ConvergeMedia™ CORTEX

Clustering Software for Distribution Platforms

Operators continue to grapple with increased capacity needs to meet demand for a more diverse array of video and advertising services. Additional pressures to streamline operations emphasize the challenge to consolidate operations and reduce complexity at the edge of the delivery network. This is especially true for digital ad insertion services, where ad sales groups face large upgrades fueled by HD expansions.

With these new realities, it is vital for operators to invest in delivery infrastructure that is both ultra-reliable and easily expandable. Simply put, adding capacity must be cost-effective and manageable.

CORTEX clustering software technology offers operators an innovative solution to reduce the cost of capacity upgrades and to achieve greater operational efficiency and resiliency by consolidating the ad insertion infrastructure in centralized locations.

CORTEX enables loosely coupled ConvergeMedia XMS servers to operate as a single, load-sharing, resilient, logical system.

- Uses standard GigE networking components and protocols to deliver the most cost-efficient clustering technology
- Designed and optimized to operate with the XMS COTS platform, complementing high performance and density with increased system resiliency
- Dynamic content management and load balancing to optimize storage usage and streaming demand
- Provides hardware failure isolation and automatic recovery from one or MORE node failures to ensure continued operations

CORTEX is part of the XMS operating system (SME), so any application running on top of it can take advantage of its benefits. Today, CORTEX is only supported on XMS Flex.
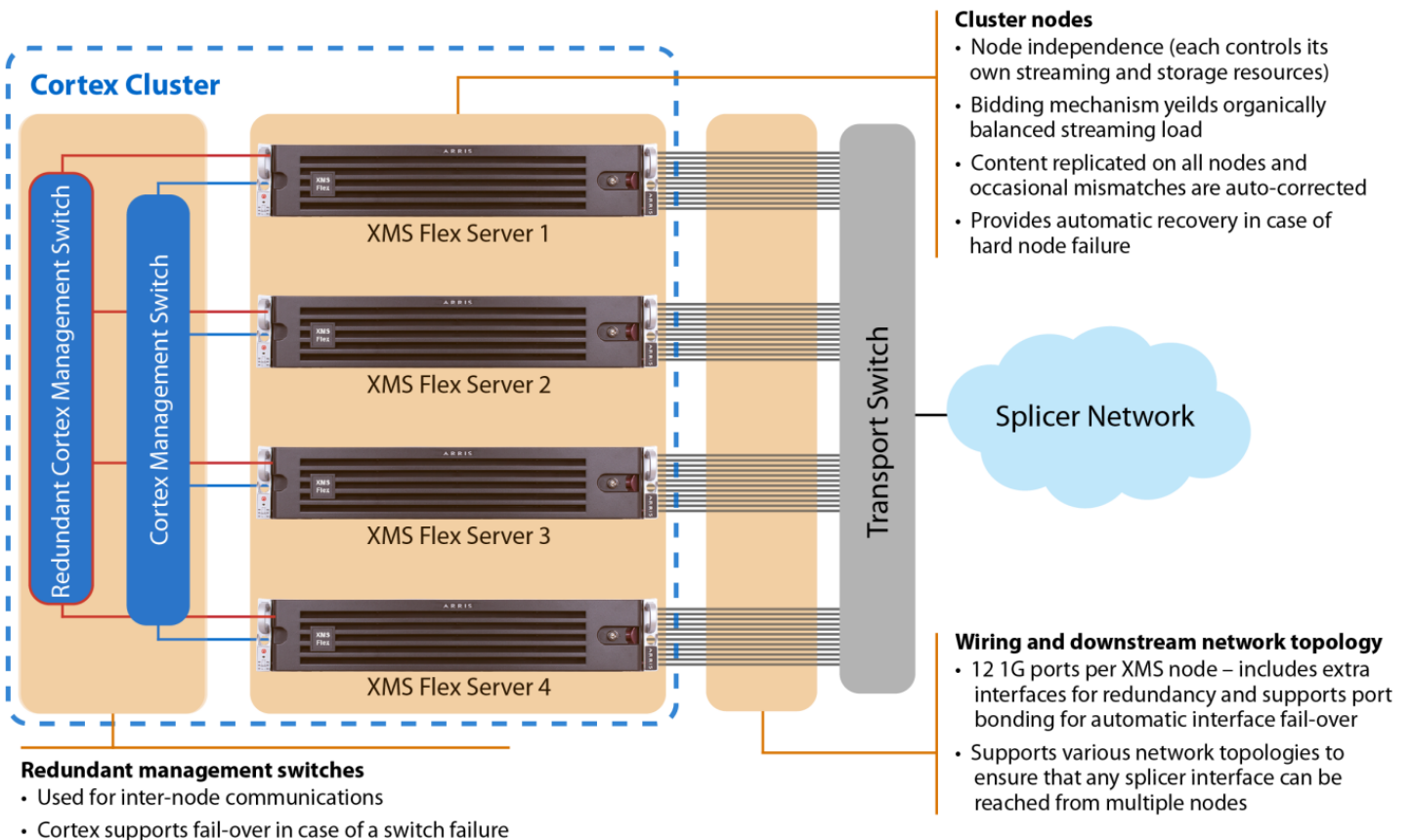
CORTEX provides more fault tolerance than previous clustering techniques. Rather than striping the content across all the nodes in the system and using interdependent streaming processes between nodes, CORTEX lets each node retain full control of its streaming and storage resources, while leveraging intelligence sharing load status among nodes to balance resource allocation decisions.

CORTEX also contrasts with systems using external applications to provide fail-over resiliency. While keeping the ad server design simple and cost-effective, such approaches reduce overall efficiency and substantially affect performance. Putting the burden of managing resiliency on a single application creates a single point of failure and limits the ability to centralize resources. On the other hand, distributing ad servers across more resiliency managers undermines cost-efficiency and increases complexity.

CORTEX is integral to the design of the server, thus providing more granularity and flexibility in configuring the system and developing new capabilities. It is also more scalable since the intelligence is embedded in each node deployed.

CORTEX is designed to satisfy a wide array of applications. For Ad Sales groups wishing to centralize their ad insertion servers in order to maximize hardware efficiency and reduce operational complexity, CORTEX, combined with the XMS Flex, provides added flexibility and resiliency needed to scale capacity both cost-effectively and reliably.

Cluster nodes
- Node independence (each controls its own streaming and storage resources)
- Bidding mechanism yeilds organically balanced streaming load
- Content replicated on all nodes and occasional mismatches are auto-corrected
- Provides automatic recovery in case of hard node failure

Cortex Cluster

Redundant Cortex Management Switch

Cortex Management Switch

XMS Flex Server 1

XMS Flex Server 2

XMS Flex Server 3

XMS Flex Server 4

Transport Switch

Splicer Network

Redundant management switches
- Used for inter-node communications
- Cortex supports fail-over in case of a switch failure

Wiring and downstream network topology
- 12 1G ports per XMS node – includes extra interfaces for redundancy and supports port bonding for automatic interface fail-over
- Supports various network topologies to ensure that any splicer interface can be reached from multiple nodes

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GENERAL SPECIFICATIONS

- Maximum Cluster Size: 5 Nodes
- Redundant GigE switch fabric
- Requires all members of a CORTEX cluster to be of the same hardware profiles (i.e. same server model)
- Dynamic balancing of streaming load
- Automatic recovery in case of server failure for continued service of a post-failure streaming sessions

Distribution Platforms Supported

- XMS Flex 4G with 7TB HDD Internal Storage
- XMS Flex 6G with 14TB HDD Internal Storage
- XMS Flex 8G with 14TB HDD Internal Storage

Supported Dynamic Content Management Policies

- Full Content Replication across all members of a cluster
- Automatic correction of content mismatches across cluster members

ORDERING INFORMATION

Part Number	Description
792695	(SME/MD/CORTEX-HA) SME Cortex High Availability clustering option, per cluster node for DPI
796191	(SWITCH/1G/C/KIT) GigE Management Switch Kit for XMS server clustering, includes redundant switch
780940	(SWITCH/1G/C/KIT-DC) GigE Management Switch Kit for XMS server clustering

Supported Raw Cluster Streaming Capacities * (Table 1)

XMS hardware profile	Number of Nodes				
	1	2	3	4	5
XMS Flex 4G / 7TB	3,750 Mbps (500 SD-equivalent ch.)	7,500 Mbps (1,000 SD-equivalent ch.)	11,250 Mbps (1,500 SD-equivalent ch.)	15,000 Mbps (2,000 SD-equivalent ch.)	18,750 Mbps (2,500 SD-equivalent ch.)
XMS Flex 6G / 14TB	5,625 Mbps (750 SD-equivalent)	11,250 Mbps (1,500 SD-equivalent ch.)	16,875 Mbps (2,250 SD-equivalent ch.)	22,500 Mbps (3,000 SD-equivalent ch.)	28,125 Mbps (3,750 SD-equivalent ch.)
XMS Flex 8G / 14TB	7,500 Mbps (1,000 SD-equivalent)	15,000 Mbps (2,000 SD-equivalent ch.)	22,500 Mbps (3,000 SD-equivalent ch.)	30,000 Mbps (4,000 SD-equivalent ch.)	37,500 Mbps (5,000 SD-equivalent ch.)

* Raw capacities rated above specify the capacities of the clusters under normal operations exclusive of any failures. A cluster can still operate in degraded capacity in case one or more cluster members are in failure mode.