

**Report for HP**

## Toward a services-oriented factory super-suite

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Dr. Mark H Mortensen and John Abraham

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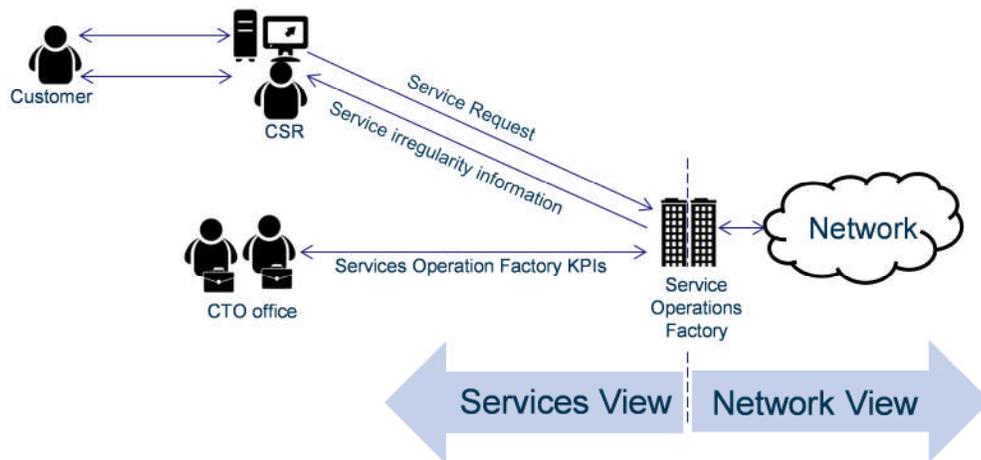
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# 1 Executive summary

When both speed of implementation and efficiency of operations are important, communications service providers have found that implementing large-footprint suites of operations support software systems from commercial vendors can be an effective approach. These suites have been growing larger and covering an increasing number of functions as software vendors have pre-integrated their systems. However, while such suites can save considerable time and cost, they still require a certain degree of integration and continuing support – depending on the number of different vendor products involved – and this can delay time to revenue.

The “super-suite” is an advanced version of the suite concept which combines multiple service element blocks within a single offering. One such super-suite comprises the functions of a Service Operations Factory, as depicted in Figure 1. It can provide all of the technical functions necessary for new customer onboarding and after-sales support, encapsulating all of the technical knowledge of the services and network, and providing to the outside world a simplified interface that takes a pure customer-oriented services view. A Service Operations Factory can be compared to modern industries which reuse production facilities for multiple products. For instance, an automotive assembly line creates multiple variants of an automobile – and even different types of automobiles – on the same production line, encapsulating into its operations all of the required complexity of design and implementation. The Service Operations Factory brings these industrialization concepts to the telecom market: it includes the traditional OSS functions of service fulfillment and service assurance, consulting and delivery expertise, all of which brings significant benefits in speed of implementation and operations quality and faster ROI.

Figure 1: The Service Operations Factory concept [Reference: Analysys Mason, 2013]



## 2 Recommendations

Communications service providers (CSPs) should consider implementing a super-suite that provides integrated operations support via a Service Operations Factory when they need to:

Simplify their OSS infrastructure by a transformation project that consolidates a large number of service assurance and service fulfillment systems. This is done to reduce support and maintenance costs and streamline and modernize operations.

or

Implement a new OSS stack for new infrastructure such as LTE, IMS, or OTT/VAS services. This is done to provide modern OSS support for the new infrastructure and then, usually, extend the support of these modern systems to other legacy areas.

To accomplish the shift to service operations factory, CSPs should:

- Consider pre-integrated suites of software that have as large a functional footprint as possible, in order to optimally manage costs, increase ROI, and decrease project risk
- Implement a standards-based information model for all OSS/BSS systems. The SID from the TM Forum in particular, has been well adopted and provides an industry-standard reference model which has been proven to reduce cost and complexity in systems integration
- Ensure the systems have advanced features for ensuring the quality of the network data.

In implementing these projects, CSPs should:

- Keep the number of vendors involved in the solution to a minimum.
- Carry out a pilot project to prove the super-suite's applicability to the CSP's operations staff.
- Phase the implementation of the project into multiple projects of three to six months that gradually increase the footprint of the super-suite.
- Choose vendors which can also provide the consulting and delivery services required to successfully deploy the product.

### 3 Trends in OSS services operations

The lack of growth in mature markets and low ARPU levels in emerging markets are squeezing margins, leading to a gradual convergence of costs and revenues and an evolution in the CSP-supplier relationship. The three key trends in OSS services are detailed below.

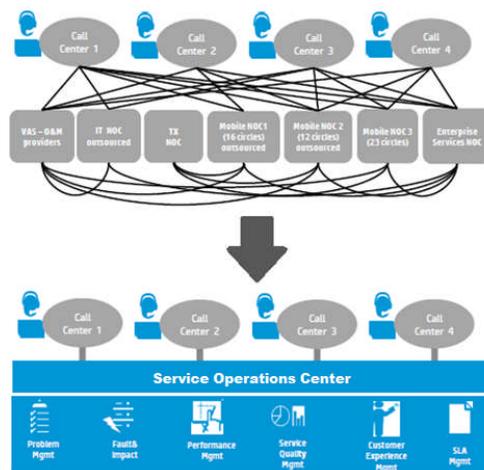
#### 3.1 Moving towards Service Operations Factory

The supply and demand relationship between CSPs and their customers is under pressure, as customers seek to reduce costs by cutting their telecom expenditure. Moving towards service-oriented operations is a step towards cost control while improving business KPIs.

With CSPs increasingly moving away from *best of breed* and towards *best of suite*, the integration challenges have been reduced. However integrating the new suite into existing systems can still be a costly exercise, and data extraction from the different OSS systems can be expensive. The Service Operations Factory, a super-suite containing both service assurance and service fulfillment, encapsulates the complexity of the services within the factory, exposing only the services characteristics to the world outside the factory. Implementing such a software solution greatly simplifies the interface to the BSS and other OSS systems

Leading-edge CSPs have begun implementing service operations centers (SOCs). These SOC are centers that consolidate all of the service operations taking a services view of operations instead of the traditional network equipment view. Thus, they provide a service-oriented layer over and above the OSS functions that is integrated into all the different systems, and provides a standard and consistent data output which is available to all departments from a single source. An SOC provides a dashboard view of a CSP's services, just as a network operations center (NOC) does for its network (see Figure 2).

Figure 2: The service operations center (SOC) concept [Reference: Analysys Mason and HP, 2013]



### 3.2 Customer onboarding: automatic service configuration is the new norm

The onboarding process for a customer used to be very complex and expensive: many new services needed special network equipment, hand-configured to provide the services that were needed in order to take into account differences in network equipment vendor implementation, local conditions, and available technology. But the replacement of much of the specialized network equipment by standard IT-, IP- and server-based technologies has simplified the job considerably. In addition, the abstraction layers of service and resource<sup>1</sup> has broken the tight link between a service and the implementation of the services in the network. This has allowed “higher-level” systems to deal with just the service characteristics, while a “service” may be implemented in many ways by a detail-oriented software system using the available “resources”.

### 3.3 Moving the focus from functionality to processes

Traditionally, all discussions of BSS/OSS systems revolved around *functions* and capability. Since different departments within CSPs required different functions, this led to a series of non-interoperable systems and practices within CSPs. Of late, standards and compliance have become a crucial part of OSS. The move towards *processes* as a key focus area has primarily arisen because the lack of appropriate standards has led to inflexible platforms which require custom integration and are therefore very expensive to maintain and upgrade. Process-oriented systems are much faster to implement and upgrade, have substantially less implementation risk, and reduce the time to revenue for CSPs.

## 4 The Service Operations Factory

There has been much discussion about how to take the customized, highly technical systems used by CSPs – systems that are often bespoke or highly customized – and turn them into more “industrialized” systems.

### 4.1 Concept of a Service Operations Factory

The Service Operations Factory brings the concept of a manufacturing assembly line into telecommunications, applying manufacturing techniques and principles to services development, implementation and support, in order to obtain the benefits of traditional manufacturing within the telecom sector. These features include:

- catalog-driven production cycles, enabling flexibility and customer-specific products
- supervision and control of the production cycle, and quality control when the products are in use (customer experience)
- rapid adaptation of the production environment to new product types
- continuous supervision of the key parameters of the production line.

With CSPs increasingly moving towards best of suite from best of breed, the integration challenges have been reduced. However integrating the new suite into existing systems can still be a costly exercise, and data extraction from the different OSS systems can be expensive. The Service Operations Factory takes the concept of suites even

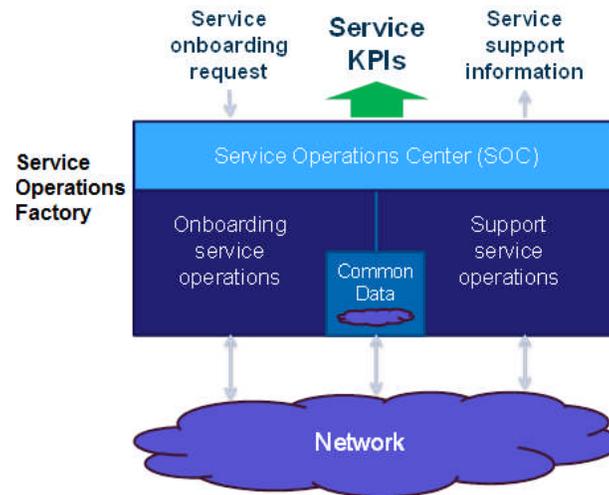
<sup>1</sup> At an even higher level of abstraction, a “product” includes bundles of services, with special characteristics of the bundles (such as discounts) for use by billing and CRM systems.

further by building in multiple suites within a single block which provides a standard and consistent output from a single source. It also standardizes and simplifies the interface between BSS and OSS, and exposes only the services' characteristics to the outside world.

## 4.2 Functions of a Service Operations Factory

A Service Operations Factory has two main inputs and outputs, as shown in Figure :

Figure 3: Functions of a Service Operations Factory [Reference: Analysys Mason, 2013]

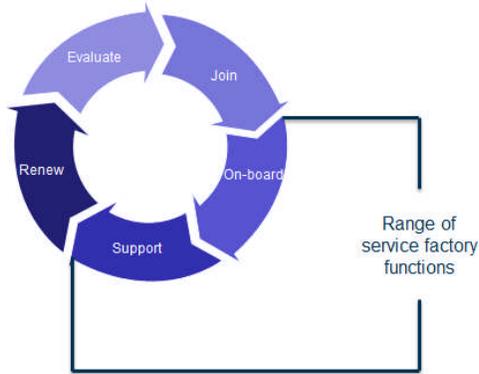


- **Onboarding service operations:** During the customer onboarding process for the service, the Service Operations Factory takes in requests for services and implements them, providing appropriate status and query information.
- **Support service operations:** During the services support process, it provides the customers and CSP operations personnel with information about the services.

*These interfaces are all at the service level, encapsulating all of the complexity of the services within the factory itself.*

Within the Service Operations Factory, the full complexity of the situation is known, including the particular equipment used, the configuration required to provide the service, the vendor(s) of the equipment, the relationship of customer-dedicated equipment to common equipment, and the relationship of this service to the other services. This allows the engineering staff and NOC personnel to continue to do their jobs of engineering, configuring and maintaining the network equipment, and ensuring proper service.

Figure 4: Functions of a Service Operations Factory and resulting benefits [Reference: Analysys Mason, 2013]



Customer lifecycle steps	Description	Benefits of the Service Operations Factory
Evaluate	Customer evaluates the options, often hopping across information and marketing channels. Makes a decision on products and services.	n/a
Join	Customer communicates desired product and services, operator creates account, verifies financial and identity information. The customer is now a "customer."	n/a
Onboard	The Operator implements the desired service, configuring its various systems and network equipment to provide the service.	Decreased time to deliver services reliably, improving customer loyalty and reducing cost
Support	Operator continues to monitor the network and the service, acting upon any irregularities. Customer may also report irregularities.	Better quality of service increases customer loyalty while improving cost control
Renew	Customer buys more of the same service, or adds additional services to their account.	n/a

### 4.3 Benefits of the Service Operations Factory concept

The services factory concept can offer substantial benefits to a CSP that adopts it, beyond the normal benefits of the systems themselves:

- **Better market alignment:** Telecom offerings and service bundles are becoming radically more complex across all areas of the industry. Having a pre-integrated super-suite enables complex bundle order details to be seamlessly carried down the stack.
- **Faster delivery:** Deployment of new OSS/BSS systems can impact the overall efficiency of operations. The comparatively quick deployment and reduced integration risk of a Service Operations Factory minimizes the impact on operations and ensures quicker ROI. The interfaces of the services operation factory to the rest of the world are simple and easier to integrate to.
- **Common models and accurate data:** Having a synchronized view of the network resources and configuration across service assurance and service fulfillment brings benefits for both the provisioning and the trouble-resolution processes.
- **Common process:** Setting up SA-SF stacks normally require an SI to be closely involved. Pairing these two stacks together saves cost while bringing greater accountability and better project management.
- **Monitoring by business KPIs:** Management outside of the factory can use business-level KPIs to ensure continued proper operation of the Services Operations Factory.

In Section 3 we discussed three key trends in OSS services: the move towards service-oriented operations, the prevalence of automatic service configuration for customer onboarding, and the shift of focus from functionality to processes. The following table shows the positive impact of these three trends on the four key elements of time, cost, risk, and customer service.

Figure 5: Level of benefit from a Service Operations Factory [Reference: Analysys Mason, 2013]

	Moving towards service oriented operations	Customer onboarding: automatic service configuration	Moving from functionality to processes
Impact on time	●○○○	●●○○	●○○○
Impact on cost	●●○○	●●○○	●●○○
Impact on risk	●●○○	●●○○	●●●○
Impact on customer service	●●●○	●●●○	●●○○

## 5 Evolution from best-in-class systems architectures to super-suites

In areas of potential business differentiation, it could be suggested that CSPs should develop their own software to provide operations functions. However, modern commercial off-the-shelf (COTS) software is available to provide these functions, and is so configurable that it can be adapted to meet the key requirements of a wide variety of CSPs. Differentiation can still be achieved, in the form of how features are employed and what kinds of service bundle are offered.<sup>2</sup>

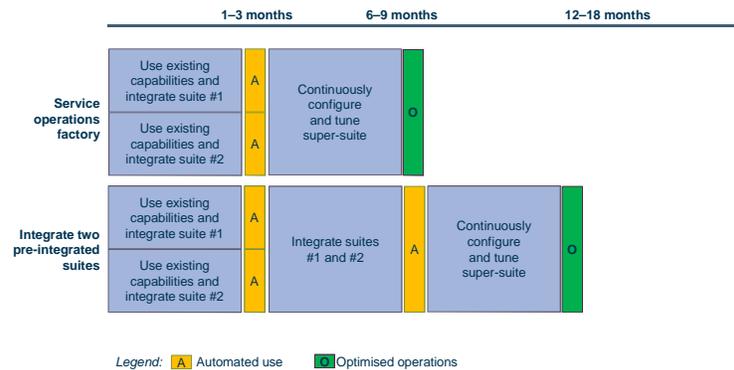
### From COTS to suites

In modern CSP operations, differentiation is based on how solutions are deployed and used, not on their proprietary uniqueness. COTS solutions are engineered to deliver a “build once, deliver many” model. Further reductions in cost and time have been realized by pre-integrating the COTS solutions into multi-system suites. The benefits of this model are well understood: such suites bypass the “integration tax” of time, money and risk, reducing initial implementation times from 18 months to three to six months, and overall costs by 15% to 35%.<sup>3</sup>

### Integrating suites together: super-suites

In some cases, the suites need to be closely integrated. For example, the systems that support customer onboarding and services support both need to have the same view of the network and services: they need to share a single picture of the network elements, their configuration, and the services that utilize the network. This integration takes time – especially when there are differences in the data models used, as is very commonly the case. Having the suites pre-integrated has similar benefits to the suites, as shown in Figure .

Figure 6: Typical implementation timelines of suites vs. Service Operations Factory [Reference: Analysys Mason, 2013]



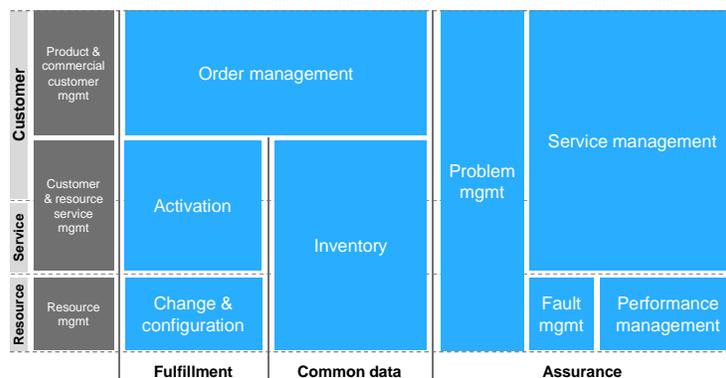
<sup>2</sup> Mortensen, M. H. and Heinzelmann, E., 'Adaptive COTS OSSs: Introduction and Technologies', *Annual Review of Communications*, December 2006.

<sup>3</sup> Mortensen, M.H "Build or buy: configurable COTS software changes the game "(Comment), Analysys Mason, March 2012. <http://www.analysismason.com/Research/Content/Comments/build-buy-configurable-Mar2012-RMA02-RMA05-RMA11/>

## 6 The HP CMS OSS portfolio – the first example of a Service Operations Factory

HP, long a provider of advanced service assurance software to CSPs worldwide, has recently expanded its portfolio using its own software and carefully selected third-party software. It has integrated its CMS OSS portfolio according to a blueprint in keeping with the concepts of the Service Operations Factory. The architecture is shown in Figure 7 and explained more fully below.

Figure 7: HP CMS OSS blueprint – a Service Operations Factory offering [Reference: HP, 2013]



The HP OSS blueprint implements a consistent use of ITIL processes within the overall TMF (TeleManagement Forum) Framework process to provide integrated fulfillment and assurance solutions in a single super-suite. On the service fulfillment side, the Change and Configuration Management solution provisions resources, and updates the resource inventory ready for service activation, while Customer and Service Order Management implements a zero-touch completion chain - from customer order to service activation. As a result, the inventory is updated with customer information, and also the customer service subscription.

On the service assurance side, Fault Management and Performance Management cover the IP network, IT systems and specific telecom network domains and functions. Problem Management implements automated intelligent incident creation and incident diagnostics. Service Management provides a consolidated view of services that allows CSPs to focus on delivering better services and customer experience. Root cause analysis and service impact analysis are provided in real time thanks to the tight alignment and integration of the fulfillment and assurance stacks.

### 6.1 The HP OSS Fulfillment stack

The HP OSS fulfillment software stack addresses CSPs' fulfillment processes for services to be delivered in volume. It covers the entire fulfillment process stack as defined by the TMF's enhanced telecom operations map (eTOM), including product catalog-based order management, activation of network and service infrastructure, and service and resource inventory management. The HP OSS fulfillment solution addresses four key functional areas:

- **Order Management:** The Order Management solutions from HP and its partner ConceptWave manage the full order lifecycle, including catalog management, order entry and negotiation, order management, and order analytics.
- **Activation:** HP Service Activator provides the complete framework required to deliver, modify, or retire a service, including adaptable workflows, network plug-ins, and robust management tools.
- **Inventory Management:** HP Trueview is the database of records for all of the physical and logical network assets and services. Data accuracy and high usability are the key design principles of its inventory and reconciliation capabilities.
- **Configuration and Change Management:** The HP solutions in this area allow implementation and automation of the entire change lifecycle, to enable easier handling of planned and unplanned changes. They also provide service and resource configuration management, and integration between change and configuration management systems. The solutions include HP Service Manager, HP Network Automation, and HP Server Automation.

Figure 8: Benefits of the HP OSS fulfillment stack [Reference: HP, 2013]

Problem	HP solution	Value proposition	Business value
<ul style="list-style-type: none"> <li>• Quick time-to-market for new products whilst maintaining complete control of processes to order and deliver</li> </ul>	<ul style="list-style-type: none"> <li>• HP Order Management (HP OM)</li> </ul>	<ul style="list-style-type: none"> <li>• Catalog which orchestrates the complete commercial and technical process required to deliver a service</li> </ul>	<ul style="list-style-type: none"> <li>• Improved product introduction time</li> </ul>
<ul style="list-style-type: none"> <li>• Accuracy and confidence in inventory data</li> <li>• Speed of deployment and ongoing change</li> <li>• Usability and value across the organization</li> </ul>	<ul style="list-style-type: none"> <li>• HP Trueview Inventory</li> <li>• HP Trueview Assign &amp; Design</li> </ul>	<ul style="list-style-type: none"> <li>• Active inventory with ongoing process to reconcile planned build out and service setup with actual state of network</li> <li>• Accurate data and usability across the organization</li> </ul>	<ul style="list-style-type: none"> <li>• Rapid innovation</li> <li>• Improved customer experience</li> <li>• Optimized cost</li> <li>• Speed of deployment</li> </ul>
<ul style="list-style-type: none"> <li>• Automate and secure error-free process to deliver customer-facing service</li> </ul>	<ul style="list-style-type: none"> <li>• HP Service Activator</li> </ul>	<ul style="list-style-type: none"> <li>• Generic workflow engine to model complex activation process</li> <li>• High reliability, robustness, scalability and usability</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced time-to-market</li> <li>• Automated 'zero-touch' activations</li> <li>• TCO</li> </ul>

## 6.2 The HP OSS assurance stack

After a service has been ordered, provisioned, and activated, it must be delivered to the end customer within defined levels of service quality and performance. This requires that the infrastructure supporting the service is functioning properly and efficiently. HP OSS Assurance Suite was certified to the Framework standard by the TMF in 2011, against both the Business Process Framework (eTOM) and the Information Framework (SID). Additionally, HP's suite is compliant to ITSMF's ITIL standard.<sup>4</sup>

Efficient assurance processes and tools are essential in order to detect any degradation in network or service performance, identify the source of the problem, and ideally fix the problem before end users notice it. HP offers a comprehensive integrated portfolio of assurance solutions and services that help CSPs meet the expectations of businesses and consumers, while providing sophisticated features that improve service and network operations efficiency. The HP OSS Assurance Suite addresses four key functional areas:

- **Problem management:** Automates the workflow for problem resolution to track customer, service or resource issues by implementing the problem management processes as defined in eTOM, combined with incident management as defined by the IT Infrastructure Library (ITIL) service desk concept.
- **Service management:** Monitors the quality of service being delivered, to help meet customer expectations and provide visibility of the actual customer experience and its association with the performance of services and network resources. This category includes full lifecycle management of contractual service level agreements (SLAs) with corporate or end customers, as well as management of internal operational level agreements (OLAs). This solution also includes Customer Experience Management which provides visibility of actual end-user experience and its relation to the health and performance of services and resources.
- **Fault management:** Provides a consolidated real-time view across all network and service domains, deduced from domain-specific (for example, IP domain, IT domain, radio access network domain) collection and processing of alarms, and including cross-domain correlation, service impact, and root cause analysis.
- **Performance management:** Collects performance data and key performance indicators, generates threshold events, and provides reports for trend analysis and capacity planning.

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<sup>4</sup> Visit <http://www.tmforum.org/HPOSSAssuranceSolution/12277/home.html> to see the detailed TMF certification report and download a white paper written by HP that discusses in further detail how both the Framework and ITIL standards are operationalized inside HP's OSS Assurance Suite.

Figure 9: Benefits of the HP OSS assurance stack [Reference: HP, 2013]

Function	HP solution	Benefits
<b>Fault management</b>	<ul style="list-style-type: none"> <li>TeMIP Solution Suite, NNMI, NNMI Telco SPIs, Omi, Unified Correlation Analyzer (UCA)</li> </ul>	<ul style="list-style-type: none"> <li>Reduced MTTR, faster troubleshooting and resolution</li> <li>Prioritization of fault by service impact analysis</li> <li>Improved operational efficiency</li> </ul>
<b>Service management</b>	<ul style="list-style-type: none"> <li>HP Service Quality Manager</li> <li>HP uSLAM</li> <li>HP Customer Experience Assurance (CEA)</li> </ul>	<ul style="list-style-type: none"> <li>Immediately detect service quality issues across multiple disparate technical data sources</li> <li>Rapidly locate service issues and coordinate the related repair activities</li> <li>Automate creation, administration and reporting for large numbers of SLAs as contractual obligations</li> <li>Monitor user experience down to the individual subscriber</li> <li>Facilitate detailed diagnosis and resolution of user-affecting issues</li> <li>Expose user and service experience results across the organization</li> </ul>
<b>Service management</b>	<ul style="list-style-type: none"> <li>MyCom (partner)</li> </ul>	<ul style="list-style-type: none"> <li>Provide proactive capturing and monitoring of the KPIs for capacity planning, which are both critical to a successful service level management of telecom services</li> </ul>
<b>Problem management</b>	<ul style="list-style-type: none"> <li>HP Service Manager</li> </ul>	<ul style="list-style-type: none"> <li>Manage the process of opening job tickets, matching skillsets and coordinating technicians for planning and problem resolution</li> <li>Constantly monitor incoming tasks and match with the availability of technicians, based on location, skills, spare parts availability, and inventory resources.</li> </ul>

## Conclusions

The architectural evolution of systems supporting CSPs' services has followed that of other industries – from bespoke or home-grown software, to middleware powered systems, to best-in-class systems in bespoke architectures, to best-in-suite offerings, and now to the super-suite. Each evolutionary step has reduced costs, implementation time, and implementation risk.

The Service Operations Factory, with its process-oriented systems, can be swiftly implemented and upgraded. Moreover, it cuts down on integration pains by simplifying the interface between the BSS and OSS systems, and exposes only the service characteristics to the world outside the factory. The Service Operation Centre (SOC), part of the Service Operations Factory, provides a standard and consistent services view of operations from a single source, aiding data consistency and cutting down on redundancy.

The Service Operations Factory, such as the one offered by HP and detailed in Section 6, is a new development, but seems destined to be here to stay. The evolution of these systems from a “keep the network working” attitude to a “provide excellent customer experience” approach represents a profound evolution in the operations philosophy of modern CSPs, one greatly desired by consumers.

## About the authors



**Dr. Mark H. Mortensen** (Principal Analyst) is the lead analyst for Analysys Mason's *Customer Care* and *Service Fulfillment* research programs. He is an expert in personalized multi-channel CRM, the interaction of BSS and OSS systems with complex networks, and provisioning of network and service layers. The first 20 years of Mark's career were spent at Bell Laboratories, where he specialized in enterprise-wide systems architecture and strategy, leading teams that brought new software products to new markets and network technologies, and the interaction of software systems with the underlying network hardware. Mark was Chief Scientist of Management Systems at Bell Labs, has been president of his own OSS strategy consulting company, CMO at the inventory specialist Granite Systems and a network planning company, and VP of Product Strategy at Telcordia Technologies. He is also an adjunct professor at UMass Lowell in the Manning School of Business, specializing in strategic management of high-tech companies. Mark holds an MPhil and a PhD in Physics from Yale University, and has received two AT&T Architecture awards for innovative communications software solutions.



**John Abraham** (Analyst) is part of Analysys Mason's Telecoms Software research team and contributes to the *Revenue Management* and *Service Fulfillment* programs. He has over six years' experience in the telecom industry working for a OSS vendor, and has implemented revenue management solutions for Tier 1 telcos in India, the Middle East and Europe. John has been with Analysys Mason since early 2012. He holds a bachelor's degree in computer science from Anna University (India) and an MBA from Bradford University School of Management (UK).

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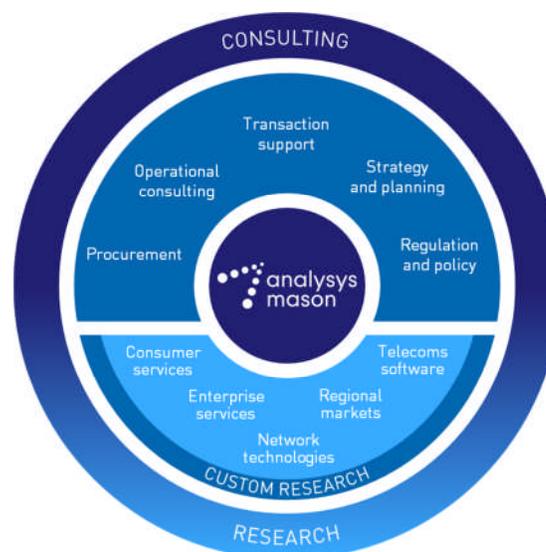
## About Analysys Mason

Knowing what's going on is one thing. Understanding how to take advantage of events is quite another. Our ability to understand the complex workings of telecoms, media and technology (TMT) industries and draw practical conclusions, based on the specialist knowledge of our people, is what sets Analysys Mason apart. We deliver our key services via two channels: consulting and research.

### Consulting

- Our focus is exclusively on TMT.
- We support multi-billion dollar investments, advise clients on regulatory matters, provide spectrum valuation and auction support, and advise on operational performance, business planning and strategy.
- We have developed rigorous methodologies that deliver tangible results for clients around the world.

For more information, please visit [www.analysismason.com/consulting](http://www.analysismason.com/consulting).



### Research

- We analyze, track and forecast the different services accessed by consumers and enterprises, as well as the software, infrastructure and technology delivering those services.
- Research clients benefit from regular and timely intelligence in addition to direct access to our team of expert analysts.
- Our dedicated Custom Research team undertakes specialized and bespoke projects for clients.

For more information, please visit [www.analysismason.com/research](http://www.analysismason.com/research).