Elastic Services Controller Overview

Cisco Elastic Services Controller (ESC) is a Virtual Network Functions Manager (VNFM), performing life cycle management of Virtual Network Functions (VNFs). ESC provides agentless and multi vendor VNF management by provisioning the virtual services, and monitoring their health and load. ESC provides the flexibility to define rules for monitoring, and associate actions to be triggered based on the outcome of these rules. Based on the monitoring results, ESC performs scale in or scale out on the VNFs. It also supports automatic VM recovery when a VM fails.

ESC fully integrates with Cisco and other third party applications. As a standalone product, the Elastic Services Controller can be deployed as a VNF Manager. ESC integrates with Cisco Network Services Orchestrator (NSO) to provide VNF management along with orchestration. Elastic Services Controller (ESC) as a VNF Manager targets the virtually managed services and all service provider NFV deployments such as virtual video, WiFi, authentication and others.

Complex services include multiple VMs that are orchestrated as a single service with dependencies between them. These multiple VMs are managed as a single entity, for example, Virtually Managed Services (vMS) 1.0.

ESC Terminology Usage

The following terms are used throughout the document:

- **Virtual Machine (VM)**—A virtual machine (VM) is an operating system OS or application installed on a software which imitates dedicated hardware. The end user has the same experience on a virtual machine as they would have on dedicated hardware.

- **Virtual Network Function (VNF)**—A VNF consists of a single or a group of VMs with different softwares and processes that can be deployed on a Network Function Virtualization Infrastructure (NFVI).

- **Virtual Network Function Manager (VNFM)**—Manages the life cycle of a VNF.
• Network Function Virtualization Orchestrator (NFVO)—An ETSI NFV MANO standard term. The orchestrator communicates with ESC APIs to perform all the VNFM functions.

• Service—A Service consists of single or multiple VNFs.

• Virtual Infrastructure Manager (VIM)—The Virtualized Infrastructure Manager adds a management layer for the data center hardware. Its northbound APIs are consumed by other layers to manage the physical and virtual resources for instantiation, termination, scale in and out procedures, and fault & performance alarms.

• Key Performance Indicator (KPI)—Measures performance management. KPIs specify what, how and when parameters are measured. KPI incorporates information about source, definitions, measures, calculations for specific parameters.

Target Users

• Service Providers (SPs)—Helps SPs reduce cost of operating the networks by providing effective and optimal resource usage.

• Small-to-Medium Businesses (SMBs)—Helps meet the needs of single- and small-to-medium businesses to administer and control network functions. Cisco Elastic Services Controller automates provisioning, configuring and monitoring of network functions. Small-to-medium businesses can benefit by leveraging some of the basic services such as DNS, DHCP and NTP.

Key Features of Elastic Services Controller

• Provides open and modular architecture, which allows multi-vendor OSS, VNF and VIM support.

• Provides end-to-end dynamic provisioning and monitoring of virtualized services using a single point of configuration.

• Provides customization across different phases of life cycle management; while monitoring the VM, service advertisement, and custom actions.

• Provides agentless monitoring with an integrated Monitoring Actions (MONA) engine. The monitoring engine provides simple and complex rules, to decide scale in and scale out of VMs.

• Provides scale in and scale out options based on the load of the network.

• Deploys or removes VMs based on the monitoring errors and threshold conditions detected as part of healing (also called as recovery).

• Supports service agility by providing faster VNF deployment and life cycle management.

• Supports multi-tenant environments.

• Supports REST and NETCONF / YANG interfaces to provide better hierarchical configuration and data modularity.

ESC Architecture

Elastic Services Controller (ESC) provides open and modular architecture, which allows OSS, and multi-vendor support. ESC performs life cycle management of the VNFs, that is, VNF onboarding, configuring the VNFs,
monitoring them, and making VNF level life cycle decisions such as healing and scaling based on the KPI requirements. Elastic Services Controller (ESC) and its managed VNFs are deployed as VMs running within a Virtual Infrastructure Manager (VIM). Currently, OpenStack is supported. The ESC core engine manages transactions, validations, policies, workflows, VM state machines and rollbacks. The monitoring and actions service engine in ESC performs monitoring based on several monitoring methods. Events are triggered based on the monitoring actions. The monitoring engine also supports custom monitoring plugins.

ESC can be configured for High Availability. For details, see the Cisco Elastic Services Controller Install and Upgrade Guide.

ESC interacts with the top orchestration layer using the REST and NETCONF/YANG NB APIs. The orchestration layer can be a Cisco NSO or any third party OSS. Confd enables integration with NSO by adding NETCONF/YANG north bound interface support. A configuration template, Virtual Network Function Descriptor (VNFD) file is used to describe the deployment parameters and operational behaviors of the VNFs. This VNFD is used in the process of onboarding a VNF and managing the life cycle of a VNF instance. Figure 1: Cisco Elastic Services Controller Architecture represents the Elastic Services Controller architecture.

Figure 1: Cisco Elastic Services Controller Architecture

ESC can be deployed in the following ways:

Elastic Services Controller Usage Scenarios

ESC can be deployed in the following ways:
As part of the Cisco Orchestration Suite, ESC is packaged with Cisco Network Service Orchestrator (NSO), and available within Cisco Solutions such as Virtually Managed Services (vMS) and Cisco Cloud Services (CCS).

As a standalone product, ESC is available as a VNFM bundled with Cisco VNFs such as VPN, vRouter, vSecurity and many others.