

Keysight's Ixia Fabric Controller (IFC) Clustering

Improving Visibility Efficiency and Design Flexibility for Distributed Packet Brokers

With today's complex network infrastructure, the needs for visibility and security monitoring could change dramatically from customer to customer. Some require security tools being centralized, while others require security tools being placed in various locations in a distributed environment for operating efficiency and maximum design flexibility.

In a distributed environment, Single Pane of Glass management for all network packet brokers is essential for ease of use. Operation and management for a cluster of NPBs should be as easy as a single one. Keysight's IFC Clustering solution offers such an example.

Keysight's Ixia Fabric Controller Node

IFC Controller Node works like an SDN controller for visibility packet brokers. The controller node in an IFC cluster creates and maintains global configuration database for all nodes in the cluster. Multiple controller nodes are possible in an IFC cluster, offering configuration redundancy and resiliency. IFC clustering is based on distributed architectures that allow network administrators access to traffic sent to monitoring and diagnostic tools anyway in the visibility network, single-or-multi hops away.

Highlights

- Keysight's Ixia Fabric Controller Clustering provides a single 'pane of glass' configuration, management and operation for a cluster of Keysight network packet brokers in any-to- any, single hop or multi hop topology
- Leverages Keysight's patented filter compiler to seamlessly resolve filter overlaps even in a distributed environment
- Transparent interconnects, in direct connect or over GRE tunnel, make it seamless to forward tapped data from multiple remote locations to centralized tool farm
- Tight integration with IFC Centralized Manager for rich NMS functions, topology visualization, and single sign- on
- Comprehensive statistics along each hop and colorful indicator for congestion and link health help reduce troubleshooting time in large scale deployments

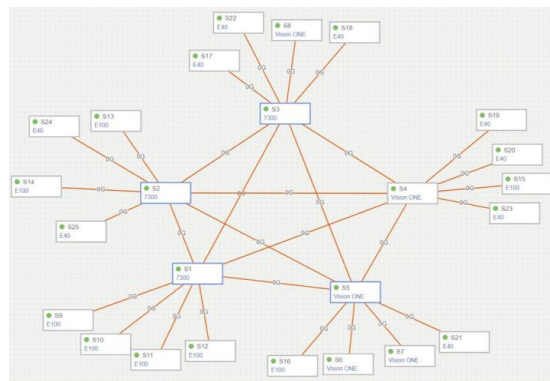


Figure 1: Example IFC Cluster Topology

Single Pane of Glass (SPoG) for Configuration, Management and Operation

All ports and nodes in a IFC cluster can be configured and managed from one user interface (UI) as shown in Figure 2. Cluster topology displays how nodes are connected, what the interconnect links are, and how much bandwidth is allocated. Colorful indicator indicates if links are normal, or dropping packets, or simply down and unusable. Keysight's visibility intelligence capabilities—NetStack, PacketStack, SecureStack, and AppStack—resources can also be used across the fabric. This makes it easy to operate across multiple sites, providing the centralized control required of complex visibility infrastructure.

FLEXIBLE ANY-TO-ANY TOPOLOGY SUPPORT

Customers deploying monitoring solutions today continue to face challenges. For example, how to get the distributed packet brokers working together cost effectively? Imagine you have 2-3 remote offices and you want flexibility in connecting them because of connectivity costs. Keysight's IFC clustering architecture allows to connect the packet brokers in various topologies, thus allowing you to select the deployment that makes the best business sense. It also allows you to get an unprecedented level of resiliency—with multiple controller nodes configured, a copy of the configuration maintained on all controller nodes. Thus, if some fail, the remaining good controller nodes are still accessible and continue to function as designed.

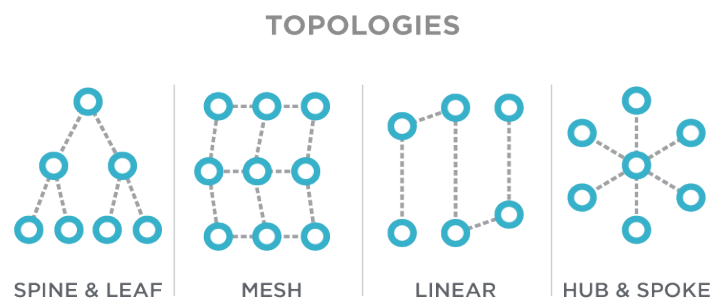


Figure 2: Supported Topologies

WIDE-SCALE MONITORING WITH IFC CLUSTERING

As cyber threats expand, and the cost of downtime increases, businesses increasingly want to deploy massive monitoring solutions. With the support of IFC clustering on all major Vision platforms, Keysight extends the benefits of sophisticated packet processing provided by its patented filter compiler to many more end-points across a network in a distributed environment. IFC clustering integration with IFC centralized managers offers powerful NMS features, such as auto discovery, event/alarm management, bulk software upgrade.

IFC MULTI-HOP CLUSTERING

Tapped traffic must traverse two or more interconnects to reach a tool. Unique requirements for multi hop topology include the following:

- Best routes are calculated using Shortest Path First (SPF) algorithm
- Interconnects can be either direct connection or over GRE tunnel

- Load Balance must happen on Equal Cost Multiple Paths (ECMP)
- Tapped traffic must be delivered to tools in orderly fashion with session integrity
- Failover protection with resiliency
- On-demand route re-optimization
- Automatic discovery of Interconnects by using LLDP

KEY FEATURES:

- Centralized network visibility management and operational control through a single pane of glass
- Supports more than 50 nodes in a single cluster
- Seamless interconnect links between packet brokers make it possible to forward tapped traffic to any given tools in the IFC cluster
- IFC interconnects among members can be either in direct connects, or over GRE encapsulated tunnels; enabling IFC member to be connected over DWDM devices or WAN routers/switches (selected packet brokers)
- Compressive statistics and health indicators make troubleshooting extremely easy
- Any-to-any, single-or-multi hops topology support allows maximum design flexibility
- Cost-effective visibility deployment with combination of low cost edge NPBs and more powerful NPBs for advanced packet processing and application identification
- Multiple controller nodes support allows redundancy and resiliency
- Automatic failover protection on interconnects and on-demand route optimization
- LLDP based interconnect discovery
- Open API's for seamless integration with SDN Controllers, including Cisco ACI

USE CASES:

Primary uses of Keysight's Ixia Fabric Controller Clustering include enabling enterprises or data centers to aggregate data, filtering traffic, applying smart operations on monitored traffic such as deduplication or header stripping, thus creating new operating efficiencies for security tools. Specifically, early users have been interested in these use cases:

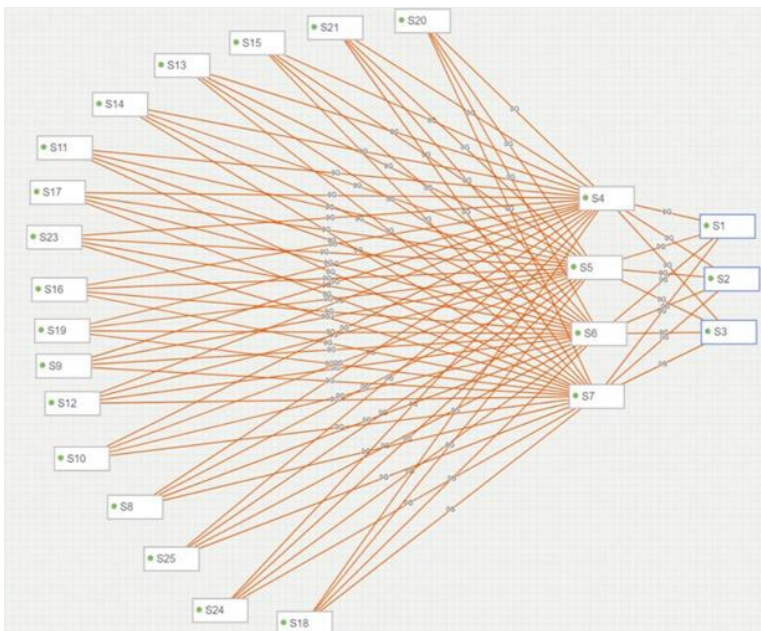
Large scale monitoring—Today's large-scale datacenters and country wide networks require a lot of links to be tapped, and traffic is generally directed to a central tool farm. Keysight's Ixia Fabric Controller clustering allows you to deploy many low cost NPBs as aggregation layer and then direct filtered traffic to more advanced NPBs collocated at central tool farm. This design can easily scale to thousands of ports with managed cost, yet with a single pane of glass configuration and management interface.

Agile monitoring—Many lawful intercepts require agile monitoring even for a distributed environment. Whenever needs arise, customer wants to quickly setup new rules and forwards interested traffic to more specific security tools for deep analysis. The whole process must be quick and agile, ideally within seconds certainly not hours or days. Keysight's patented technology of filter compiler makes this possible with standalone or centralized monitoring. Now, IFC clustering simply extends the same benefit to a distributed cluster of nodes.

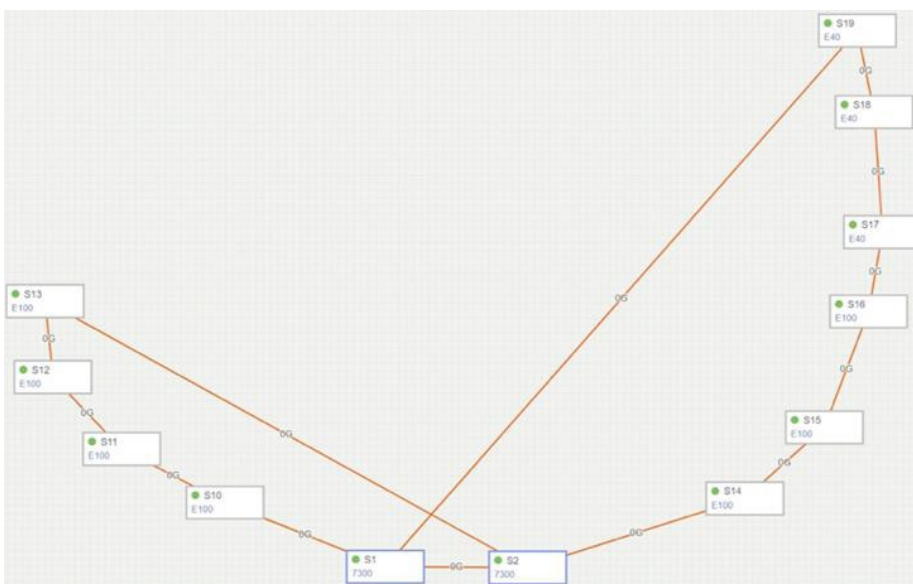
Traffic engineering with protection—Laying a resilient infrastructure for visibility is crucial in the design of large data centers. Aggregation is unavoidable which also means flexible traffic engineering options are required to cope with oversubscription. IFC clusters offer any-to-any topology support (vs. hub-and-spoke only) that makes any-to-any interconnection possible. If one interconnect is overbooked, excessive traffic can be rerouted to other links. Load balance on the interconnect link bundle also offers redundancy and resiliency to the tapped traffic. So, tools have far less chance to be blinded.

Flexible visibility topology—Visibility networks come in different shapes—hub-and-spoke, spine-and-leaf, tree, mesh or partial mesh, or any combination of above. It all depends on how customers plan to design their visibility infrastructure, and with or without redundancy. Some examples are shown below:

- Spine-and-leaf aggregation with failover redundancy



- Dual ring topology



Ordering Information

Keysight's Ixia Fabric Controller requires a license on each Vision network packet broker that needs to be part of the SDN clustering architecture. Both single hop and multi hop features are included in the same license.

Part Number	Description
LIC-V1-IFC	Keysight Vision ONE license, enables Keysight's Ixia Fabric Controller (IFC) Clustering for direct connection to other Vision devices supporting IFC Clustering (E100, E40, Vision ONE, 7300/3); licensed per system; requires previous or adjunct purchase of port licenses to operate (993-0170).
LIC-E100-IFC	Keysight Vision E100 license, enables Keysight's Ixia Fabric Controller (IFC) Clustering for direct connection to other Vision devices supporting IFC Clustering (E100, E40, Vision ONE, 7300/3); licensed per system; requires previous or adjunct purchase of port licenses to operate (993-0150).
LIC-E40-IFC	Keysight Vision E40 license, enables Keysight's Ixia Fabric Controller (IFC) Clustering for direct connection to other Vision devices supporting IFC Clustering (E100, E40, Vision ONE, 7300/3); licensed per system; requires previous or adjunct purchase of port licenses to operate (993-0151).
LIC-7300-IFC	Keysight Vision 7300 series license, enables Keysight's Ixia Fabric Controller (IFC) Clustering for direct connection to other Vision devices supporting IFC Clustering (E100, E40, Vision ONE) as well as both direct connection and GRE tunnel to other 7300/3 devices over the M7300CAS-PS16PX line card; licensed per system; requires previous or adjunct purchase of port licenses to operate (993-0172).
LIC-E10S-IFC	Vision E10S, Enables Keysight's Ixia Fabric Controller (IFC) for direct connect to Vision ONE or NTO 7300/3, Vision Edge 40, Vision Edge 100; licensed per system; requires previous or adjunct purchase of port licenses to operate.
LIC-VX-IFC	Keysight Vision X, (1) Fabric connectivity feature license
LIC-7816-IFC	Keysight, Add On Feature, IFC for Edge-core AS7816-64X AC/DC switch, One per system (993-0177)

Learn more at: www.keysight.com

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