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Network Service Orchestration: Competitive Landscape Assessment

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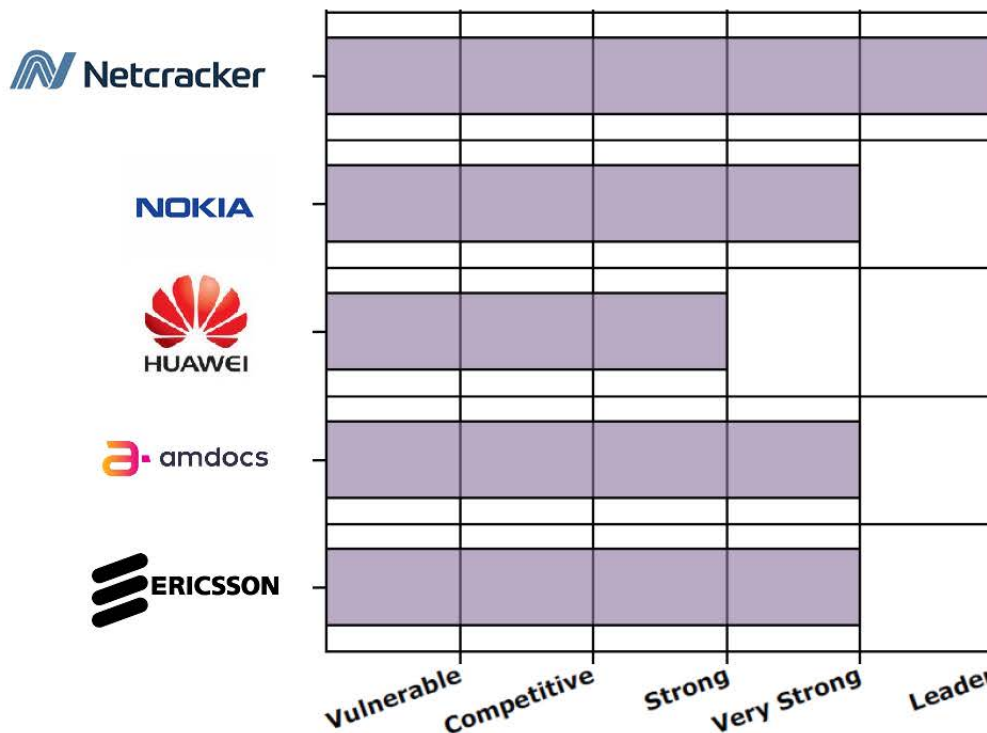
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COMPETITIVE LANDSCAPE ASSESSMENT - NETWORK SERVICE ORCHESTRATION

REPORT SUMMARY

With this report, GlobalData launches its coverage of Network Service Orchestration, a nascent but rapidly developing function that coordinates multidomain, multivendor components with a high level of automation.

PRODUCT CLASS SCORECARD

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MARKET OVERVIEW

Product Class	Network Service Orchestration
Market Definition	GlobalData's Network Service Orchestration (NSO) report covers vendor products and solutions that address lifecycle management (LCM) of services that comprise virtualized, cloud-native, and sometimes physical network resources. NSO enables carriers, their partners, and their customers to design services that meet precise performance specifications, often defined in a service-level agreement (SLA) between the operator and the customer. Assuring the performance of these services within SLA specifications in an end-to-end manner is vital to NSO, as is the automation that enables closed-loop orchestration. NSO is essential for the dynamic network slicing required by Standalone 5G. Northbound, NSO works with BSS and other customer-facing systems. Southbound, it works with the network resource orchestration layer, which coordinates domain controllers, NFVO, and other lower-level functions to allocate and manage network resources required by the service over its lifecycle. Note: GlobalData's Network Resource Orchestration report is a companion piece to this document.
Rated Competitors	• Amdocs • Ericsson • Huawei • Netcracker • Nokia
Additional Competitors	• Cisco • HPE • IBM • DZS (Rift) • Robin.io • Whale Cloud
Changes Since Last Update	• This is GlobalData's first Competitive Landscape Assessment (CLA) on Network Service Orchestration. Together with its companion CLA on Network Resource Orchestration, it replaces our previous report class on NFV MANO.

MARKET ASSESSMENT

This competitive landscape assessment is one of two successors to GlobalData's NFV Management and Orchestration (MANO) report, which GlobalData produced for several years as the industry moved to implement the NFV framework laid out by ETSI in 2012. The MANO suites available in the market now reliably address the requirements of that NFV framework, so we have moved our focus to adjacent, less settled technology areas. To further decouple the service and resource layers, and to make service infrastructure more reliable, innovation has expanded to the areas above and below classical NFV MANO: service orchestration (this document), and resource orchestration, which is the subject of a separate GlobalData report.

Service orchestration encompasses the full, end-to-end lifecycle of network services made up not only of classic network functions, but of components that may come from service partners and/or offered in public cloud environments. In addition, the rise of microservices and containers in telecoms infrastructure means that telcos must now manage three types of resources in their service environments: physical, virtualized (VM-based), and cloud-native. Those resources make up services that may execute on the edge, in the core, or in a cloud environment managed by another party.

Source: GlobalData.
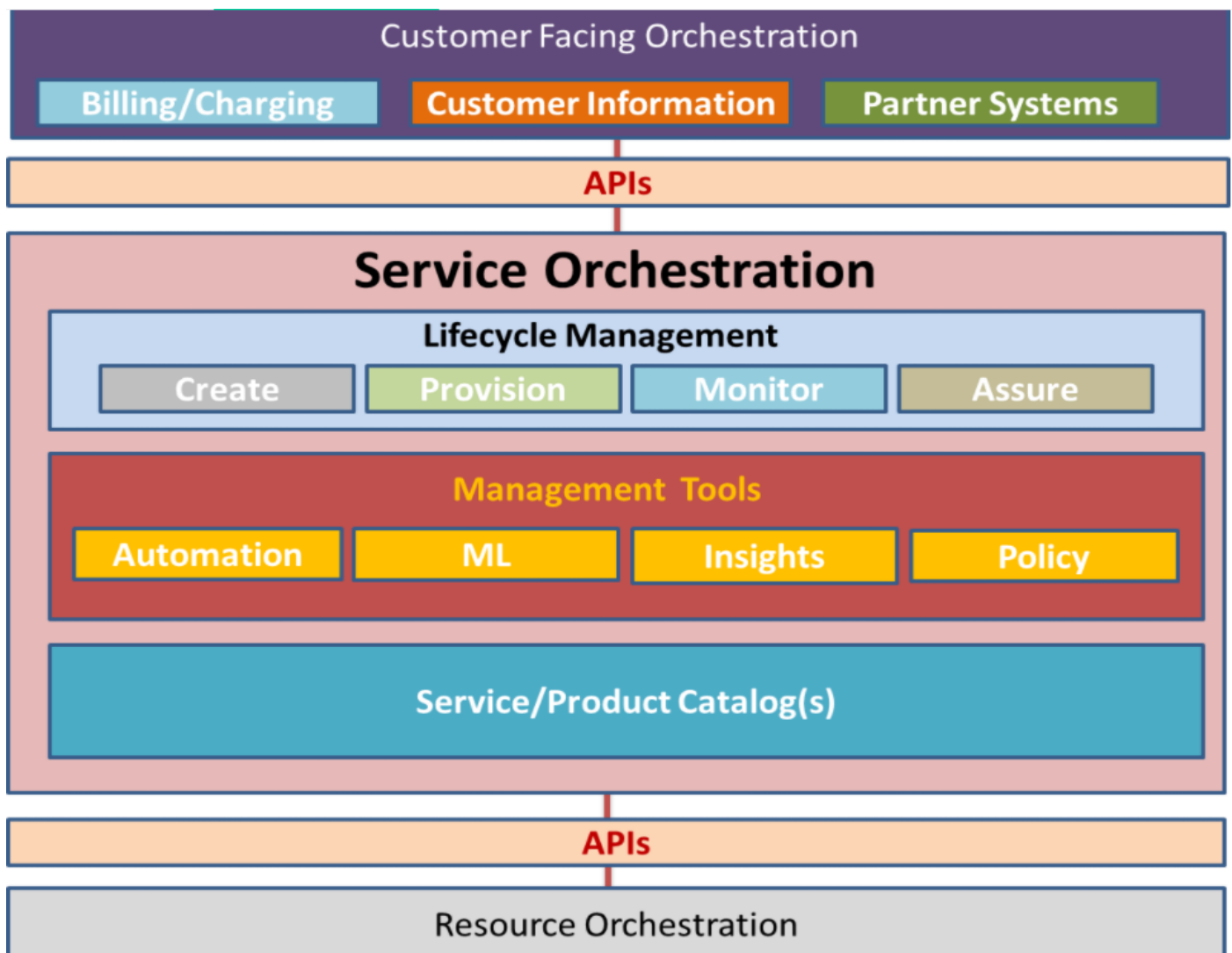
While all network operators want to decrease the time and effort required to design and operate new services, 5G is bringing operators face-to-face with the need to create and manage services dynamically, and in far greater numbers than they are used to. They must be able to construct services rapidly, provision them easily, and assure and operate them reliably. Full-lifecycle automation and end-to-end systems integration are essential to this capability. Since each service will be underpinned by one or more network slices, lifecycle orchestration must extend to those slices as well.

As an architectural layer and software solution, service orchestration is still relatively new, and thus immature. This can be seen both in industry standards and in production deployments. Standards support for this area is still in flux: there are three different industry efforts to define the interfaces, data models, and data repositories that enable the necessary zero-touch lifecycle orchestration and communication with other management layers:

• TM Forum's Zero-Touch Orchestration, Operation, and Management (ZOOM),

• ETSI's Zero-Touch Network and Service Management (ZSM), and

• MEF's Lifecycle Service Orchestration (LSO).

In particular, TM Forum's APIs have largely become the standard for northbound integration with the monetization/customer information layer; however, the southbound interfaces to the resource orchestration functions are much less settled. ETSI's and MEF's architectures are also being used in production today, sometimes in relation to specific use cases. MEF LSO, for example, is often used in fixed line networks.

Production experience with service orchestration engines to date has understandably largely not lived up to the vision of full end-to-end, automated, and multivendor deployment. As could be expected from a new software architecture, many deployments are limited to a single network domain- with transport appearing especially often initially- and therefore also often a single infrastructure vendor. This can make it difficult to determine whether a vendor offers a truly resource-agnostic service orchestration layer, or whether it merely provides a full-stack silo for a particular domain. Similarly, some deployments support a single service (e.g., VoLTE) across more than one network domain. To be evaluated in this report, a vendor must show that its solution credibly handles service orchestration across multiple technology domains.

The rapid development of capabilities in this arena suggests that competition will remain intense for the next few years, and that any vendor evaluated in this report could be the best vendor for a given carrier's particular set of circumstances. We also expect that the Leader ranking will shift from revision to revision as technology matures.

MARKET DRIVERS

• **Little Architectural Consensus:** In addition to different approaches to the APIs between different layers of the stack- especially between the service and resource layers-- vendors and carriers are exploring various alternatives in reference architectures, data models, and data abstraction, and catalog convergence.

• **Hybrid Resources:** Not only must a service orchestration solution be able to manage virtual, cloud-native, and ideally physical functions, it should also be able to orchestrate resources from across the operator's infrastructure as well as partner resources including those from public clouds.

• **Automation and Assurance:** Any service orchestration solution must use automation to handle service creation and orchestration demands, the complexity of which far exceeds the capabilities of traditional manual processes. Automation is therefore essential throughout the solution, especially in the assurance function.

- **End-to-End Visibility and Analytics:** To support this automation, any service orchestration solution must be able to monitor service performance in real time, and ideally track/report on service experience. Moreover, this monitoring should be on a per-user, per-service, per-device basis. This sophistication and granularity requires not only advanced data gathering and data models, but artificial intelligence as well.

- **Model- and Intent-Driven Orchestration:** Traditional rules-based orchestration is inadequate to the demands of an infrastructure that must spin up slices and services on the fly, add and subtract resources, and move workloads around the network for the best experience. Service orchestration must therefore drive these functions with service models, intent, and/or experience inputs.

- **Deployment Diversity:** Some early service orchestration projects are parts of large, complex, and professional services-heavy transformation engagements. While some operators require that kind of work, others are looking a more packaged, plug-and-play solution. Both models are necessary; neither will meet all of the market's needs.

BUYING CRITERIA

- **Portfolio Scope:** This category judges the breadth of a vendor's solution as if it were to be deployed as a single-vendor, best-of-suite silo. Partner components are included if they are integrated with the vendor's stack and offered as a single solution. It includes catalogs, data abstraction layers, data models, model-driven and intent-driven capabilities, assurance, analytics security, hybrid cloud management, and partner ecosystems.

- **Integration and Interworking:** This category evaluates the solution's ability to work with the diverse third-party products that make up a typical carrier network. It covers north- and south- bound functions like policy control, monetization, and resource orchestration, but also assurance and analytics capabilities provided by other vendors.

- **Standards and Interface Support:** Industry-standard architectures, interfaces, modelling languages and so on are essential for smooth operation and to avoid vendor lock-in. Since the industry has yet to reach a consensus in many of these areas, this section evaluates support for standards from the TM Forum, MEF, ETSI, 3GPP, and other industry consortia.

- **Lifecycle Management:** The LCM category evaluates the solution's ability to ease and automate the full lifecycle of the service, from design and testing to assurance. It also includes intent-driven orchestration and smart workload placement.

- **Production Experience:** Since solutions mature by adjusting to real-world conditions, this category evaluates customer numbers, PoCs/trials, a vendor's largest and most complex deployments, as well as the breadth of supported services.

VENDOR RECOMMENDATIONS

- **Cross-Domain Boundaries:** While most vendors will have built up orchestration expertise in a few network domains, all should strive to add proof points in adjacent domains in the race for full end-to-end service orchestration experience. One way to do this quickly is to use successful work in one domain to convince the telco to award top-level orchestration to the incumbent vendor when a new domain is added.

- **Stand and Deliver 3GPP RAN:** Open RAN, virtual RAN, and similar disaggregation efforts will revolutionize the industry, eventually. But vendors that wait for widespread adoption of these new approaches before supporting wireless service orchestration may miss the boat. Standard 3GPP RAN is mature and has a mighty install base; supporting it is the key to 5G and many edge-related orchestration RFPs.

- **Tell a Monetization Story:** While most architecture diagrams place the monetization layer above the service orchestration layer, it is the latter's ability not only to automate service/slice operations, but to support quick and easy creation that will enable operators to produce high-margin services. Vendors should therefore be able to provide specifics about how their orchestration supports service agility.

BUYER RECOMMENDATIONS

- **Choose Your Openness:** This network transformation generation represents telcos' last, best chance to avoid vendor lock-in in their service infrastructure. While some operators will begin with a single-vendor orchestration deployment- after all, they have to start somewhere- operators should ensure that the vendor's interfaces and architecture match their evolution strategy, especially regarding interfaces with lower-level functions where there are still competing approaches.

- **Require Hyperscaler Support:** While the integration of public clouds and telco networks is still largely in the laboratory stage, the eventual need to integrate SaaS workloads and cloud domains is inevitable. Build that likelihood into your RFPs.

- **Press Vendors on Intent:** Intent-based orchestration appears on marketing slides more than it does in production networks. Buyers should determine how each vendor's architecture defines, stores, and implements business intent, and should satisfy themselves that their vendor's scheme will work with other vendor components to the north and south of the service orchestration layer.

RATED COMPETITORS

Product Name	Amdocs NEO Service and Network Automation Platform
Current Perspective	Amdocs NEO Service and Network Automation provides end-to-end service management capabilities covering orchestration, design, inventory and assurance. It can be broken down into several separately salable components, including Order & Service Orchestrator, Open Network Inventory (ONI), 5G Slice Manager, Open Network Designer, Open Network Assurance, and a packaged SD-WAN offering. Amdocs is a category leader in ONAP support, and NEO benefits from that mature foundation. Its orchestration and inventory systems underpin service topology information that speeds closed-loop service assurance. It is delivering some complex and sophisticated transformation projects for leading service providers that include multiple domains including satellite, hybrid PNF/VNF/CNF orchestration, and integration with customer-facing systems.
Buying Criteria Rating	• Portfolio Scope: Leader • Integration and Interworking: Very Strong • Standards and Interface Support: Leader • Lifecycle Management: Very Strong • Production Experience: Very Strong
Product Scores	Very Strong

Strengths	• By packaging and selling individual NEO components, Amdocs is well placed to serve telcos that build best-of-breed systems. • Amdocs focusses strongly on industry standards, basing its products on industry reference architectures and participating actively in standards bodies. • Amdocs has solid early experience in hyperscale support, orchestrating production deployments on both Azure and AWS.
Limitations	• With no network slicing orchestration yet in production and less RAN orchestration experience than some of its competitors, Amdocs has more to do to demonstrate its 5G orchestration capabilities. • Amdocs has deep credibility in large and complex network transformation projects; it will need to leverage its experience with smaller, more contained orchestration deployments to capture the broad middle of the market. • To date, Amdocs has little production experience in orchestrating private networks.
Product Name	**Ericsson Orchestrator - Service Orchestrator (EO-SO)**
Current Perspective	EO- SO is a cloud-native orchestration engine that contains separately saleable service design and assurance components. It can also be combined with Ericsson's core, radio, transport, and edge domain orchestrators. Its Service Slice Inventory is based on inventory software that functions as a single topology source and inventory in near real time. Its topology models encompass both domain-specific and overall e2e levels. Ericsson has a full-featured and well-articulated architectural vision, but as a somewhat more recent entrant does not yet have the reference cases for EO- SO and expanded features that some of its competitors offer.
Buying Criteria Rating	• Portfolio Scope: Strong • Integration and Interworking: Strong • Standards and Interface Support: Strong • Lifecycle Management: Leader • Production Experience: Very Strong
Product Scores	Very Strong
Strengths	• Ericsson has a well-elaborated architectural vision, including enhancements for intent-driven networking and smart workload placement. • As the Leader in our Service Assurance CLA, Ericsson has a strong foundation for closed-loop orchestration. • Ericsson has strong testing and onboarding features.

Limitations	• Ericsson's self-service capabilities are not as advanced as other competitors in the class.
	• Most of Ericsson's service orchestration reference cases are pre-production.
	• Ericsson trails its competitors in applying service orchestration to private/dedicated networks.
Product Name	**Huawei Network Operation Engine. NSFM+ (NOE.N+)**
Current Perspective	Huawei's NOE.N+ is a component of the vendor's Autonomous Driving Network (ADN) portfolio, which was released in 2020.
	Huawei does provide slice templates and slice design, as well as a newly reemphasized service partner ecosystem. Its commercial deployments are few, however, and still limited to Chinese carriers. It therefore has less experience with the full range of hybrid, multivendor environments that a wider install base would provide.
Buying Criteria Rating	• Portfolio Scope: Strong
	• Integration and Interworking: Strong
	• Standards and Interface Support: Strong
	• Lifecycle Management: Strong
	• Production Experience: Very Strong
Product Scores	Strong
Strengths	• Having worked on AI-enriched network operations for several years, Huawei embeds it at every level of its framework.
	• Huawei's prepackaged service/slice templates reflect greater experience in specific enterprise use cases than many competing offerings.
	• Huawei's work for Chinese carriers gives it experience orchestrating services at massive scale.
Limitations	• Huawei's reference deployments are limited to carriers in its home market, so its ability to handle diverse carrier environments is still unproven.
	• Huawei pushes more automation intelligence to the domain controller level than many competitors, which will require careful interoperability testing in a multivendor implementation.
	• Huawei has less experience than some of its competitors orchestrating service components and resources provided from public clouds.

Product Name	Netcracker Hybrid Operations Management (HOM)
Current Perspective	Netcracker HOM is fully microservice-based; these microservices can be decoupled and configured for each deployment to match a customer's environment and requirements. Oriented toward end-to-end automation of network slices and services, HOM supports a broad range of APIs and standards bodies. Netcracker bolsters HOM with self-service portal capabilities, domain orchestrator experience across several network areas, out-of-the box service definitions for many different enterprise services, a full OSS/BSS suite, and an enterprise services ecosystem.
Buying Criteria Rating	• Portfolio Scope: Very Strong • Integration and Interworking: Leader • Standards and Interface Support: Leader • Lifecycle Management: Leader • Production Experience: Leader
Product Scores	Leader
Strengths	• Netcracker boasts among the most extensive deployments of single- and cross-domain service orchestration. • HOM already runs in production on several major public clouds. • Netcracker has surrounded HOM with a full suite of ecosystem partners and preconfigured service templates.
Limitations	• Netcracker's production experience is much stronger in transport and fixed line than in 3GPP radio, posing a potential vulnerability in 5G orchestration RFPs. • Netcracker occupies the middle of the pack when it comes to private/dedicated network support. • While Netcracker has a good mix of customer and project sizes as well as both brownfield and greenfield expertise, it has fewer of the largest network transformation deals than some competitors.

Product Name	Nokia Digital Operations Center
Current Perspective	Launched in June 2020, Nokia Digital Operations Center comprises two natively integrated but separately saleable and deployable products: Nokia Orchestration Center and Nokia Assurance Center. FlowOne, an older orchestration product, coexists with Digital Operations Center; in addition to its current install base, it can also be used for provisioning and activation needs in Digital Operations Center deployments. Nokia designed Digital Operations Center for network slice lifecycle orchestration, providing templates, a strong creation and management interface, and the ability to modify slice resources and performance in real time. It has broad experience in public cloud partnerships, and also boasts mature capabilities in analytics and automation.
Buying Criteria Rating	• Portfolio Scope: Very Strong • Integration and Interworking: Leader • Standards and Interface Support: Very Strong • Lifecycle Management: Very Strong • Production Experience: Leader
Product Scores	Very Strong
Strengths	• Nokia has substantial experience with production deployment in carrier networks, both with Digital Operations Center and FlowOne. • Nokia's service/slice creation and monitoring interface is full-featured and intuitively designed. • An early mover on hyperscaler partnerships, Nokia has strong experience in hybrid/partner orchestration.
Limitations	• Although Nokia's stance that orchestration is an additive task to fulfilment is understandable, using FlowOne for provisioning and activation may confuse operators seeking an all-in-one solution. • While Nokia participates in industry model deployments and complex trials, it has yet to demonstrate 5G network slice orchestration in production. • Nokia's leading position in private network orchestration is somewhat offset by the fact that these deployments predominantly use FlowOne rather than DOC.