Enterprise Databases

FlexPod

NetApp
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Enterprise Databases

SAP

Introduction to SAP on FlexPod

The FlexPod platform is a predesigned, best practice data center architecture that is built on the Cisco Unified Computing System (Cisco UCS), the Cisco Nexus family of switches, and NetApp storage controllers.

FlexPod is a suitable platform for running SAP applications, and the solutions provided here allows you to quickly and reliably deploy SAP HANA with a model of tailored datacenter integration. FlexPod delivers not only a baseline configuration, but also the flexibility to be sized and optimized to accommodate many different use cases and requirements.

FlexPod Datacenter for SAP solution using FibreChannel SAN with Cisco UCS Manager 4.0 and NetApp ONTAP 9.7

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

This document describes the Cisco and NetApp FlexPod Datacenter with NetApp ONTAP 9.7 on NetApp AFF A400 storage and Cisco UCS Manager unified software release 4.1(1) with second-generation Intel Xeon Scalable Processors for SAP HANA in particular.

FlexPod Datacenter with NetApp ONTAP 9.7 and Cisco UCS unified software release 4.1(1) is a pre-designed, best-practice datacenter architecture built on the Cisco Unified Computing System (Cisco UCS), the Cisco Nexus 9000 family of switches, MDS 9000 multilayer fabric switches, and NetApp AFF A-Series storage arrays running ONTAP 9.7 storage OS.

FlexPod Datacenter for SAP solution using FibreChannel SAN with Cisco UCS Manager 4.0 and NetApp ONTAP 9.7

SAP Non-HANA with SQL white paper - Design

The current IT industry is witnessing a dramatic transformation in data center solutions. In recent years, there has been a considerable interest in prevalidated and engineered data center solutions. Introduction of virtualization technology in critical areas has had a major impact on the design principles and architecture of these solutions. It has allowed many applications running on bare-metal systems to migrate to new virtualized integrated solutions. FlexPod is one such prevalidated and engineered data center solution designed to address the rapidly changing needs of IT departments. Cisco and NetApp have partnered to deliver FlexPod, which uses bestin-class computing, networking, and storage components as the foundation for a variety of enterprise workloads, including databases, enterprise resource planning (ERP), customer relationship management (CRM), and web applications.

The consolidation of IT applications, particularly databases, has generated considerable interest in recent years. The most widely adopted and deployed database platform over the past several years is Microsoft SQL

Server. SQL Server databases frequently have become subject to database sprawl, leading to IT challenges such as underutilized servers, incorrect licensing, security concerns, management concerns, and huge operational costs. Therefore, SQL Server databases are good candidates for consolidation on a more robust, flexible, and resilient platform. This document discusses a FlexPod reference architecture for deploying and consolidating SQL Server databases.

SAP Non-HANA with SQL white paper - Design

FlexPod Datacenter for SAP Solution with Cisco UCS third-generation fabric and NetApp AFF A–Series

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

This document describes the deployment methodology of Cisco and NetApp FlexPod Datacenter for SAP HANA based on second-generation Intel Xeon Scalable Processors supported Cisco UCS Computing System (Cisco UCS).

Cisco UCS Manager (UCSM) 4.0(4) provides consolidated support of all current Cisco UCS Fabric Interconnect models (6200, 6300, 6324 and 6454), 2200/2300 series IOM, Cisco UCS B-Series Blade, and Cisco UCS C-Series Rack Formfactor servers. FlexPod Datacenter with Cisco UCS unified software release 4.0(4d) and NetApp ONTAP 9.6, is a pre-designed, best-practice data center architecture built on the Cisco UCS, the Cisco Nexus 9000 family of switches, and NetApp AFF A-Series storage arrays.

FlexPod Datacenter for SAP Solution with Cisco UCS third-generation Fabric and NetApp AFF A–Series

FlexPod Datacenter for SAP solution using FibreChannel SAN with Cisco UCS Manager 4.0 and NetApp ONTAP 9.7 - Design

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

Cisco and NetApp have partnered to deliver a series of FlexPod solutions that enable strategic data center platforms. The FlexPod solution delivers an integrated architecture that incorporates computing, storage, and network design best practices, thereby minimizing IT risks by validating the integrated architecture to ensure compatibility between various components. The solution also addresses IT pain points by providing documented design guidance, deployment guidance, and support that can be used in various stages (planning, designing, and implementation) of a deployment.

FlexPod Datacenter for SAP solution using FibreChannel SAN with Cisco UCS Manager 4.0 and NetApp ONTAP 9.7 - Design

FlexPod Datacenter for SAP solution with Cisco ACI, Cisco UCS Manager 4.0, and NetApp AFF A–Series - Design

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

This document describes Cisco ACI integrated FlexPod solution as a validated approach for deploying SAP HANA Tailored Data Center Integration (TDI) environments. This

validated design provides guidelines and a framework for implementing SAP HANA with best practices from Cisco and NetApp.

The recommended solution architecture is built on the Cisco Unified Computing System (Cisco UCS) using a unified software release to support Cisco UCS hardware platforms that include the following components:

- Cisco UCS B-Series blade servers and Cisco UCS C-Series rack servers configurable with the Intel Optane Data Center Persistent Memory Module (DCPMM) option
- Cisco UCS 6400 series Fabric Interconnects
- Cisco Nexus 9000 Series Leaf and Spine switches
- NetApp All Flash series storage arrays

Additionally, this document provides validations for both Red Hat Enterprise Linux and SUSE Linux Enterprise Server for SAP HANA.

FlexPod Datacenter for SAP solution with Cisco ACI, Cisco UCS Manager 4.0, and NetApp AFF A–Series - Design

FlexPod Datacenter for SAP with Cisco ACI, Cisco UCS Manager 4.0, and NetApp AFF A–Series - Deployment

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

This document describes the architecture and deployment procedures for the SAP HANA Tailored DataCenter Integration option on FlexPod infrastructure, which is composed of:

- Cisco UCS Computing System (Cisco UCS) supported by second-generation Intel Xeon Scalable Processors.
- Switching products that leverage Cisco Application Centric Infrastructure (ACI).
- NetApp A-series AFF arrays.

The intent of this document is to show the detailed configuration steps for SAP HANA deployment

FlexPod Datacenter for SAP with Cisco ACI, Cisco UCS Manager 4.0, and NetApp AFF A–Series - Deployment

FlexPod Datacenter for SAP Solution with Cisco UCS Manager 4.0 and NetApp AFF A–Series - Design

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

This document describes the Cisco and NetApp FlexPod solution, which is a validated approach for deploying SAP HANA Tailored Data Center Integration (TDI) environments. This validated design provides guidelines and a framework for implementing SAP HANA with best practices from Cisco and NetApp.

FlexPod is a leading integrated infrastructure that supports a broad range of enterprise workloads and use cases. This solution allows you to quickly and reliably deploy SAP HANA with a model of a tailored data center

integration mode.

FlexPod Datacenter for SAP Solution with Cisco UCS Manager 4.0 and NetApp AFF A–Series - Design

FlexPod Datacenter for SAP solution with Cisco ACI on Cisco UCS M5 servers with SLES 12 SP3 and RHEL 7.4

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

This document describes the architecture and deployment procedures for SAP HANA Tailored DataCenter Integration option on FlexPod infrastructure composed of Cisco compute and switching products that leverage Cisco Application Centric Infrastructure (ACI) - the industry-leading software-defined networking solution (SDN) - along with NetApp A-series AFF arrays. The intent of this document is to show the design principles with the detailed configuration steps for SAP HANA deployment.

FlexPod Datacenter for SAP solution with Cisco ACI on Cisco UCS M5 servers with SLES 12 SP3 and RHEL 7.4

FlexPod Datacenter for SAP Solution with IP-based storage using NetApp AFF A-Series and Cisco UCS Manager 3.2

Shailendra Mruthunjaya, Cisco
Ralf Klahr, Cisco
Marco Schoen, NetApp

The reference architecture detailed in this document highlights the resiliency, cost benefit, and ease of deployment of an IP-based storage solution. A storage system capable of serving multiple protocols across a single interface allows for customer choice and investment protection because it truly is a wire-once architecture. The solution is designed to host scalable SAP HANA workloads.

FlexPod Datacenter for SAP Solution with IP-based storage using NetApp AFF A-Series and Cisco UCS Manager 3.2

FlexPod Datacenter for SAP solution using FibreChannel SAN with Cisco UCS Manager 4.0 and NetApp ONTAP 9.7

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

This document describes the Cisco and NetApp FlexPod Datacenter with NetApp ONTAP 9.7 on NetApp AFF A400 storage and Cisco UCS Manager unified software release 4.1(1) with second-generation Intel Xeon Scalable Processors for SAP HANA in particular.

FlexPod Datacenter with NetApp ONTAP 9.7 and Cisco UCS unified software release 4.1(1) is a pre-designed, best-practice datacenter architecture built on the Cisco Unified Computing System (Cisco UCS), the Cisco Nexus 9000 family of switches, MDS 9000 multilayer fabric switches, and NetApp AFF A-Series storage arrays

running ONTAP 9.7 storage OS.

FlexPod Datacenter for SAP solution using FibreChannel SAN with Cisco UCS Manager 4.0 and NetApp ONTAP 9.7

Deploy SAP application servers on FlexPod with SQL

FlexPod is a pre-validated and engineered data center solution designed to address the rapidly changing needs of IT departments. Cisco and NetApp have partnered to deliver FlexPod, which uses best-in-class computing, networking, and storage components as the foundation for a variety of enterprise workloads, including databases, enterprise resource planning (ERP), customer relationship management (CRM), and web applications. The consolidation of IT applications, particularly databases, has generated considerable interest in recent years. The most widely adopted and deployed database platform over the past several years is Microsoft SQL Server. SQL Server databases frequently have become subject to database sprawl, leading to IT challenges such as underutilized servers, incorrect licensing, security concerns, management concerns, and huge operational costs. Therefore, SQL Server databases are good candidates for consolidation on a more robust, flexible, and resilient platform. This document discusses a FlexPod reference architecture for deploying and consolidating SQL Server databases.

Deploy SAP application servers on FlexPod with SQL

FlexPod Datacenter for SAP with Cisco ACI, Cisco UCS Manager 4.0, and NetApp AFF A–Series

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

This document describes the architecture and deployment procedures for the SAP HANA Tailored DataCenter Integration option on FlexPod infrastructure, which is composed of:

- Cisco UCS Computing System (Cisco UCS) supported by second-generation Intel Xeon Scalable Processors.
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- NetApp A-series AFF arrays.

FlexPod Datacenter for SAP with Cisco ACI, Cisco UCS Manager 4.0, and NetApp AFF A–Series

FlexPod Datacenter for SAP solution with Cisco ACI, Cisco UCS Manager 4.0, and NetApp AFF A–Series - Design

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

This document describes Cisco ACI integrated FlexPod solution as a validated approach for deploying SAP HANA Tailored Data Center Integration (TDI) environments. This validated design provides guidelines and a framework for implementing SAP HANA with

best practices from Cisco and NetApp.

The recommended solution architecture is built on the Cisco Unified Computing System (Cisco UCS) using a unified software release to support Cisco UCS hardware platforms that include the following components:

- Cisco UCS B-Series blade servers and Cisco UCS C-Series rack servers configurable with Intel Optane Data Center Persistent Memory Module (DCPMM) option
- Cisco UCS 6400 series Fabric Interconnects
- Cisco Nexus 9000 Series Leaf and Spine switches
- NetApp All Flash series storage arrays

Additionally, this document provides validations for both Red Hat Enterprise Linux and SUSE Linux Enterprise Server for SAP HANA.

FlexPod Datacenter for SAP solution with Cisco ACI, Cisco UCS Manager 4.0, and NetApp AFF A–Series - Design

FlexPod Datacenter for SAP solution with Cisco UCS third-generation fabric and NetApp AFF A–Series

Shailendra Mruthunjaya, Cisco
Ralf Klahr, Cisco
Marco Schoen, NetApp

This document describes the deployment methodology of Cisco and NetApp FlexPod Datacenter for SAP HANA based on based on the Cisco UCS Computing System (Cisco UCS) supported by second-generation Intel Xeon Scalable Processors.

Cisco UCS Manager (UCSM) 4.0(4) provides consolidated support of all current Cisco UCS Fabric Interconnect models (6200, 6300, 6324 and 6454), 2200/2300 series IOM, Cisco UCS B-Series Blade, and Cisco UCS C-Series Rack Formfactor servers. FlexPod Datacenter with Cisco UCS unified software release 4.0(4d) and NetApp ONTAP 9.6 is a predesigned, best-practice data center architecture built on the Cisco UCS, the Cisco Nexus 9000 family of switches, and NetApp AFF A-Series storage arrays.

FlexPod Datacenter for SAP solution with Cisco UCS third-generation fabric and NetApp AFF A–Series

FlexPod Datacenter for SAP solution with Cisco UCS Manager 4.0 and NetApp AFF A–Series - Design

Pramod Ramamurthy, Cisco
Marco Schoen, NetApp

This document describes the Cisco and NetApp FlexPod solution, which is a validated approach for deploying SAP HANA Tailored Data Center Integration (TDI) environments. This validated design provides guidelines and a framework for implementing SAP HANA with best practices from Cisco and NetApp.

FlexPod is a leading integrated infrastructure that supports a broad range of enterprise workloads and use cases. This solution allows you to quickly and reliably deploy SAP HANA with a model of a tailored datacenter integration mode.

The recommended solution architecture is built on the Cisco Unified Computing System (Cisco UCS) using a unified software release to support Cisco UCS hardware platforms that include the following components:

- Cisco UCS B-Series blade servers, and Cisco UCS C-Series rack servers configurable with Intel Optane Data Center Persistent Memory Module (DCPMM) option
- Cisco UCS 6300 series Fabric Interconnects
- Cisco Nexus 9000 Series switches
- NetApp All Flash series storage arrays

In addition, this document provides validations for both Red Hat Enterprise Linux and SUSE Linux Enterprise Server for SAP HANA.

FlexPod Datacenter for SAP solution with Cisco UCS Manager 4.0 and NetApp AFF A–Series - Design

Oracle

FlexPod Datacenter with Oracle RAC Databases on Cisco UCS and NetApp AFF A-Series

Tushar Patel, Cisco
Hardikkumar Vyas, Cisco

Cisco Validated Designs include systems and solutions that are designed, tested, and documented to facilitate and improve customer deployments. These designs incorporate a wide range of technologies and products into a portfolio of solutions that have been developed to address the business needs of customers. Cisco and NetApp have partnered to deliver FlexPod, which serves as the foundation for a variety of workloads and enables efficient architectural designs that are based on customer requirements. A FlexPod solution is a validated approach for deploying Cisco and NetApp technologies as a shared cloud infrastructure.

The FlexPod Datacenter with NetApp All Flash AFF system is a converged infrastructure platform that combines best-of-breed technologies from Cisco and NetApp into a powerful converged platform for enterprise applications. Cisco and NetApp work closely with Oracle to support the most demanding transactional and response-time-sensitive databases required by today's businesses.

This Cisco Validated Design (CVD) describes the reference FlexPod Datacenter architecture using Cisco UCS and NetApp All Flash AFF Storage for deploying a highly available Oracle RAC Database environment. This document shows the hardware and software configuration of the components involved and results of various tests. Also, this document offers implementation and best practices guidance using Cisco UCS Compute Servers, Cisco Fabric Interconnect Switches, Cisco MDS Switches, Cisco Nexus Switches, NetApp AFF Storage and Oracle RAC Database.

FlexPod Datacenter with Oracle RAC Databases on Cisco UCS and NetApp AFF A-Series

FlexPod Datacenter with Oracle RAC on Oracle Linux

Tushar Patel, Cisco
Niranjan Mohapatra, Cisco
John Elliott, NetApp

The Cisco Unified Computing System (Cisco UCS) is a next-generation data center platform that unites computing, network, storage access, and virtualization into a single cohesive system. Cisco UCS is an ideal platform for the architecture of mission-critical database workloads. The combination of Cisco UCS platform, NetApp storage, and Oracle Real Application Cluster (RAC) architecture can accelerate your IT transformation by enabling faster deployments, greater flexibility of choice, efficiency, and lower risk. This Cisco Validated Design (CVD) highlights a flexible, multitenant, high performance and resilient FlexPod reference architecture featuring the Oracle 12c RAC Database.

The FlexPod platform, developed by NetApp and Cisco, is a flexible, integrated infrastructure solution that delivers pre-validated storage, networking, and server technologies. It's designed to increase IT responsiveness to business demands while reducing the overall cost of computing. Think maximum uptime, minimal risk. FlexPod components are integrated and standardized to help you achieve timely, repeatable, consistent deployments. You can plan with accuracy the power, floor space, usable capacity, performance, and cost of each FlexPod deployment.

FlexPod embraces the latest technology and efficiently simplifies the data center workloads that redefine the way IT delivers value:

- Take advantage of the capability of NetApp FAS Hybrid Arrays with Flash Pool flash to provide the capability to deploy the precise proportion of flash to spinning media for your specific application or environment.
- Leverage a pre-validated platform to minimize business disruption and improve IT agility and reduce deployment time from months to weeks.
- Slash administration time and total cost of ownership (TCO) by 50 percent.
- Meet or exceed constantly expanding hardware performance demands for data center workloads.

FlexPod Datacenter with Oracle RAC on Oracle Linux

FlexPod Datacenter with Oracle RAC Databases on Cisco UCS and NetApp AFF A-Series

Tushar Patel, Cisco
Hardikkumar Vyas, Cisco

The FlexPod Datacenter with NetApp All Flash AFF system is a converged infrastructure platform that combines best-of-breed technologies from Cisco and NetApp into a powerful converged platform for enterprise applications. Cisco and NetApp work closely with Oracle to support the most demanding transactional and response-time-sensitive databases required by today's businesses.

This Cisco Validated Design (CVD) describes the reference FlexPod Datacenter architecture using Cisco UCS and NetApp All Flash AFF Storage for deploying a highly available Oracle RAC Database environment. This document shows the hardware and software configuration of the components involved and the results of various tests. Also, this document offers implementation and best practices guidance using Cisco UCS Compute Servers, Cisco Fabric Interconnect Switches, Cisco MDS Switches, Cisco Nexus Switches, NetApp AFF Storage and Oracle RAC Database.

FlexPod Datacenter with Oracle RAC Databases on Cisco UCS and NetApp AFF A-Series

Microsoft SQL Server

FlexPod Datacenter for Microsoft SQL Server 2019 and VMware vSphere 6.7

Gopu Narasimha Reddy, Cisco
Sanjeev Naldurgkar, Cisco
Atul Bhalodia, NetApp

This document describes a FlexPod reference architecture using the latest hardware and software products and provides deployment recommendations for hosting Microsoft SQL Server 2019 databases in VMware ESXi virtualized environments. This solution also uses Cisco Workload Optimization Manager (CWOM), which provides automated recommendations for optimal and efficient resource utilization for both SQL workloads and infrastructure.

The solution is built on Cisco Unified Computing System (Cisco UCS) using the unified software release 4.1.1c to support the Cisco UCS hardware platforms, including Cisco UCS B-Series Blade Servers, Cisco UCS 6400 Fabric Interconnects, Cisco Nexus 9000 Series Switches, and NetApp AFF Series Storage Arrays.

FlexPod Datacenter for Microsoft SQL Server 2019 and VMware vSphere 6.7

FlexPod Datacenter with Microsoft SQL Server 2016 and VMware vSphere 6.5

Gopu Narasimha Reddy, Cisco
Sanjeev Naldurgkar, Cisco
David Arnette, NetApp

This document discusses a FlexPod reference architecture using the latest hardware and software products and provides configuration recommendations for deploying Microsoft SQL Server databases in a virtualized environment.

The recommended solution architecture is built on Cisco Unified Computing System (Cisco UCS) using the unified software release to support the Cisco UCS hardware platforms, including Cisco UCS B-Series Blade Servers, Cisco UCS 6300 Fabric Interconnects, Cisco Nexus 9000 Series Switches, and NetApp All Flash Series Storage Arrays. Additionally, this solution includes VMware vSphere 6.5, vSphere 6.5, providing a number of new features to optimize storage utilization and to facilitate a private cloud.

FlexPod Datacenter with Microsoft SQL Server 2016 and VMware vSphere 6.5

FlexPod Datacenter with Microsoft SQL Server 2017 on Linux VM running on VMware and Hyper-V

Gopu Narasimha Reddy, Cisco
Sanjeev Naldurgkar, Cisco
Atul Bhalodia, NetApp

This document discusses a FlexPod reference architecture using the latest hardware and software products and provides deployment recommendations for hosting Microsoft SQL Server databases in VMware ESXi and Microsoft Windows Hyper-V virtualized environments with Linux support enablement from Microsoft for SQL Server deployment.

The recommended solution architecture is built on Cisco Unified Computing System (Cisco UCS) using the unified software release 4.0.1c to support the Cisco UCS hardware platforms including Cisco UCS B-Series Blade Servers, Cisco UCS 6300 Fabric Interconnects, Cisco Nexus 9000 Series Switches, and NetApp AFF Series Storage Arrays.

FlexPod Datacenter with Microsoft SQL Server 2017 on Linux VM running on VMware and Hyper-V

FlexPod Datacenter with Microsoft SQL Server 2017 on Linux VM running on VMware and Hyper-V

Gopu Narasimha Reddy, Cisco
Sanjeev Naldurgkar, Cisco
Atul Bhalodia, NetApp

This document discusses a FlexPod reference architecture using the latest hardware and software products and provides deployment recommendations for hosting Microsoft SQL Server databases in VMware ESXi and Microsoft Windows Hyper-V virtualized environments with Linux support enablement from Microsoft for SQL Server deployment.

The recommended solution architecture is built on Cisco Unified Computing System (Cisco UCS) using the unified software release 4.0.1c to support the Cisco UCS hardware platforms, including Cisco UCS B-Series Blade Servers, Cisco UCS 6300 Fabric Interconnects, Cisco Nexus 9000 Series Switches, and NetApp AFF Series Storage Arrays.

FlexPod Datacenter with Microsoft SQL Server 2017 on Linux VM running on VMware and Hyper-V

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