An overview of Cisco Intelligent Automation for Cloud

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Paper2, April 30, 2017

Cisco Intelligent automation for cloud is a cloud platform that can deliver services across mixed environments. Its services range from underlying infrastructure to anything-as-a-service and allows the users to evaluate, transform and deploy various IT services. It provides a foundation for organizational transformation by expanding the uses of cloud technology beyond its infrastructure.

Keywords: Automation, Multitenancy, Integration, Orchestration, Provisioner

https://github.com/cloudmesh/sp17-i524/blob/master/paper2/S17-IR-2018/report.pdf

1. INTRODUCTION

Cisco Intelligent Automation for Cloud (IAC) provides a framework that allows users to make use of the cloud services effectively and manage the cloud beyond Infrastructure-as-a-service (IaaS) [1]. It can be considered as a unified cloud platform that can deliver any type of service across mixed environments [2]. This leads to an increase in cloud penetration across different businesses. Its services range from underlying infrastructure to anything-as-a-service by allowing its users to evaluate, transform and deploy the IT and business services in a way they desire. Cisco Intelligent Automation for Cloud automates sophisticated data center from a single self-service portal which is beyond the provision of virtual machines. It creates a catalog of standardized service offerings, thereby implementing policy-based controls. It also provides resource management across different aspects of IT infrastructure such as network, virtualization, storage, compute and applications.

2. COMPONENTS

Cisco Intelligent Automation for Cloud consists of major interface and automation components. In other words, it provides an integrated stack of core elements namely Cisco Cloud Portal, Cisco Process Orchestrator, Cisco Process Orchestrator Integration Framework, Cisco Server Provisioner, and Cloud Automation Packs [3].

2.1. Cisco Cloud Portal

Cisco Cloud Portal is a web-based service portal that helps users to order and manage services. It provides a configurable interface for different roles and departments which include managers, administrators and consumers [3]. This provides an access to a catalog of on-demand IT resources. Service requests for resources running on cross-platform infrastructure can be managed effectively by Cisco Cloud Portal. It tracks and manages lifecycle of each service from the initial request to withdrawal. The modules which constitute Cisco Cloud Portal are Cisco Portal Manager, Cisco Service Catalog, Cisco Request Center and Cisco Service Connector.

Cisco Portal Manager combines data from multiple sources providing a highly flexible portal interface. It manages the interface and increases user satisfaction. It provides a drag-and-drop facility on the interface making it easier for the users to create their own portal views which ensures flexibility [4]. Depending on the user requests, Cisco Service Catalog provides a controlled access to IT resources through standardized service options. It makes use of reusable components and tools for publishing services in the portal. Cisco Request Center provides lifecycle management and request management for the infrastructure services. To ensure data center management, it maintains policy-based controls and reduces the cycle time for the ordering, approval and provisioning process. It uses advanced methods for simplifying the ordering process. It also helps in streamlining end-to-end service delivery cycle time. Cisco Service Connector is a platform that can be used for integrating with third-party systems. This supports a heterogeneous data center environment by providing adaptors for integrating with automated provisioning systems.

2.2. Cisco Process Orchestrator

Cisco Process Orchestrator is a component of Cisco IAC responsible for automation of service management and assurance instantiation. It is an orchestration engine that provides an automation design studio and a reporting and analytics module. It is useful in automating and standardizing IT processes in heterogeneous environments [5]. It considers IT automation as a service-oriented approach and focuses more on services. It allows users to deploy services by defining new instances in

real time. Cisco Process Orchestrator acts as a foundation for building application, network and data center oriented solutions. It includes auditing and extensive reporting and provides workspaces for developers and administrators making it easier for the stakeholders to manage services.

The primary function of Cisco Process Orchestrator is to provide automation through integration with domain managers and tools in the environment [6]. Automation Packs and Adapters are the features used in the integration. Some of the services include event correlation, application provisioning and event application provisioning. It usually receives events requiring further analysis. It also includes security tools, configuration tools, change management systems, visualization management tools, provisioning systems and service desks.

2.3. Cisco Process Orchestrator Integration Framework

Cisco Process Orchestrator Integration Framework is responsible for integrating Cisco IAC with any data center element in the environment. It connects IT service management tools into streamlined and automated processes by making use of field-built integration. VMware, SAP, Oracle DB, Remedy and Windows are some of the available integrations. Field integration and automation are carried out by the design studio which provides web services, database access and command-line interface.

2.4. Cisco Server Provisioner

Cisco Server Provisioner is a software application used for deploying systems with Linux, Windows and Hypervisors from bare metal in IT organizations and data centers [7]. It acts as an application for native and remote installations on physical and virtual servers. It provides imaging component for OS and Hypervisor. The Cisco Server Provisioner can be considered as a server suite that consists of Bare Metal Provisioning Payloads and Bare Metal Imaging Payloads which provide GUI and API interfaces including remote file copying and remote troubleshooting. Provisioner runs on a dedicated system which does not run any other application. Some of the benefits of the Provisioner include reduced deployment time and increased utilization of systems.

2.5. Cloud Automation Packs

Cloud Automation Packs are the workflows useful for complex computing tasks. The tasks include automation of core activities that cover various domains, Cisco Server Provisioner task automation, VMware task automation and Cisco UCS Manager task automation. Automation Packs provide a set of target groups, variables, configurations and process definitions required for defining automated IT processes. Automation Packs combine with Adaptors to enable integrations. Integration with IT element is carried out through a combination of automation content from an Automation Pack and a set of Adaptors. Some of the integration scenarios include Command Line Interface invocations, Web Service integration, Messaging integration and Scripting support. Automation content can leverage Adaptors to enable these scenarios. Automation Packs can be used to build, pack, update and ship the integrations.

3. FUNCTIONS

Cisco Intelligent Automation for Cloud provides a platform for designing, deploying and operating a cloud infrastructure in a public, private or a hybrid model. It supports various cloud management activities including setup and design, system operations, reporting and analytics.

3.1. Self-Service Interface

Self-Service Interface is a web-based interface which allows the users to view the service catalog according to their roles and other access controls. It provides dynamic forms by which users can provide configuration details and order services. It also allows the users to track order status, manage and modify placed orders and view the usage and consumption.

3.2. Service Delivery Automation

After the approval of the placed orders, Service Delivery Automation takes place to orchestrate the configuration and provision of resources like compute, network, storage and supporting services such as firewall, disaster recovery and load balancing [3]. The automated provisioning provides consumption tracking and integration into metering and billing systems. The automated processes then orchestrate the configuration updates and allows the service information updates to be sent back to the system management tools and web-based portal.

3.3. Operational Process Automation

Operational Process Automation coordinates the operational tasks for cloud management which include service-level management, alerting, reporting, capacity planning, performance management, user management and maintenance checks. It provides user administration capability to control user roles and identity, placing the users securely isolated from each other. Systems incidents can be managed by the users through alert management feature and all the processes and results can be tracked and reported by the reporting functionality. Operational Process Automation consists of an Automation Control Center which is a console for viewing and controlling automated processes.

3.4. Network Automation

Cisco IAC allows a manual pre-provisioning of network layer with the increasing amount of data being placed in cloud. This is carried out by Network Automation. Network Automation enables deployment of network services through the Self-Service Portal with a single order [8]. It facilitates dynamic installation of virtual network devices with onboarding users and creates network topologies for the users based on the applications they use.

3.5. Cloud Governance

Through Cloud Governance, Cisco IAC delivers a set of measures for tracking business-oriented metrics. Cloud Governance provides portfolio management across different cloud environments. It allows organizations to establish limits ahead of time. Financial granularity is achieved by these consumption limits.

3.6. Advanced Multitenancy

Advanced Multitenancy allows multiple users to securely reside in a shared environment by providing isolated containers. User management work is offloaded from the cloud provider as the users are controlled by the cloud administrators. Multitenancy sets service pricing per user and accordingly, the services can be enabled or disabled per organization or user. It provides onboarding, modification and offboarding of users and enables secure containers by instantiating network devices.

3.7. Multicloud Management

By Multicloud Management, service providers can tailor their services to specific project needs and specific functions of the hypervisor platforms. For example, Cisco IAC supports two infrastructure layers namely Cisco UCS Director and OpenStack [8]. It allows administrators to manage network services and virtual machines by integrating with Havana and Icehouse. This allows the Cisco UCS Director users to manage Microsoft System Center Virtual Machine Manager.

3.8. Resource Management

Cisco IAC Resource Management orchestrates resource-level operations across different hypervisors such as Hyper-V, Xen or VMware, compute resources such as Cisco UCS, network resources and storage resources such as NetApp. This is done by orchestrating the requests to domain resource managers. It provides maintenance and replacement of units. Capacity management is provided by automated capacity utilization checks, trending reports and alerts. The usage and user quota are managed by automated monitoring and metering of user accounts.

3.9. Lifecycle Management

Lifecycle Management is responsible for creation of service definitions which include selection parameters, business and technical processing flows, pricing options and design descriptions. It also involves management of a service model and underlying automation design for managing a service. Automation design is managed by creating workflows to automate service provisioning, modification, decommissioning and upgrades. The designs are modified by point-and-click-tools instead of custom programming. Lifecycle Management tracks all aspects of services that are running which includes business and project information.

4. DEPLOYMENT

Cisco Intelligent Automation for Cloud is deployed as a software solution. For planning, preparation, design, implementation and optimization of cloud services, it is deployed along with services engagement. The services engagement involves creation of automation workflows and development of a cloud strategy. It focuses on service capabilities for the software deployment.

5. CONCLUSION

Cisco Intelligent Automation for Cloud is a framework useful in expanding cloud responsiveness and flexibility. It provides services beyond provisioning virtual machines. It delivers various services in a self-service manner across mixed environments. The cloud management in Cisco Intelligent Automation for Cloud allows users to evaluate, procure and deploy IT services according to the needs. Self-Service Portal, Service Delivery Automation, Network Automation, Resource Management, Provisioning, Advanced Multitenancy, Portfolio Management and Lifecycle Management are the elements responsible for the cloud management in Cisco Intelligent Automation for Cloud. Cisco IAC integrates with Cisco Unified Computing System, one of the Cisco solutions, to provide the required environment for big data and analytics.

6. ACKNOWLEDGEMENTS

The author thanks Professor Gregor Von Lazewski and all the AIs of Big Data class for the guidance and technical support.

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