

F R O S T & S U L L I V A N

FROST & SULLIVAN BEST PRACTICES AWARD

CLOUD-BASED SERVICE ASSURANCE - GLOBAL

**Product Line Strategy Leadership
2019**

mycomOSI

FROST & SULLIVAN

2019

BEST
PRACTICES
AWARD

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Background and Company Performance

Industry Challenges

In preparation for the launch of 5G services, network operators are rearchitecting their network infrastructure, introducing cloud-native software and deploying or leveraging private and public cloud datacenters. This is in anticipation of the densification of networks – for example incorporating small cells that can be placed closer to the end user - along with the introduction of network function virtualization (NFV) and software-defined networking (SDN) driving network service creation and delivery.

Delivering 5G services will require a scalable, programmable network that can adapt to rapidly changing demand originating from diverse services. To accommodate this requirement for scalability and programmability, the migration to the cloud is gaining substantial traction among network operators. However, network operators now face a new challenge of assuring the quality of services that rely on functions residing on both physical and virtualized cloud infrastructure.

Network operators will, for the foreseeable future, depend on hybrid network infrastructure supporting both the physical network function (PNF) and the virtualized network function (VNF). VNFs can run on commodity hardware which, although cheaper, has higher rates of failure than the proprietary hardware on which PNFs run. Network operators therefore need to assure that their network and IT services continue to deliver carrier-grade performance and service quality. This represents a significant challenge: delivering end-to-end carrier-grade Quality of Service (QoS) in a multi-domain, hybrid network context.

As 5G gains traction, the migration to a decentralized datacenter architecture and the adoption of edge computing, supporting the low latency and critical 5G use cases, should also follow. Many participants that are established in service assurance offer solutions that support hybrid network infrastructure. However, their service assurance solutions have themselves been developed to run from on-premises infrastructure and are early in their journey to cloud-native software architecture public, private and hybrid cloud deployment models. However, assuring the quality of a growing number of services at the edge will require service assurance itself to also be located at the edge, adjacent to the services themselves. The Virtual Central Office (VCO) open source project is one such example of this. Service assurance solutions therefore need to be containerized and cloud-native in order to support edge use cases.

A fully automated, cloud-native service assurance solution, when coupled with the public cloud, in turn enables a new software-as-a-service (SaaS) business model, where the complexity of operating and maintaining the infrastructure on which the solution runs, is handled by the software provider, not the CSP customer. This brings significant business agility and total cost of ownership (TCO) benefits to the CSP. Alongside this, support for integration with peripheral OSS applications such as orchestration systems - which themselves are embracing open-source technology and standard APIs – opens the possibility of much greater and more advanced levels of automation of network operations.

As orchestration becomes exponentially more complex in the 5G era, this automation requirement becomes essential.

Product Line Strength and Customer Impact

Brand Equity

Prior to the acquisition of OSI in 2014, MYCOM was a network performance management specialist, and OSI a fault management specialist. The acquisition enabled MYCOM OSI to build an integrated service assurance solution package comprising performance and fault management. Combined with its subsequently released service quality management, automation and analytics applications, the Experience Assurance & Analytics™ (EAA) suite of applications was formed. MYCOM OSI moved all common services across its applications into an integrated cloud platform - the EAA Cloud Platform (ECP) - and confirmed its market leadership with the launch of the world's first fully cloud native carrier-grade service assurance offering, the Assurance Cloud™ in February 2019.

MYCOM OSI currently supports over 75 global communication service providers (CSPs), such as Verizon Communications, Telefónica, Vodafone and Deutsche Telekom. While all of its solutions are offered directly to CSP customers, MYCOM OSI also has channel partners that source its solutions typically as part of large OSS transformation projects. In India for example, MYCOM OSI works with system integrators such as Hewlett Packard Enterprise (HPE) and Ericsson to provide holistic solutions to CSPs including Vodafone Idea Limited and Reliance Jio Infocomm Ltd.

Recent months have seen significant positive developments for MYCOM OSI's business and growth in CSP adoption of its Assurance Cloud™ SaaS offering. In November 2018, MYCOM OSI was acquired by private equity firm Inflexion. The acquisition is important because it supports the expansion of MYCOM OSI's global footprint as well as technology advancements across several areas, such as AI/Machine Learning, 5G and the Internet of Things (IoT). In addition, MYCOM OSI entered into partnerships with Red Hat and AWS in 2018 and 2019 respectively. These partnerships enable MYCOM OSI to integrate the technology products and assets of its partners into its portfolio, accelerating product innovation and supporting agile operations for its customers by enabling DevOps through continuous integration and delivery (CI/CD).

MYCOM OSI is partnering with standards development organizations (SDO), such as TM Forum and its Open Digital Architecture (ODA) standards program. The ODA program aims to digitalize operations support systems (OSS)/business support systems (BSS). MYCOM OSI has implemented the program's key principles in its platform, including support for open APIs, micro-services, intent-based management, and automation. In addition MYCOM OSI actively supports many open-source projects such as the Open Network Automation Platform (ONAP), Open Source MANO (OSM), and OpenDaylight in the network domain, and its Experience Assurance & Analytics™ (EAA) suite of applications is supported by a range of open source projects such as Openstack, Kubernetes and Ceph in the platform domain, among others.

MYCOM OSI's application portfolio: Experience Assurance and Analytics™ (EAA), is a unified network and service assurance platform for Mobile, Fixed and Converged Network Operators covering the full end to end network domain: the access network including 3G/4G/5G radio access networks (RAN), fixed and satellite; the full range of transmission and backhaul domains including IP; and the core domain. Because EAA is cloud-native, it scales easily, supports containerization, and supports agile DevOps.

Customer Experience

MYCOM OSI helps global CSPs across all stages of network evolution maturity, with one example being Three UK. In 2017, Three UK announced that they would build a greenfield cloud core solution – a Telco Cloud - and in October of that year selected MYCOM OSI and its Assurance Cloud™ SaaS offering for network and service assurance of its telco cloud and the services delivered through it.

As of 2019, Three UK has successfully completed the deployment of its telco cloud, which spans across 20 different data centers in the country as opposed to the 3 data centers which it owned and managed previously. Three UK has begun the process of migrating its 4G customers to the new cloud, which it will also use to host 5G functionalities. While the new architecture helped reduce the cost associated with managing and owning proprietary data centers, Three UK also credits the versatility of MYCOM OSI's solution, which has been able to seamlessly adapt to the expanded data center footprint. Three UK's telco cloud serves as a bedrock for its 5G core network, which was launched in July 2019.

In the Asia-Pacific region, Globe Telecom recently implemented south-east Asia's first public cloud hosted service assurance platform, with MYCOM OSI's Assurance Cloud™. The rapid growth CSP currently serves over 83 million customers, and its Assurance Cloud instance, hosted in AWS, handles billions of data records per hour.

MYCOM OSI is also working closely with global tier 1 customers such as Vodafone to help them transition to an intelligent and automated network. MYCOM OSI is also working with several global telecom companies with their early 5G deployments. It places strong emphasis on customer success, analyzing its customers' business and identifying where they are in their maturity journey, building and executing a tailored phased plan, with each phase designed to be self-contained and deliver positive RoI in and of itself.

Some of MYCOM OSI's customers have ambitions to automate up to 95% network quality management with MYCOM OSI's solutions, which translates to significant cost savings.

Supply Chain Reliability

MYCOM OSI works with customers' other ecosystem suppliers, such as adjacent technology suppliers, network equipment vendors and systems integrators to integrate their solution into the architectures of CSPs' larger transformation or BSS/OSS projects. They also leverage local implementation partners where customers have a preferred supplier or to extend their geographic reach and coverage. MYCOM OSI has premium relationships with its strategic technology partners including Red Hat and Amazon Web Services (AWS) where MYCOM OSI is a preferred telecom partner of these organizations and conducts joint go-to-

market, reference architecture and customer deployment programs to optimize success in the market and with customers.

Scalability — The Assurance Cloud™

In February 2019 at MWC, MYCOM OSI officially launched its Assurance Cloud™ SaaS offering, which is currently provided from the AWS public cloud. Among the many AWS products and features that it leverages, native daily backups exceeding 300 per day is an example. The Assurance Cloud™ also leverages AI/ML tools, container orchestration, native active-active geo-redundancy, and elastic scalability effectively removing the capacity constraint typical of legacy 'on-premise' OSS/BSS deployments. Another core advantage of MYCOM OSI's public cloud hosted Assurance Cloud™ is that since MYCOM OSI controls and manages the entire infrastructure architecture and configuration on behalf of the CSP, it can guarantee the environmental criteria for deployments, updates and solution implementations, thus dramatically reducing deployment times (the Assurance Cloud™ can be instantiated and ready to ingest data in under one hour), whilst delivering carrier-grade availability, performance and reliability. In this way MYCOM OSI is able to deliver more advanced, complex systems in a shorter period of time than other market competitors.

Breadth

MYCOM OSI's EAA platform is a uniquely cross-domain, cloud-native solution that can be used by CSPs whose network infrastructure is on-premise, on the cloud, or hybrid. The EAA solution integrates cloud service assurance with automation and data analytics, thus providing comprehensive service assurance domain coverage and support for closed loop automation.

The EAA suite of applications can itself run on bare metal, public or private cloud, or a combination of these. The applications include EAA ProOptima™ for performance management, EAA NetExpert™ for fault management, EAA ProAssure™ for service quality management, EAA ProActor™ for automation, and EAA ProInsight™ for analytics, which are in turn the building blocks of a catalogue of integrated 'Digital Transformation Solutions' that deliver end-to-end use cases across automation, monitoring, reporting, analytics and auditing, to name some examples.

By providing integrated solutions, MYCOM OSI is able to deliver targeted, localized capabilities for specific teams within the CSP organization, for example the NOC, the SOC and planning departments.

Technology Leverage

Empowered with actionable insights from AI/Machine Learning capabilities, MYCOM OSI's EAA platform is scalable and highly interoperable, made possible by incorporating open-source technology, open standards and open APIs. This enables advanced closed-loop assurance that can automate and optimize network operations across a range of scenarios, and because the platform is fully cloud-native, it can instantiate applications for individual 5G network slices. This is important as each 5G network slice could be independently owned by a different enterprise, and thus MYCOM OSI's systems can empower the enterprise to

assure the quality of service within its particular slice without infringing on a network slice that is under the purview of another enterprise.

Conclusion

The merger between MYCOM and OSI integrated network performance management and fault management, which are now part of the wider, fully cloud-native Experience Assurance & Analytics (EAA) suite of applications. The Assurance Cloud™ elevates the offering further by providing the business agility, TCO and TTM advantages of the public cloud. Combining these with automation and analytics capabilities, MYCOM OSI's EAA platform is today the industry's first completely integrated, cloud-based service assurance solution. MYCOM OSI's success is evident from the traction it enjoys among CSPs, many of which have digitized and automated their network infrastructure using MYCOM OSI's EAA platform.

For its strong overall performance, MYCOM OSI is recognized with Frost & Sullivan's 2019 Product Line Strategy Leadership Award in the global cloud-based service assurance industry.

Significance of Product Line Strategy

Ultimately, growth in any organization depends on customers purchasing from a company and then making the decision to return time and again. A full, comprehensive product line that addresses numerous customer needs and preferences is, therefore, critical to a company's long-term retention efforts. To achieve the dual goals of customer value and product line strength, an organization must be best in class in 3 key areas: understanding demand, nurturing the brand, and differentiating from the competition.



Understanding Product Line Strategy Leadership

Driving demand, strengthening brand, and differentiating from the competition all play critical roles in delivering unique value to customers. This three-fold focus, however, must ideally be complemented by an equally rigorous focus on building a superior and comprehensive product line.

Key Benchmarking Criteria

For the Product Line Strategy Leadership Award, Frost & Sullivan analysts independently evaluated Product Line Strength and Customer Impact according to the criteria identified below.

Product Line Strength

- Criterion 1: Breadth
- Criterion 2: Scalability
- Criterion 3: Technology Leverage
- Criterion 4: Features
- Criterion 5: Supply Chain Reliability

Customer Impact

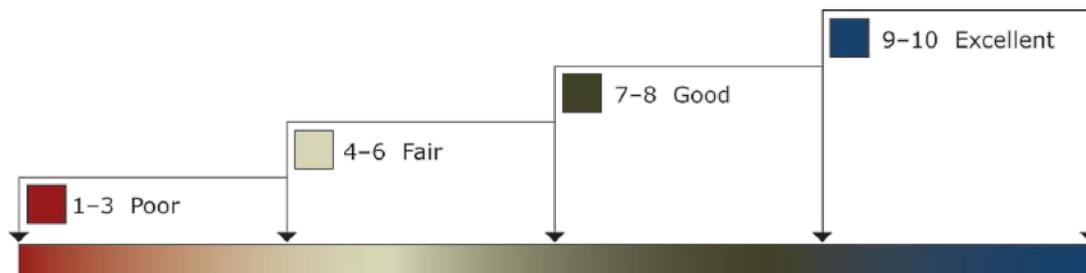
- Criterion 1: Price/Performance Value
- Criterion 2: Customer Purchase Experience
- Criterion 3: Customer Ownership Experience
- Criterion 4: Customer Service Experience
- Criterion 5: Brand Equity

Best Practices Award Analysis for MYCOM OSI

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows research and consulting teams to objectively analyze performance according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation. Ratings guidelines are illustrated below.

RATINGS GUIDELINES



The Decision Support Scorecard considers Product Line Strength and Customer Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, Frost & Sullivan has chosen to refer to the other key participants as Competitor 1 and Competitor 2.

<i>Measurement of 1-10 (1 = poor; 10 = excellent)</i>			
Product Line Strategy	Product Strength	Line	Customer Impact
			Average Rating
MYCOM OSI	9.4		9.3
Competitor 1	8.6		8.7
Competitor 2	8.1		8.3

Product Line Strength

Criterion 1: Breadth

Requirement: Product line addresses the full range of customer needs and applications.

Criterion 2: Scalability

Requirement: Product line offers products at a variety of price points and functionality levels.

Criterion 3: Technology Leverage

Requirement: Demonstrated commitment to incorporating leading-edge technologies into product offerings results in greater product performance and value.

Criterion 4: Features

Requirement: Products offer a comprehensive suite of features to serve customers at multiple levels of functionality, ease of use, and applications.

Criterion 5: Supply Chain Reliability

Requirement: There is sufficient control over the supply chain to ensure availability of products and components.

Customer Impact

Criterion 1: Price/Performance Value

Requirement: Products or services offer the best value for the price, compared to similar offerings in the market.

Criterion 2: Customer Purchase Experience

Requirement: Customers feel they are buying the optimal solution that addresses both their unique needs and their unique constraints.

Criterion 3: Customer Ownership Experience

Requirement: Customers are proud to own the company's product or service and have a positive experience throughout the life of the product or service.

Criterion 4: Customer Service Experience

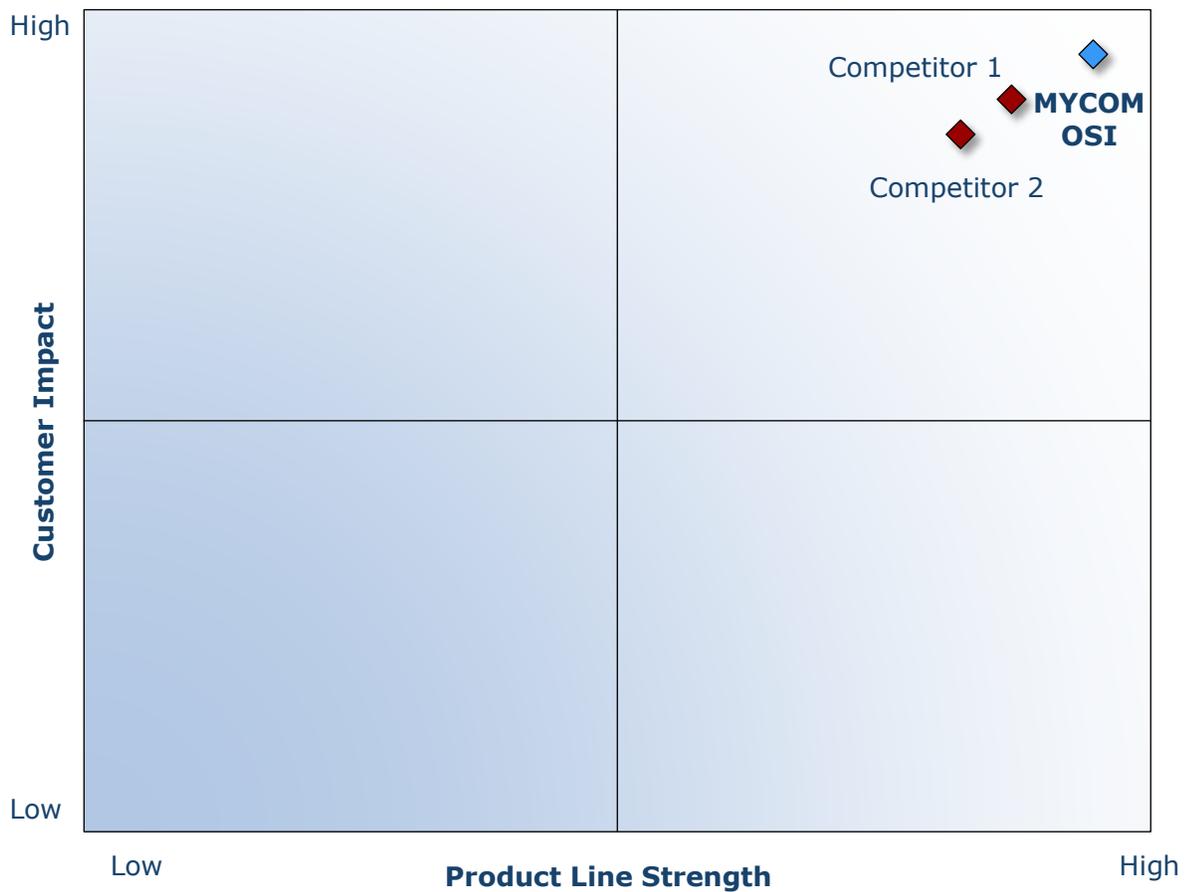
Requirement: Customer service is accessible, fast, stress-free, and of high quality.

Criterion 5: Brand Equity

Requirement: Customers have a positive view of the brand and exhibit high brand loyalty.

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.



Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate award candidates and assess their fit with select best practices criteria. The reputation and integrity of the awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 Monitor, target, and screen	Identify award recipient candidates from around the world	<ul style="list-style-type: none"> • Conduct in-depth industry research • Identify emerging industries • Scan multiple regions 	Pipeline of candidates that potentially meet all best practices criteria
2 Perform 360-degree research	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> • Interview thought leaders and industry practitioners • Assess candidates' fit with best practices criteria • Rank all candidates 	Matrix positioning of all candidates' performance relative to one another
3 Invite thought leadership in best practices	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> • Confirm best practices criteria • Examine eligibility of all candidates • Identify any information gaps 	Detailed profiles of all ranked candidates
4 Initiate research director review	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> • Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles 	Final prioritization of all eligible candidates and companion best practices positioning paper
5 Assemble panel of industry experts	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> • Share findings • Strengthen cases for candidate eligibility • Prioritize candidates 	Refined list of prioritized award candidates
6 Conduct global industry review	Build consensus on award candidates' eligibility	<ul style="list-style-type: none"> • Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates 	Final list of eligible award candidates, representing success stories worldwide
7 Perform quality check	Develop official award consideration materials	<ul style="list-style-type: none"> • Perform final performance benchmarking activities • Write nominations • Perform quality review 	High-quality, accurate, and creative presentation of nominees' successes
8 Reconnect with panel of industry experts	Finalize the selection of the best practices award recipient	<ul style="list-style-type: none"> • Review analysis with panel • Build consensus • Select recipient 	Decision on which company performs best against all best practices criteria
9 Communicate recognition	Inform award recipient of recognition	<ul style="list-style-type: none"> • Present award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance 	Announcement of award and plan for how recipient can use the award to enhance the brand
10 Take strategic action	Upon licensing, company is able to share award news with stakeholders and customers	<ul style="list-style-type: none"> • Coordinate media outreach • Design a marketing plan • Assess award's role in strategic planning 	Widespread awareness of recipient's award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of the research process. It offers a 360-degree view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, resulting in errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.



About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, helps clients accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's growth team with disciplined research and best practices models to drive the generation, evaluation, and implementation of powerful growth strategies. Frost & Sullivan leverages nearly 60 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on 6 continents. To join Frost & Sullivan's Growth Partnership, visit <http://www.frost.com>.