

the next frontier in modern network service delivery

End-to-end service delivery with Amdocs Service & Network Automation Platform and VMware Telco Cloud Automation

From virtualization and edge computing to 5G, the network transformation is well underway. These changes have a profound impact on the inner network fabric and how services are designed, provisioned and operationalized. The telco cloud progressively becomes the cornerstone of modern networks, and communications service providers (CSP) gain unprecedented agility, but they must also adapt quickly to network function modernization and a new multi-cloud paradigm. At the same time, 5G technology expands offerings with mission-critical communications and faster mobile broadband applications.

With more complex and critical service requiring real-time interventions that span a multi-layer/multi-domain architecture, CSPs need to deploy orchestration and automation practices at the heart of their service delivery. Deploying such a solution is highly complex in a multi-vendor ecosystem with parallel and fast-changing technologies. Most of these implementations are failing due to delays and issues attributable to vendors' dynamic and continuous integrations between components and versions. Implementing an end-to-end single vendor stack creates vendor lock-in and eliminates the flexibility sought by building a cloud-driven network.

What's needed is an intelligent, collaborative, and streamlined approach – one that takes advantage of best-of-breed solutions at each layer of the service delivery and maximizes the use of new cloud technologies while abstracting their complexity. Only then will it be possible to meet the scale and agility required by modern networks.

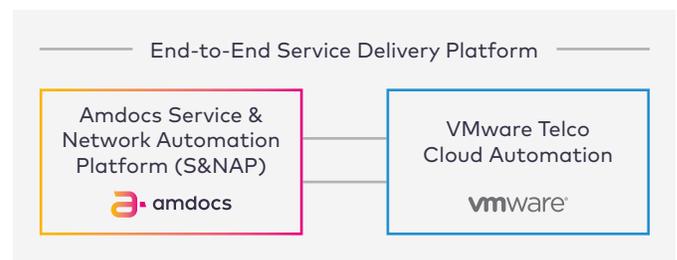


Figure 1: End-to-End Service Delivery

AT A GLANCE

The solution provides end-to-end multi-domain service orchestration and automation delivered through Amdocs S&NAP and VMware® Telco Cloud Automation. The solution accelerates the services time to revenue and transforms daily operations with centralized multi-domain services lifecycle management automation. Delivered as a packaged solution, it also removes the complex integrations and maintenances required by traditional orchestrators.

- **Pre-built and certified integrations**

Combining Amdocs leadership in telco IT and VMware leadership in virtualization reduces network function virtualization (NFV) implementation risks, accelerates time to deploy and simplifies vendor management

- **Open and vendor-neutral**

Enable the onboarding and management of any standards-compliant network function from any vendor in any xNF format (PNF, CNF, VNF)

- **Cloud-native, standard-based solution**

Multi-vendor, multi-layer, multi-domain, multi-cloud network service delivery

- **End-to-end lifecycle management**

From service design through orchestration to autonomous and closed-loop operations

An orchestration and automation solution for today's – and tomorrow's networks

VMware and Amdocs have designed a solution for an end-to-end multi-domain service and infrastructure/resource orchestration and automation using Amdocs S&NAP and VMware Telco Cloud Automation. Unlike most orchestrators, which are complex to deploy and require cumbersome integrations, the solution from VMware and Amdocs uses pre-built and certified integrations from NFV infrastructure (NFVI) to service orchestration (SO), accelerating time to

deploy and simplifying vendor management. The solution is by design vendor-neutral to enable the onboarding and management of any standards-compliant network function from any vendor in any format (physical, VM, or container) across any network domain (access, transport, core). The solution also bridges the traditionally siloed customer and network domains for end-to-end service provisioning and lifecycle management. From the sales order to its activation, activities are centralized and streamlined for better coordination, agility and cost efficiency.

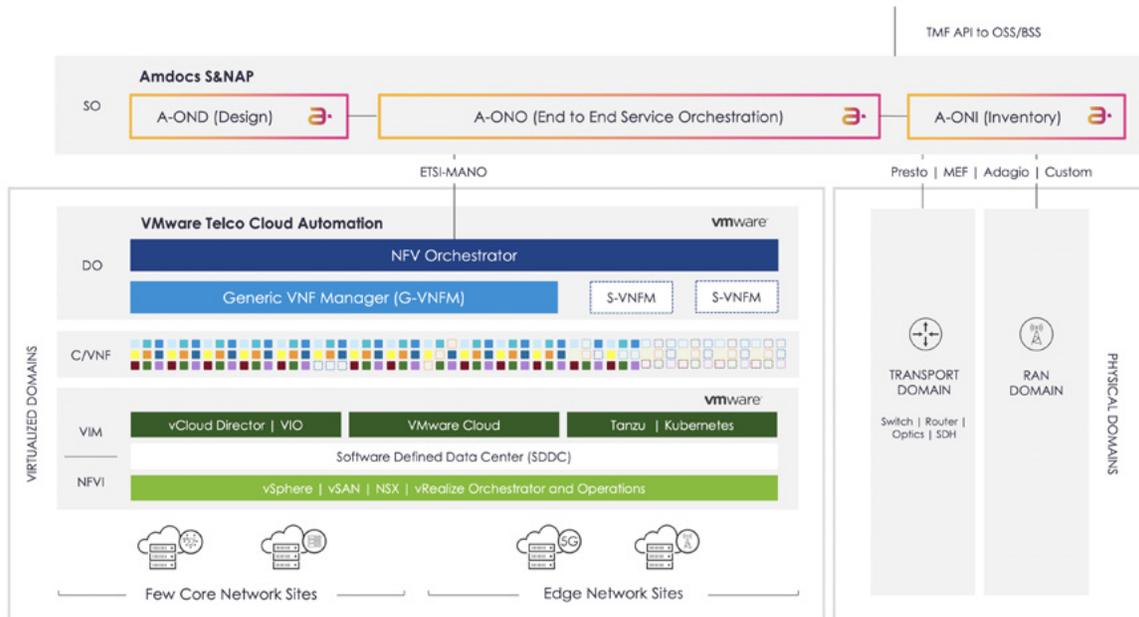


Figure 2: Multi-Domain End-to-End Service Delivery

KEY BENEFITS

- Accelerate service time to market from months to days with simplified multi-domain provisioning, design and onboarding capabilities
- Gain operational efficiencies with centralized service management and avoid error-prone manual tasks through lifecycle management automation
- Ensure service experience through workload mobility, dynamic scalability, closed-loop healing and enhanced resilience
- Optimize infrastructure resources utilization through optimized Amdocs S&NAP and VMware NFVO, G-VNFM, and VIM/NFVI integrations
- Avoid vendor lock-in and costly integrations, maximize current infrastructure investments, innovate faster, reduce project complexity, and overall time to deploy using pre-built VMware and Amdocs integrations
- Get the most of your telco cloud by leveraging best-of-breed network functions and benefits from a healthy multi-vendor ecosystem
- Lower version validation and support fees with Amdocs integrate partners and VMware Ready for NFV certification program

Multi-vendor, multi-domain, multi-cloud network service delivery

Multi-domain network service delivery spans network elements across the radio access (RAN), packet core (core to edge), and transport domains. The RAN and Core support the services-related functions while the transport enables the physical connectivity between domains and across distributed data centers of the same domain. For modern networks and especially 5G, the entire packet core and certain components of the RAN domain are software-defined and leverage the telco cloud. As the network services rely more on the telco cloud, service and infrastructure orchestrators must master this fundamental component.

The Amdocs and VMware solution provides the best of both worlds. While VMware offers reliable, future-proof network and resource orchestration, and automation for virtualized domains (NFVO), Amdocs supports end-to-end service and resource orchestration and network lifecycle management in a cross-domain, multi-vendor environment.

Amdocs Service and Network Automation Platform (S&NAP) is the solution for the end-to-end service lifecycle management of network and cloud services, from design and creation to orchestration, continuous monitoring and operation. The platform assures the end-to-end services and network traffic by orchestrating service-related operational activities and policy management. Amdocs S&NAP interacts with domains, including physical and transport as well as the virtual infrastructure through VMware Telco Cloud Automation, ensuring that resources are properly allocated to a variety of network functions across all domains.

The Amdocs Service and Network Automation Platform (S&NAP) supports product to service decomposition by integrating to common BSS systems, validating each order and decomposing it into individual service orders, then sending them to the relevant external systems such as inventories, activation, WFM, or domain orchestrators for cloud and virtual functions and infrastructure. The S&NAP stores the service orders and sends fulfillment status notifications for error handling. It provides full visibility via a 360-degree view of the service order and all related objects, such as services, processes and tasks. It also supports remediation of fallouts both manually and automatically, based on preconfigured policy, and enables advanced SLA and jeopardy management. The platform can execute service orders and fulfillment activities while handling amendments and in-flight order changes. With the ability to integrate to any product catalog, it supports dynamic fulfillment of orders, as well as to change order activities at nearly every stage of the execution, without

the need to roll back and re-fulfill the order. The platform is integrated to key elements: master product catalog, ordering systems, service and resource inventory, and activation platforms. The solution is also pre-integrated with Amdocs portfolio solutions, including Amdocs resource and services manager, and in compliance with leading industry standards (e.g. TMFs OSS/J).

KEY CAPABILITIES

- Design services with a centralized environment that uses ETSI standards-based models for any end-to-end service type and its policies
- Model network services based on multi-vendor network functions and combination of technologies (VNF/CNF, Transport and RAN)
- Abstract the multi-cloud infrastructure and resources management
- Orchestrate composite services and hand off atomic services through any vendor, across any domain and cloud
- Manage 5G slice lifecycle across multi-vendor and multi-domain networks
- Manage business policies to dynamically control allocated / used network resources
- Manage container-based infrastructure resources with application-driven Kubernetes cluster management
- Centralize and synchronize inventories across all domains and clouds (e.g., resources, network functions)
- Leverage cloud-first intent-based placement to limit fallouts while enabling exception management through retry, undo or manual treatment
- Automate lifecycle management of network functions and services (day 0 to day 2 operations)
- Manage service-to-service interactions – both positive and negative (conflicting) ones
- Perform active service testing execution
- Gain 360° awareness of the service delivery domains and layers from infrastructure to network functions and services

From a virtualized domain perspective, VMware Telco Cloud Automation interacts with Amdocs S&NAP's Open Network Orchestrator (ONO) through standard ETSI-MANO interfaces. VMware Telco Cloud Automation applies a cloud-first approach to MANO, a strategy that abstracts much of the cloud complexities and exposes the new multi-cloud ecosystem through standard telco interfaces. At the heart of this approach is VMware's integrations of each layer of the telco cloud and the continuous synchronization of the cloud infrastructure (VIM/NFVI) with the management and orchestration stack (SO/NFVO/VNFM). This innovative approach allows network functions and services to be multi-cloud aware and to leverage all available data centers as a shared pool of resources. It also enables more savvy policy and placement decisions that avoid rollbacks and retries, major problems in most of today's orchestration implementations. By combining this cloud-first philosophy with a standards-based approach and a network function vendor-neutral position, VMware Telco Cloud Automation helps CSPs to:

- Orchestrate and automate lifecycle management (day 0 to day 2 operations) of virtualized network services, functions, and resources with multi-cloud agility from the core to the edge and from private to public cloud
- Unify the management of network functions of any vendor on VM-based and container-based infrastructures (ETSI standard-compliant VNF/CNF/PNF)

- Streamline the shift to virtualized domains orchestration with native VIM or Kubernetes integrations and a pluggable architecture following ETSI-MANO standards
- Enable a thriving multi-vendor telco cloud ecosystem with standard interfaces and the certification of partner network functions from the cloud infrastructure up to the network services

Unique advantages of combining best-of-breed products

The integrated platforms provide centralized capabilities such as a unified service design studio that combines VMware Telco Cloud Automation's network service composer and Amdocs OND (Open Network Designer – component of Amdocs S&NAP). This studio enables the creation and distribution of ONAP-SDC/ETSI-MANO compliant blueprints across all service and infrastructure/resource delivery domains. With the same objective of centralization, the solution collects data points across all domains to provide single-pane-of-glass visibility of virtual and physical networks – including their states (FM/PM/KPI) and all related inventories (e.g., elements, networks and resources). These data points are used for monitoring but also to create intelligent and automation policies that enhance lifecycle management operations and quality of services with better availability and resilience.

The solution shares end-to-end single sign-on (SSO), allowing users to sign on once and navigate across both platforms. Furthermore, each version is certified across all components of both vendors at every release.

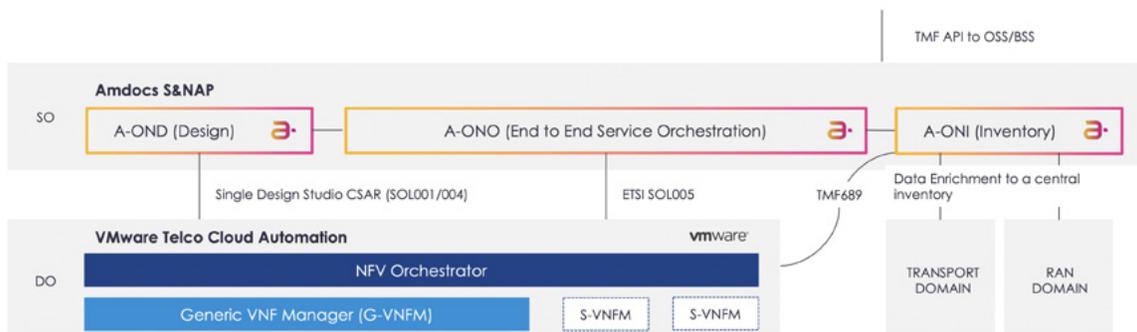


Figure 3: Single Service Designer and Centralized Inventories

A powerful suite of use cases to redefine service delivery

Build new offering with 5G slicing

Network slices span across the RAN, transport and packet core networks and utilize virtual, containerized and physical network functions that are deployed to each network slice instance, depending on the specific service it serves. To gain maximum agility, these network functions can then be automatically scaled with changes in service and performance requirements. In this multi-domain virtualized network, there is a need for a 5G slicing management entity that will coordinate the coexistence of network slices and guarantee that the required resources are available for each one. Amdocs 5G Slice Manager fulfills this exact role. Amdocs 5G Slice Manager is responsible for network slice lifecycle management and is hierarchically positioned at the top of the network management architecture to coordinate the RAN, transport and core network slice subnet operations and services, across the network siloed operational domains.

5G requires adaptive, automated and real-time systems/processes that can tune the network to business needs. Amdocs 5G Manager enables the automation of logical network segmentation with slice customization, logical network isolation and quality of service control in real time.

Accelerate the multi-domain service delivery

Amdocs ONO (Open Network Orchestrator – component of S&NAP), can receive a network service order and decompose it into one or more service requests. It receives the requests from a northbound OSS/BSS system to deploy, modify, upgrade, and terminate simple or complex composite services that can span multiple network domains and be provisioned through several domain orchestrators (DO).

A service topology plan is built to define a hierarchy or chain of network services and service components. Once the plan is ready, the execution plan consists of (1) provisioning and activation and (2) service workflow management. It executes the individual activities in sequence via their associated southbound plugins, toward individual domain orchestrators or other systems in the CSP domain. Amdocs ONO will deliver the virtual VNF service to VMware Telco Cloud Automation over SOL005, where VMware Telco Cloud Automation will instantiate, configure, and start the service over the virtualized domains.

Take advantage of multi-cloud workload placements and mobility

VMware Telco Cloud Automation supports multi-cloud placements, which allow the instantiation of services combining network functions distributed at the core, the edge, and public clouds. The solution supplies the optimal set of placement locations by matching the network function descriptor with the cloud profile (e.g., capabilities and resources). CSPs can move workloads dynamically across the clouds/data centers to maximize consumers' service experience and to optimize infrastructure resources management.

Simplify multi-vendor interoperability

The close integration, yet modularity, between Amdocs and VMware via industry-standard interfaces allows CSPs to simplify their operations and avoid the vendor lock-in for end-to-end orchestration. The VMware Ready for NFV certification program and the support of the ETSI standards with the Amdocs support of standard TMF, ETSI, and MEF SDN interfaces allow for a pluggable, productized, and agile method of supporting new transport, RAN or virtual vendor offerings.

Centralize end-to-end monitoring and management

The combined VMware and Amdocs solution creates synergies between inventories, smart policies, and resource managers. It's now possible to monitor and optimize the NFVI resources across geographically distributed NFVI nodes along with the customer transport and RAN network. CSPs can monitor their entire network and troubleshoot through a single-pane-of-glass removing the swivel chair process between multiple systems.



Operate with efficiency and enable closed-loop actions

Amdocs and VMware integration enables real-time awareness across all domains. Amdocs S&NAP centralizes end-to-end monitoring and closed-loop operations such as healing and scaling. A holistic fault and performance data collection framework gathers data from all layers of the MANO, VNF, and transport. Amdocs will aggregate multiple auto-operation models from VMware Telco Cloud Automation to allow triggering actions from NFVO, VNFM or EMS for enhanced service quality and resilience.

Improve operational team user experience

CSPs can leverage the integration of Amdocs service orchestration with VMware virtualized domain orchestration for a superior user experience while introducing seamless end-to-end automation that deals with multiple domains from a single interface. With this joint solution, CSPs can now deploy services across multiple parallel layers with a single click.

Accelerate the network transformation journey while controlling operational costs

Through their network transformation, CSPs must build orchestration and automation practices at the heart of their service delivery processes. VMware and Amdocs have partnered to deliver a solution that streamlined network transformation with end-to-end service orchestration and automation across domains, vendors, and technologies. A solution that closes the gap between the service and infrastructure-driven approaches, allowing CSPs to implement modern network capabilities faster while mitigating innovation and operational costs.

For more information about end-to-end service delivery orchestration and automation, please visit telco.vmware.com, www.amdocs.com or contact your VMware and Amdocs representatives.

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