

EMC Centera Network Segmentation

Best Practices Planning

Abstract

EMC[®] CentraStar[®] software now has the ability to segment network traffic to the EMC Centera[®] system based on configured node roles. This white paper outlines recommended configurations by EMC Centera Engineering.

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Executive summary

This white paper is a summary of recommendations from EMC Centera® Engineering for network segmentation configuration of an EMC® Centera system. This will include recommended best practices and sizing configurations. With the introduction of network segmentation features in CentraStar® 4.0, system administrators have more flexibility for dedicating EMC Centera nodes to specific roles.

Introduction

Role sizing to the EMC Centera storage system can be very important for CentraStar network segmentation. This white paper covers various features of the EMC Centera system that affect the configuration of nodes in regard to network segmentation. It also covers recommended sizing in various configuration types of the EMC Centera system. An important note when segmenting network traffic is that all nodes with external roles must be on the same subnet on their respective network.

Audience

The intended audience of this white paper is system administrators who would like to configure their EMC Centera solution for maximum information integrity utilizing network segmentation in EMC CentraStar 4.x. This paper will not cover the performance characteristics of different node roles in terms of input/output and replication. These features have not been benchmarked at this time.

Terminology

- **Access role** – EMC Centera node role used for application input/output to the system.
- **Management role** – EMC Centera node role used to manage the Centera system for system administrators.
- **Replication role** – EMC Centera node role used to manage the remote replication of data to and from the system.

Node roles

The EMC Centera storage system is based on node roles to complete the requirements of the CentraStar software. Although storage nodes (SN) are the core of the EMC Centera system, access nodes (AN) serve as much more than the entry point to the system. They are the workhorse of the EMC Centera system, not only controlling input/output to the system but also replication, management requests, and notification based on assigned roles. These roles have been further specialized in EMC CentraStar 4.0 with the addition of distinct replication and management for designated nodes.

Access roles

The access node role of EMC Centera systems is systems users' entry to the system. A node configured with the access role controls all input/output operations to and from the EMC Centera system. The access nodes also serve as the staging area for all content that is archived and retrieved. The access nodes control all requests that come from application servers to store and retrieve content.

Management roles

One of the key features for network segmentation is the ability to separate management traffic from input/output and replication traffic. This greatly enhances the security of all content that is archived to EMC Centera as system configuration is transferred on a separated network. Management roles with regard to EMC Centera utilize a small amount of bandwidth. It is recommended by EMC Centera Engineering for maximum information security that two different and dedicated networks are implemented for

input/output/replication and management, respectively. EMC requires a minimum of two nodes with the management role for CentraStar version 4.x.

Replication roles

Replicated environments are highly recommended for heightened data integrity. Replicated environments also affect access roles before CentraStar 4.0. Replication bandwidth will be shared with input and output bandwidth. It is important to understand normal input/output when planning for a replicated environment. The key configuration is to ensure that replication has enough bandwidth to keep environments synchronized without adversely affecting the normal input/output to the EMC Centera system.

CentraStar 4.0 allows a system administrator to dedicate nodes for replication roles exclusively. EMC Centera Replication is currently a prioritized service that will utilize all allotted bandwidth if possible and it cannot be throttled in the current release. The ability to “throttle” replication in CentraStar 4.0 comes with the combination of controlling the number of nodes with the replication role and the ability to pause the replication service. The number of nodes should be proportionate to the replication bandwidth that is allotted. The EMC Centera CLI allows the system administrator to pause the replication service during peak archiving time.

EMC Centera configurations

4-node system

In a four-node EMC Centera configuration it is required that at least two of the four nodes have the role of access to avoid any single point of failure. The remaining two nodes are recommended to be configured with the access role only if the environment is replicated. EMC requires a minimum of two nodes with the management role for CentraStar v4.x.

8-node system

In an eight-node EMC Centera configuration it is recommended that four of the eight nodes have the role of access. If the environment is replicated, it is recommended that all four nodes be configured with the replication role as well. EMC requires a minimum of two nodes with the management role for CentraStar version 4.x.

16-node system

In a 16-node EMC Centera configuration it is recommended that four nodes have the role of access for input/output bandwidth. If the environment is replicated, these nodes can also be configured with the replication role in increments of two depending on the bandwidth needs. These nodes can be configured with the storage role as well, depending on space requirements. EMC requires a minimum of two nodes with the management role for CentraStar version 4.x.

Multi-cabinet system (4 cabinets)

The ability to scale an EMC Centera system to multiple cabinets also has an effect on access node configuration. It is recommended that access nodes be spread across cabinets evenly. This configuration will ensure a higher level of availability if one specific cabinet has a catastrophic failure. For example, in a two-rack system, it is recommended that at a minimum each cabinet be configured with four access nodes each. If the environment is replicated, it is recommended that all of the access nodes also be configured with replication roles. As systems scale, the number of access nodes should increase respectively. It is recommended that at least two access nodes (with the replication role, if required) be added when additional cabinets are added.

Network segmentation use cases

The following diagrams illustrate the configuration options with network segmentation in CentraStar 4.x. These guidelines are standard recommendations that should be modified and adapted to the specific network topology where being implemented.

Standard setup

The standard setup describes the responsibility of roles in CentraStar 4.x. In this case, the access role encompasses access, management, and replication roles on the same node(s).

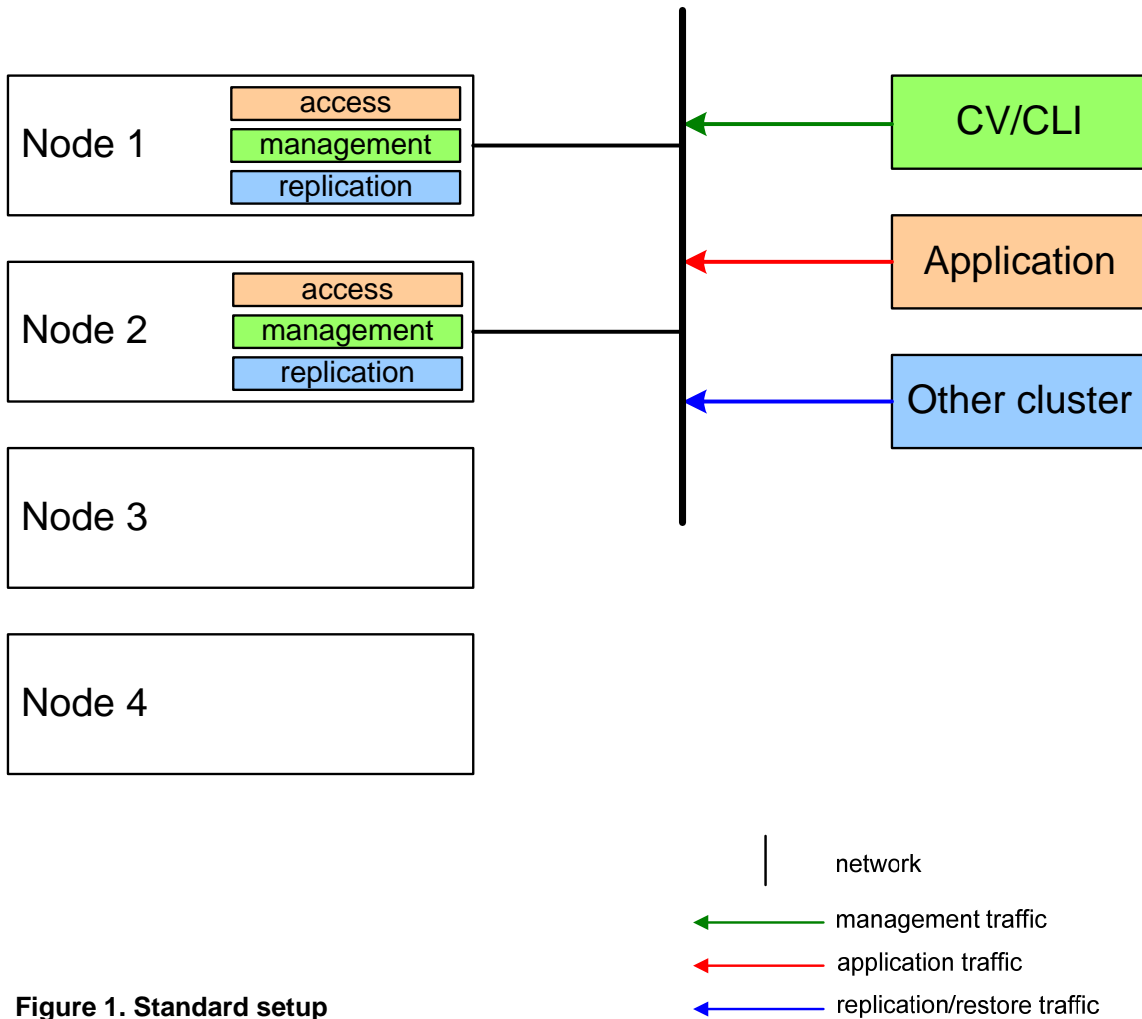


Figure 1. Standard setup

Fully segmented setup

The fully segmented setup best describes the new capabilities in CentraStar 4.x. In this setup, application, management, and replication traffic are segmented to their own dedicated networks and have dedicated nodes.

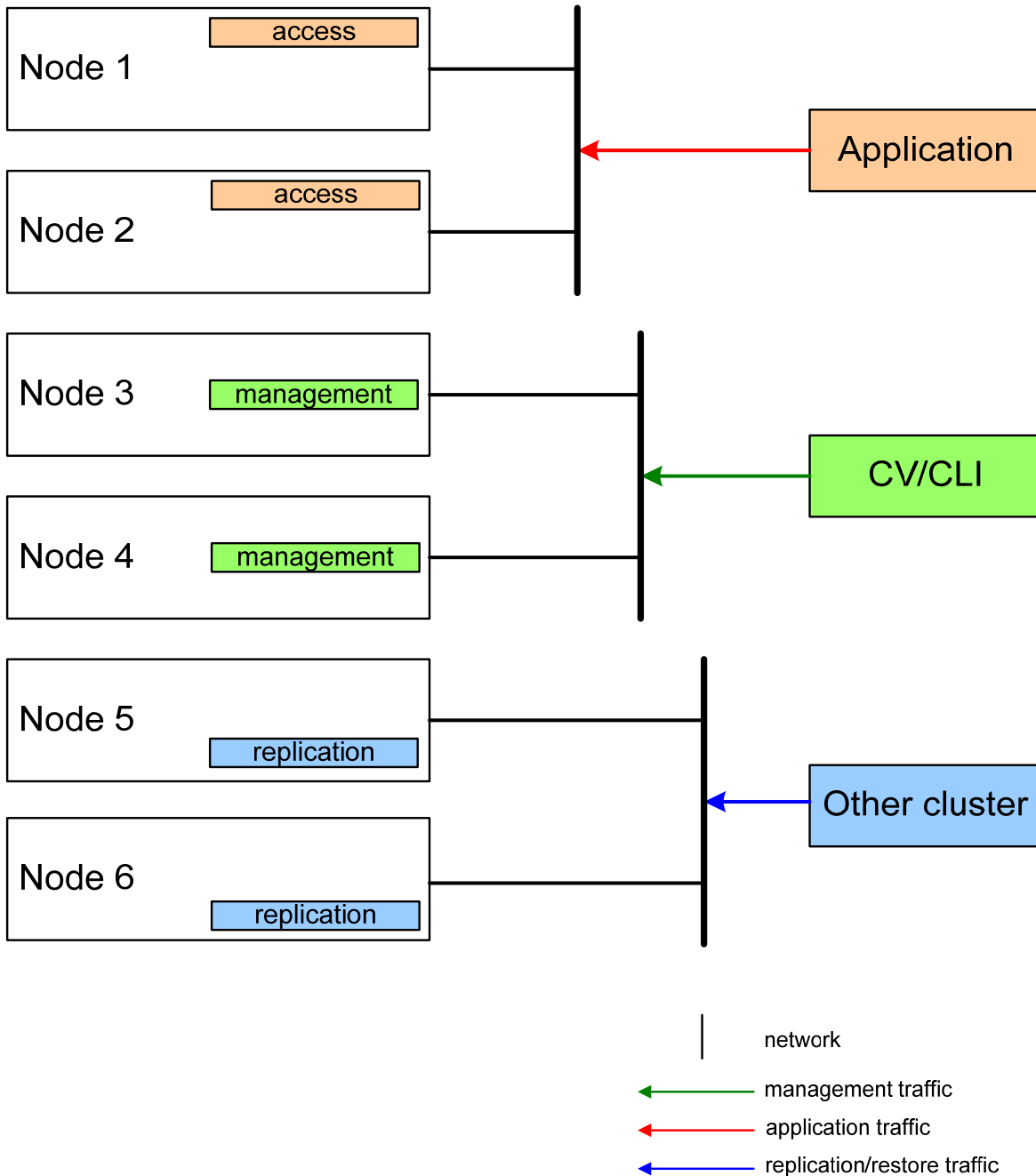


Figure 2. Fully segmented setup

Mixed setup

In the mixed setup, nodes are assigned different roles based on end-user preference or designation. The possible reasoning for this could be network-related, based on how the network is laid out for application, management, and replication traffic.

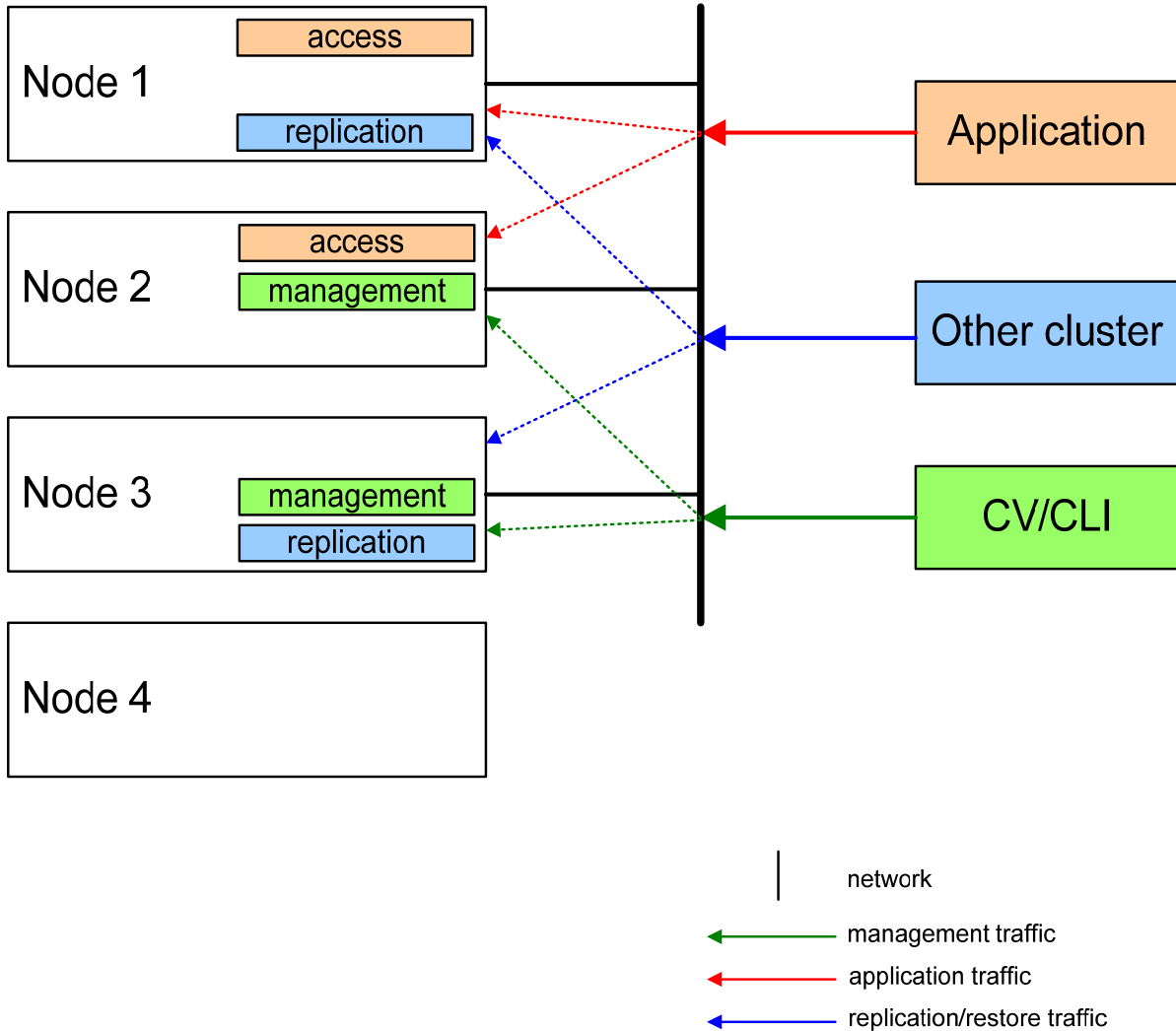


Figure 3. Mixed setup

Conclusion

In this white paper, recommendations by EMC Centera Engineering represent the configuration to utilize network segmentation. These configuration options will maximize the security and integrity of data by utilizing a dedicated network for input/output, management and replication traffic. It is important that a detailed investigation be performed prior to implementing these features to ensure maximum interoperability.