

# Extending VMware Validated Design with Multiple Regions

Technical Note

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# About Extending VMware Validated Design with Multiple Regions

*Extending VMware Validated Design with Multiple Regions* provides guidelines for expanding an SDDC to more than two regions.

Although multi-region support is not a design objective for VMware Validated Design for Software-Defined Data Center, the Standard SDDC architecture can support deployments beyond two regions. This document defines options to select from if you must extend your SDDC to multiple data centers. Select an extension option according to data center location, latency between data centers, use case profiles, availability objectives, and other requirements.

This document does not cover step-by-step instructions for performing the required configuration tasks because you can repeat the step-by-step instructions in VMware Validated Design on the extra regions.

When adding regions, perform operational verification procedures after you complete the implementation.

## Intended Audience

*Extending VMware Validated Design with Multiple Regions* document is intended for consultants and architects who have a good understanding of VMware Validated Design for Software-Defined Data Center and of the business use case for a multi-region setup.

## Required VMware Software

Use *Extending VMware Validated Design with Multiple Regions* with any release of VMware Validated Design for Software-Defined Data Center. Each release is validated against certain product versions. For the supported product versions, see *VMware Validated Design Release Notes* for the version of the release of VMware Validated Design for Software-Defined Data Center you are using.

# Overview of Multi-Region Options



Each option for extending an SDDC that is compliant with VMware Validated Design beyond two regions is based on reuse of design and implementation guidance the solution already provides. Additionally, a region or data center location might be a Remote Office and Branch Office or a hybrid cloud environment.

## Disaster Recovery Pairs

Disaster recovery pairs operate like the standard two-region design of VMware Validated Design. Management and workload virtual machines can fail over between the regions.

## Multiple Availability Zones

Availability zones use VMware vSAN stretched clusters in two physically separate data centers, or fire halls in a single data center, connected with high bandwidth and low latency. You use vSphere HA to bring up workloads in the other availability zone upon an availability zone failure.

## Expanding Past Region B

To add a region to a dual-region SDDC deployment, you perform the flow for Region B in an extra data center. Because NSX for vSphere provides the cross-region overlay, mobility of management and tenant workload between the regions is possible.

## Remote Office and Branch Office

VMware Validated Design for Remote Office and Branch Office (ROBO) provides a decentralized deployment model implementation where you stand up a workload domain in each ROBO site. You can implement a centralized ROBO architecture. However, VMware Validated Design for Remote Office and Branch Office supports only the decentralized model.

## Hybrid Cloud

You can use public cloud environments that are based on a VMware technology in a multi-region SDDC and hybrid cloud. Consult with your service provider to determine the design options and how to implement them.

## Disaster Recovery Pairs

Disaster recovery pairs operate like the standard dual region design of the VMware Validated Design for Software-Defined Data Center. You fail over management and workload virtual machines between the regions.

You can repeat VMware Validated Design to create multiple disaster recovery pairs.

Because vCenter Server and Site Recovery Manager have a one-to-one relationship, you must deploy a separate Site Recovery Manager instance for failover of tenant workloads between the regions in the pair.

If you choose this approach, you must decide on the configuration of vRealize Automation instances:

- Deploy multiple vRealize Automation instances, that is, one deployment per disaster recovery pair. For example, this setup is useful in the following cases:
  - The number of managed virtual machines and concurrent machine provisions for the initially deployed instance of vRealize Automation are going to exceed the supported maximums
  - The latency between the regions is too high to have one instance manage all workloads.
- Single vRealize Automation deployment for all disaster recovery pairs. This setup provides a consistent URL and user experience to end users.

Figure 2-1. Region A - Region B Disaster Recovery Pair

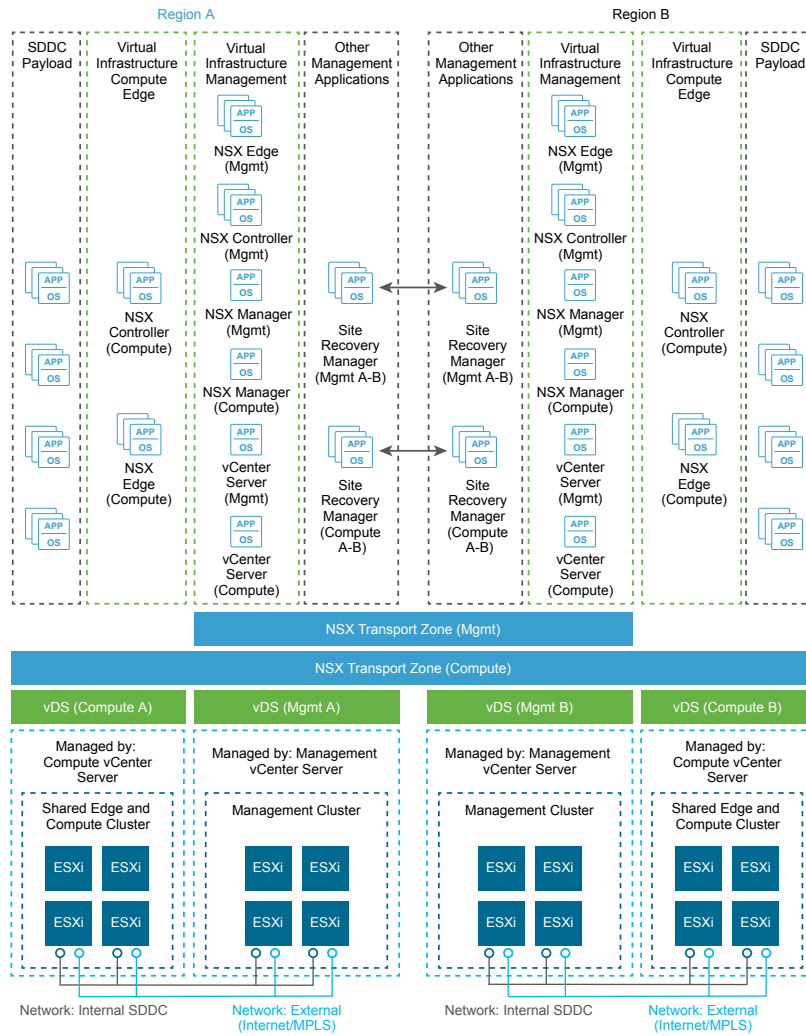
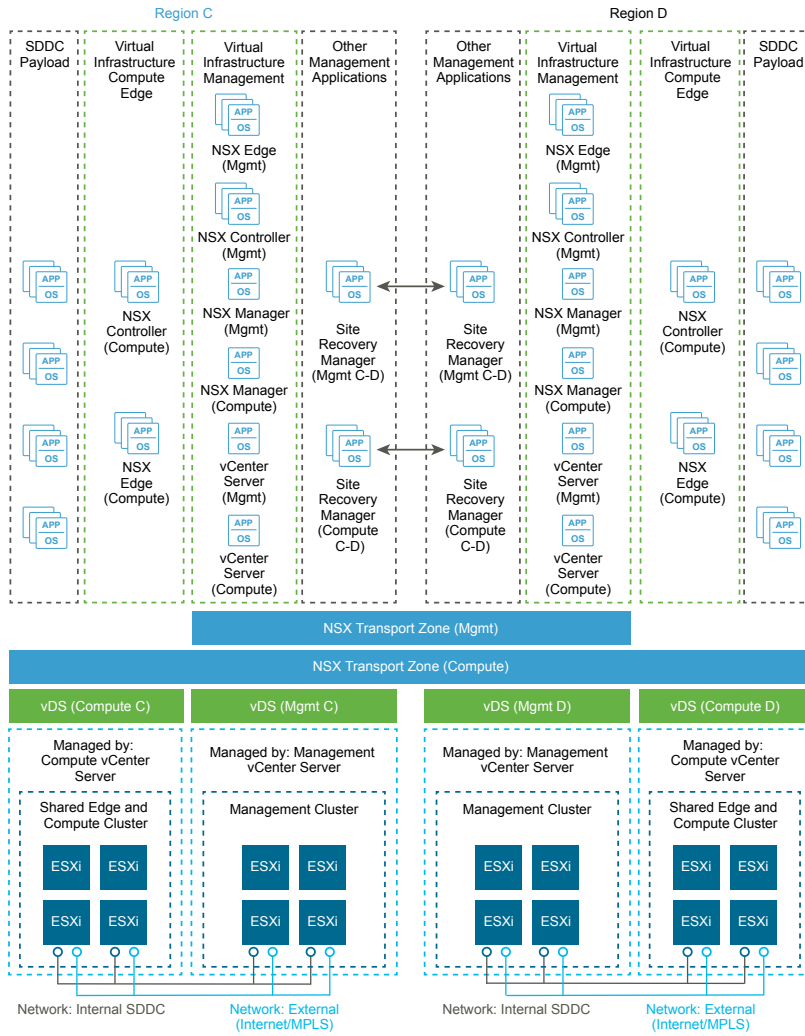


Figure 2-2. Region C - Region D Disaster Recovery Pair





## Multiple Availability Zones

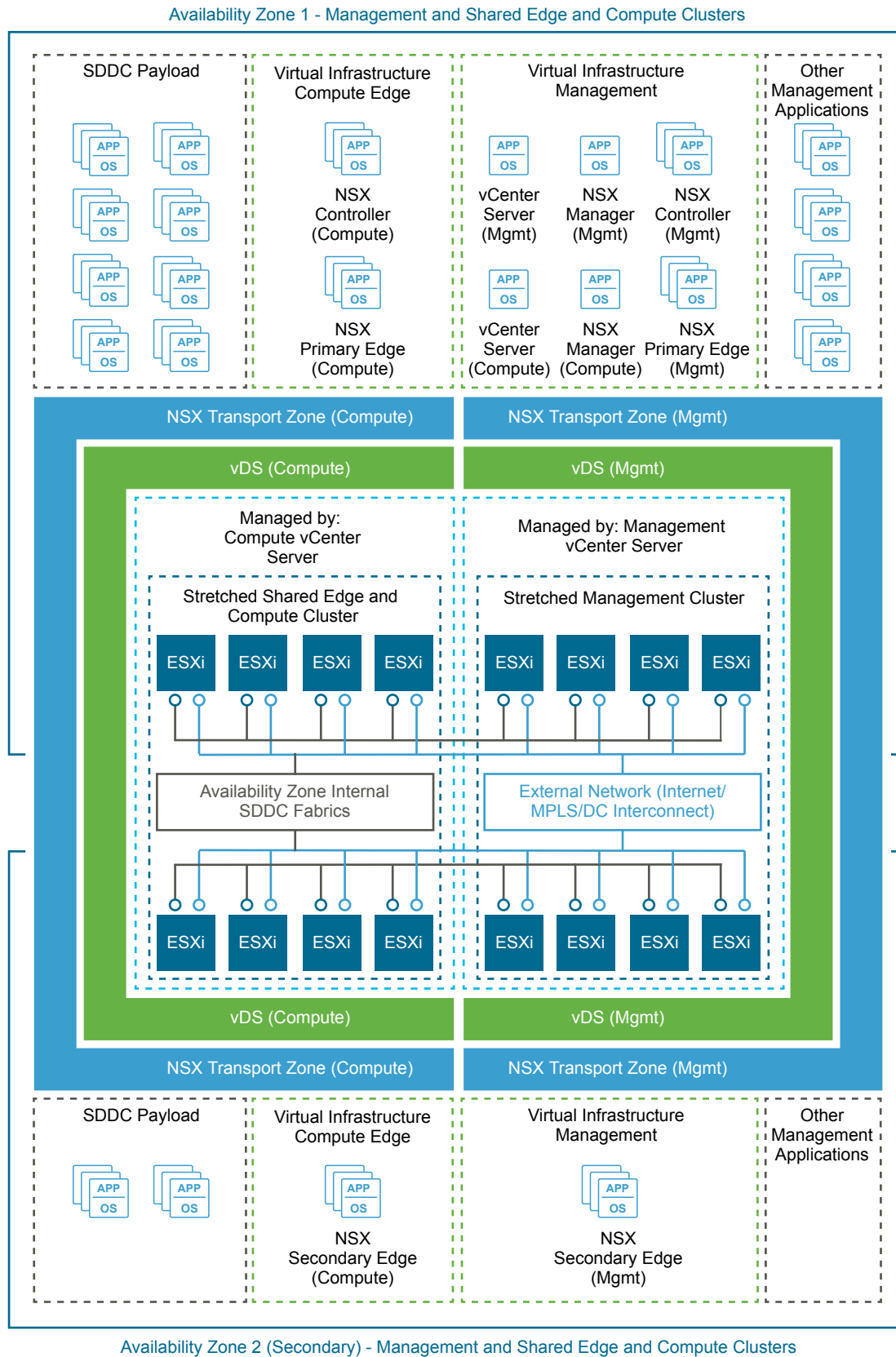
The availability zone model uses vSAN stretched clusters in two physically separate data centers, or fire halls in a single data center, that are connected with high bandwidth and low latency. You use vSphere HA to bring up workloads in the other availability zone upon an availability zone failure.

An availability zone is a fault domain in a region of the SDDC. Multiple availability zones can help provide continuous availability of an SDDC, minimize downtime of services and improve SLAs. Availability zones are a high availability solution. For a disaster recovery solution, use disaster recovery pairs.

In a region, each availability zone is isolated from the other availability zones to stop the reproduction of failure or outage across zone boundaries.

VMware Validated Design for Software-Defined Data Center includes the option to deploy a second availability zone in Region A. The vSAN witness appliance then resides in Region B. If having multiple availability zones in Region B is also a requirement, the vSAN witness appliance must not run on the vSAN stretched clusters in Region A. Place it on a traditional cluster that can be a vSAN cluster or not.

**Figure 3-1. SDDC Logical Design for Two Availability Zones**



# 4

## Expanding Past Region B

You add multiple regions by repeating the guidance for Region B in additional data centers.

Management and workload mobility between all regions is possible because NSX for vSphere provides the overlay between all regions. This approach does have a limit of eight regions or eight vCenter Server instances sharing the overlay networks as NSX for vSphere supports a single primary and up to seven secondary NSX Manager instances. You must also consider the bandwidth and latency between each physical location.

Disaster recovery is still handled between a pair of workload domains as Site Recovery Manager pairs two vCenter Server instances together for failover and failback.

Figure 4-1. SDDC Logical Design for Three Regions

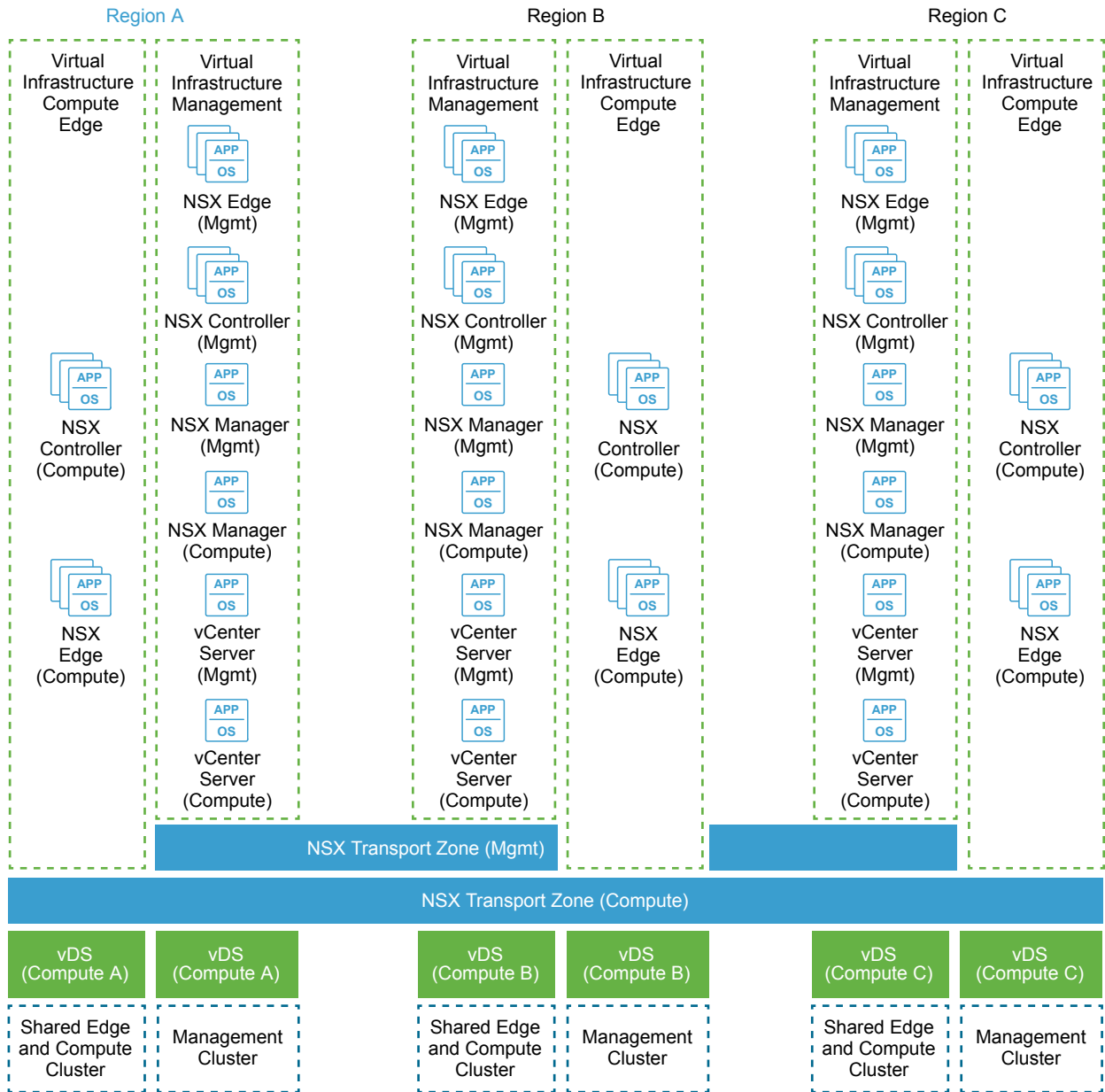
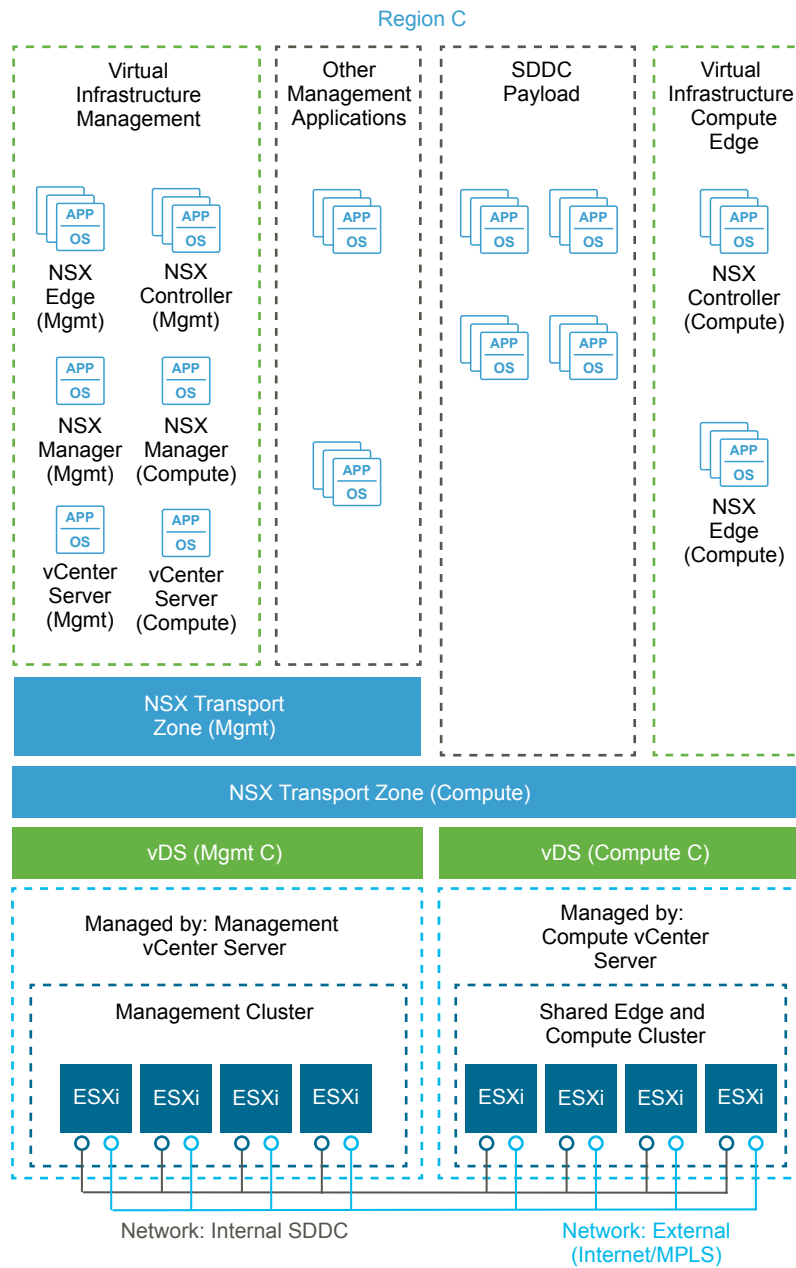


Figure 4-2. Detailed Logical Design of Region C



# Remote Office and Branch Office

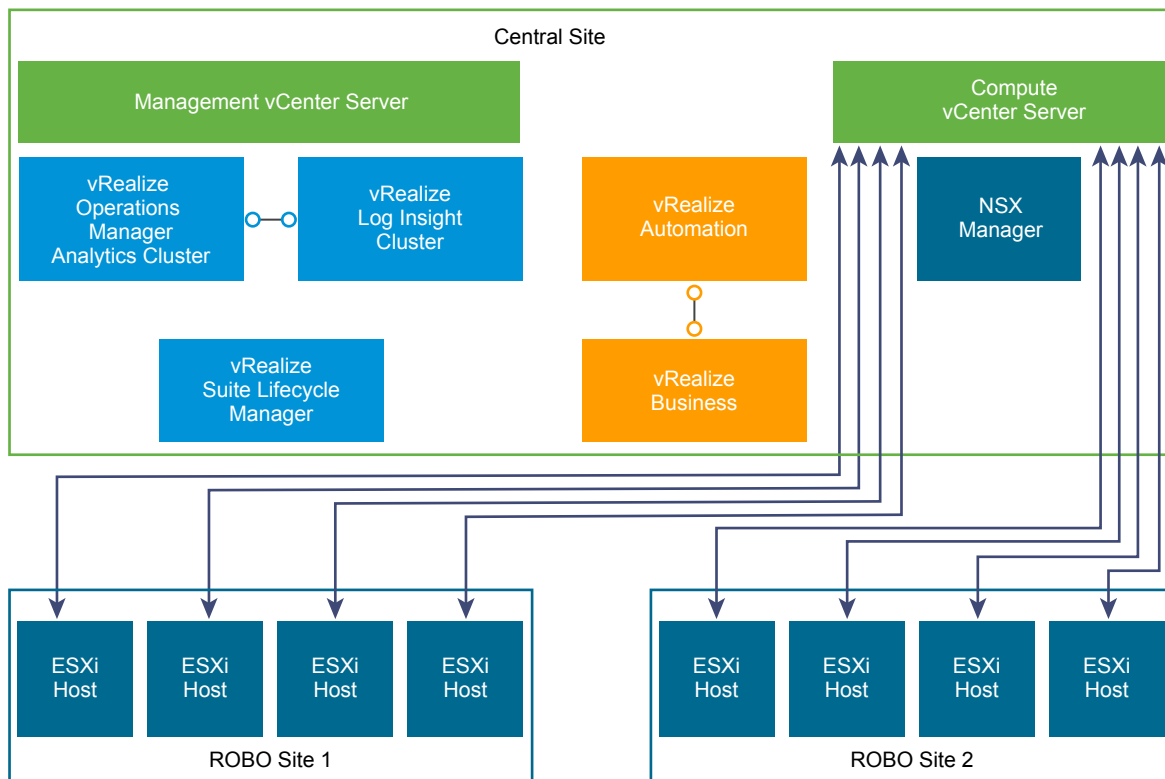
# 5

After you deploy the standard dual-region VMware Validated Design, you can add Remote Office and Branch Office (ROBO) sites.

You can extend the SDDC with centralized or decentralized ROBO sites. VMware Validated Design for Remote Office and Branch Office covers the decentralized model.

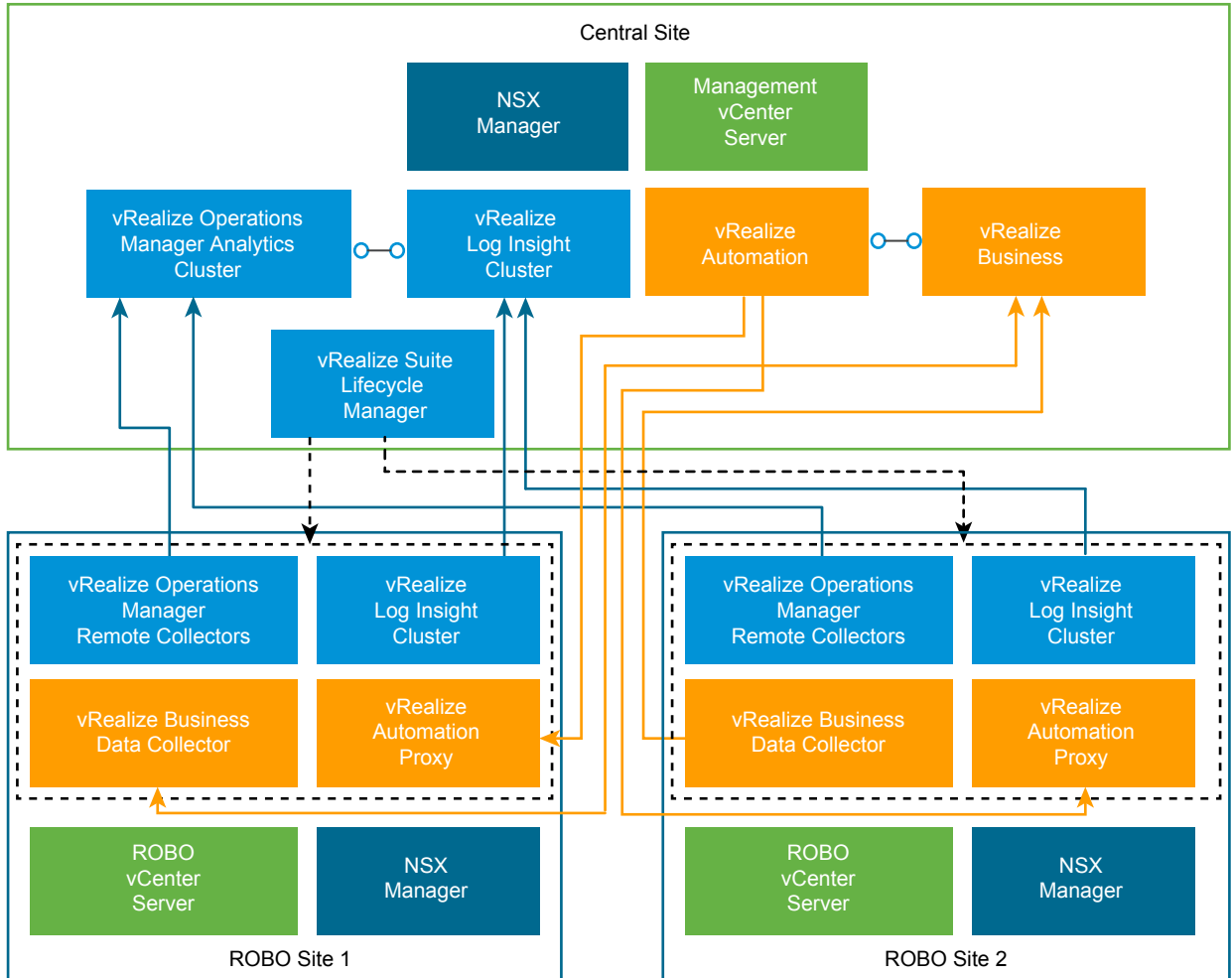
You can deploy the centralized model when your organization requires centralized management of all the ROBO sites. This model does not support local management of the vSphere infrastructure if the link between the ROBO site and the central hub is down. However, this approach can scale past ten ROBO locations because each ROBO site is a cluster in vCenter Server instead of running its own vCenter Server.

**Figure 5-1. Centralized ROBO Deployment**



You can deploy the decentralized model when you need local management of the site, including backups, if the link between the ROBO site and the central hub is down. This approach is limited to ten ROBO locations which is the number of supported vCenter Server endpoints in vRealize Automation.

**Figure 5-2. Decentralized ROBO Deployment**



## Hybrid Cloud

Use hybrid cloud to extend your on-premise SDDC to a cloud provider.

The use of cloud provider solutions as a region has not been detailed or tested as part of VMware Validated Design for Software-Defined Data Center. However, extending a VMware Validated Design implementation to use workload capacity or specific solutions that are available through cloud providers should be possible. Because each provider might support different levels of integration with your on-premise SDDC, consider the use cases that you must address.

For example, not all cloud providers can support workload mobility by extending NSX overlay from on-premise to their cloud. As a result, provider's ability to support disaster recovery of some management components in VMware Validated Design for Software-Defined Data Center can be limited. However, the disaster recovery solution available from the provider might satisfy availability requirements for workloads in your on-premise SDDC.



Figure 6-1. Example Logical Design of a Hybrid Cloud

