficiency and speed. Solutions from Netformx play a pivotal role in this context by automating end-to-end processes and by acting as a bridge to connect the design to the fulfillment process.
V. Conclusion

In our opinion, in the context of enterprise IP service provisioning, the process of design should be considered central to the service provisioning process. It transcends the sales management realm and brings about congruence between the customer-facing domain and the service fulfillment domain. CSPs looking at revamping or investing in service fulfillment systems for enterprise IP-based services need to consider a design platform as an integral part of their service fulfillment stack. Applying automation to the requirements-to-order process brings significant benefits and quality improvements to CSPs. It provides a seamless bridge between the pre-deployment sales process and the service fulfillment stage and helps streamline the ensuing order-to-cash process. This new paradigm introduces significant benefits to solution management and the underlying service fulfillment processes, including:

**Improved sales productivity:** The new paradigm helps to integrate, automate and simplify processes for sales support and sales teams. It helps create a collaborative approach and allows CSPs to quickly respond to customer changes and requests for customized, non-standard solutions. It allows CSPs to adopt a more consultative approach to serve enterprise customers and increase design accuracy. Automation and integration accelerate the sales cycle and allow the sales team to spend more time on real design issues. The time required to respond to customer requests is also shortened, because pre-sales processes are standardized. A shorter sales cycle also allows faster deployment of larger, more complex solutions, and allows designed solutions to be better positioned for successful provisioning the first time and also for add-on services.

**Shorter requirements-to-order cycle:** With an automated approach to design, CSPs can eliminate manual processes and significantly accelerate requirements-to-order response times. Further, the same number of resources can achieve more results. Manual and non-integrated tools typically used by CSPs to support sales require labor-intensive intervention and increase quoting time significantly because they do not support internal and external collaboration and cannot handle iterative processes efficiently. The new paradigm will help in design accuracy, thus saving quoting time and enhancing productivity and collaboration among different departments. It will also significantly reduce requirements-to-order time and enable CSPs to produce more bids in less time.

**Efficient and nearly error-free provisioning:** A lack of accurate data with regard to subscribers, services and resources results in a high level of order fallout because CSPs are unable to create complete and accurate orders. Common problems that result include the inability of CSPs to decompose orders and provide orchestration plans for complex IP-based service bundles. Also, there is a lack of end-to-end visibility in the order delivery process. The new paradigm will help in providing accurate designs, which will eliminate provisioning rejection issues and provide a key bridge between the needs of enterprise customers and CSP offerings.
Lowering the cost of support: In today's competitive enterprise IP market, it is crucial for CSPs to create tighter synergies among sales, order management and service fulfillment processes. This will help to better serve customers, reduce provisioning errors and improve service delivery. It will also result in the customer making fewer calls to help centers, which can translate into significant savings. The design process is dynamic in nature and not a one-time activity, because redesigns and change requests happen throughout the project lifecycle. Maintaining an up-to-date blueprint of the network from the provisioning system to the design is essential, because it significantly contributes to the lowering of support requirements. Research shows that on average 40 percent of calls to call centers result from provisioning errors, significantly increasing opex for CSPs. Lowering the volume of call center calls is an important business objective for most CSPs, and an accurate design process will play a vital role in helping CSPs achieve their objectives.

In summary, in the context of enterprise IP-based services, it is time to bring about a convergence among seemingly disparate activities and stakeholders by automating end-to-end processes and creating provisioning plans that feed into fulfillment systems. To meet this challenge, the marketplace requires a solution set that not only enables end-to-end automation, but also helps to bridge the gap between the pre-deployment and fulfillment stages.