



## FDF Requirements

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# Agenda



- **Concerns**
- **Review of realistic topologies**
- **FDF Requirements**

- **With FC-BB-5, all FCoE frames must go through an FCF:**
  - FCF can become a performance bottleneck
  - FCFs everywhere becomes costly and can create management issues
  - Each FCF requires a unique FC Domain ID (Architectural limit on domain IDs is 239. Practical limit on domains is in the range of 50-70 before management, initialization, and recovery performance issues arise.)
  - Have seen cases where 60% of traffic within a blade center (including local storage) does not leave the rack (e.g. NFS).
- **Goal – Eliminate unnecessary bottlenecks, provide high performance solutions, reduce administrative burden, and reduce the number of Domain IDs used.**

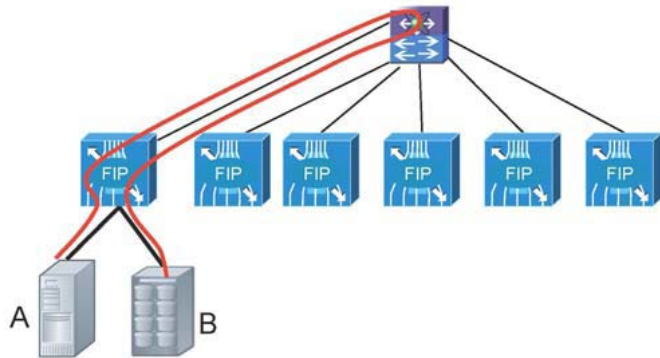
# Concerns



## FCF EoR Only

 Ethernet Switch with FIP snooping

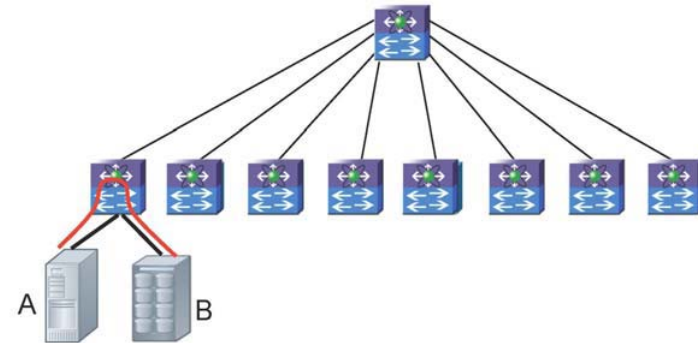
 FCF



The problem? Suboptimal forwarding

## FCF EoR and ToR

 FCF

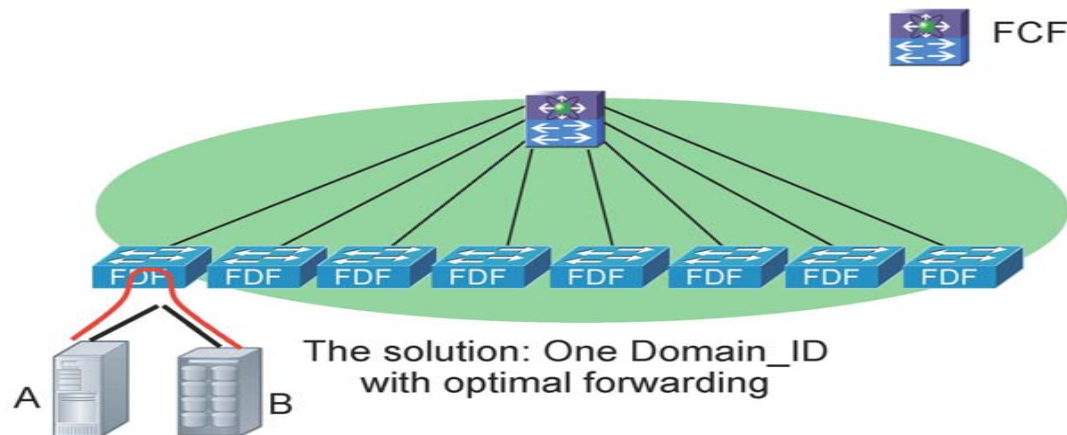


The problem? Too many Domain\_IDs

## • Local storage in the rack use case:

- ToR FCFs provide optimal forwarding (each frame from a local server to the local storage is locally switched)
- FIP snooping bridges provide suboptimal forwarding (each frame from a local server to the local storage needs to go to the EoR to be switched)
- See <http://www.t11.org/ftp/t11/pub/fc/bb-6/10-130v1.pdf> for more FCoE Topology discussion

## Introducing the FDF



## • Introducing the FDF

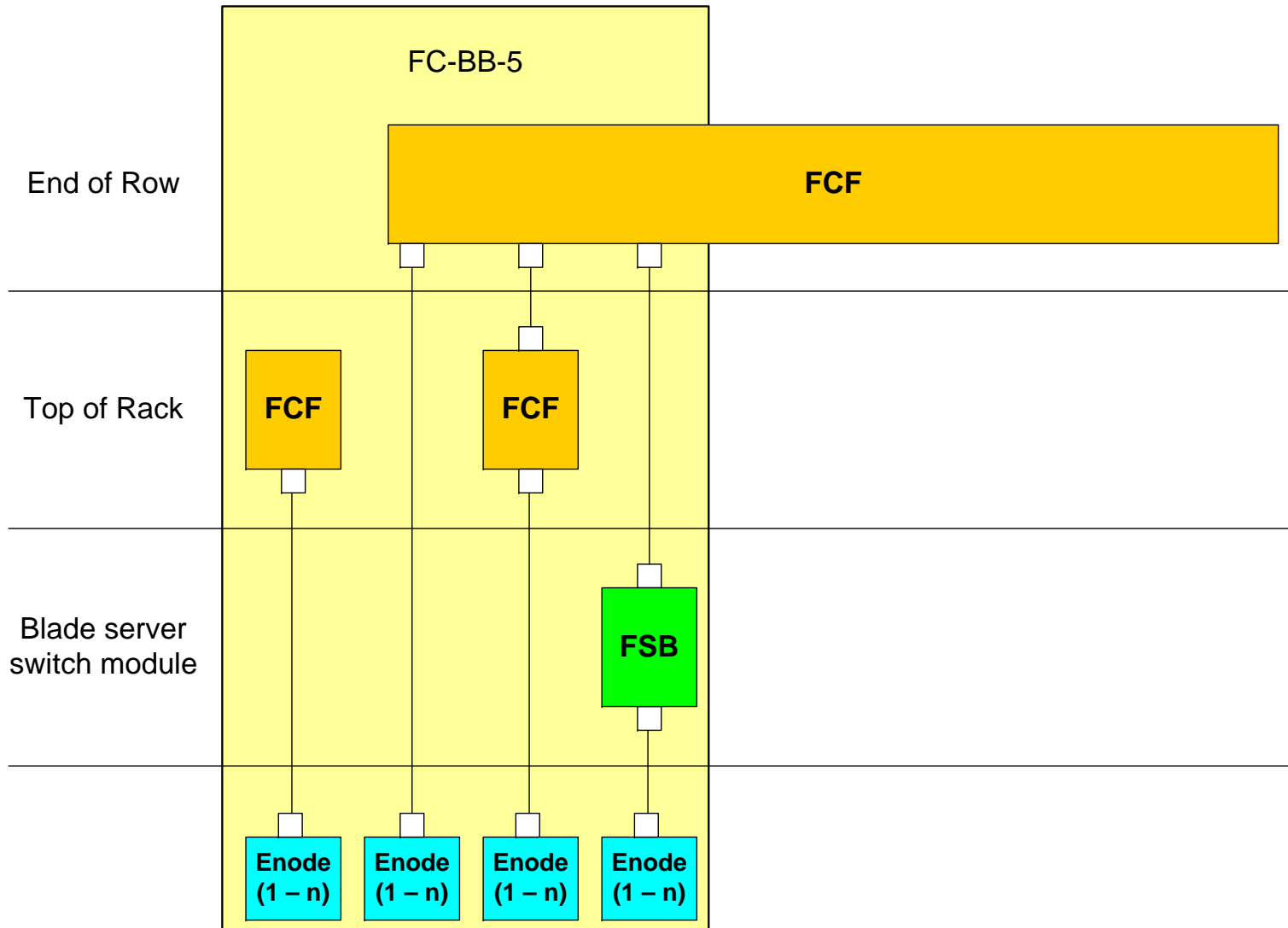
- Controlling FCFs and FCoE Data Forwarders (FDFs) share one or more single virtual domains
- FCFs provide Fibre Channel Services
- FDFs provide routing, zoning with information obtained from their controlling FCFs.
- This approach is gaining momentum
- Need to ensure heterogeneous interoperability!

# Agenda

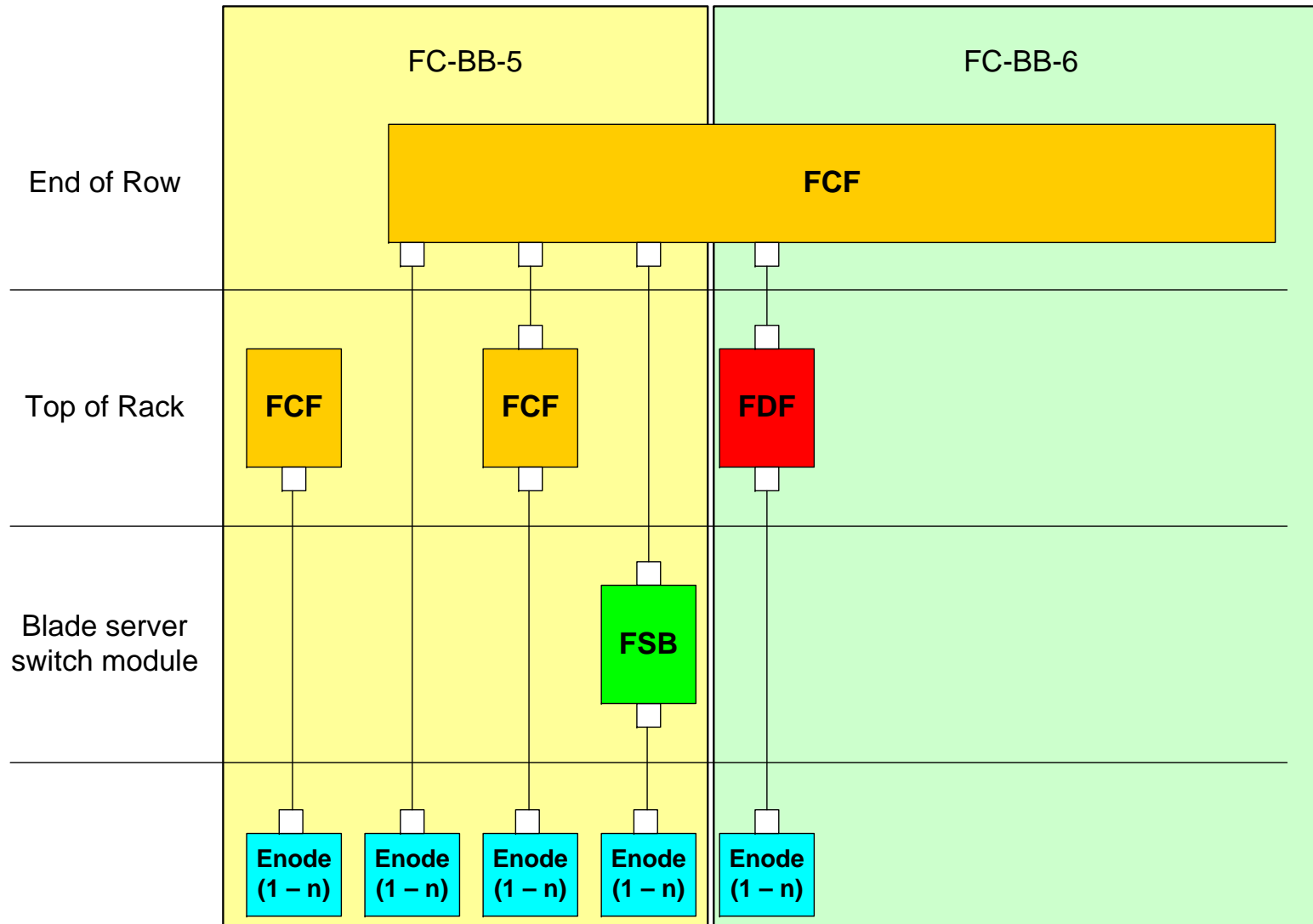


- Concerns
- **Review of realistic topologies**
- FDF Requirements

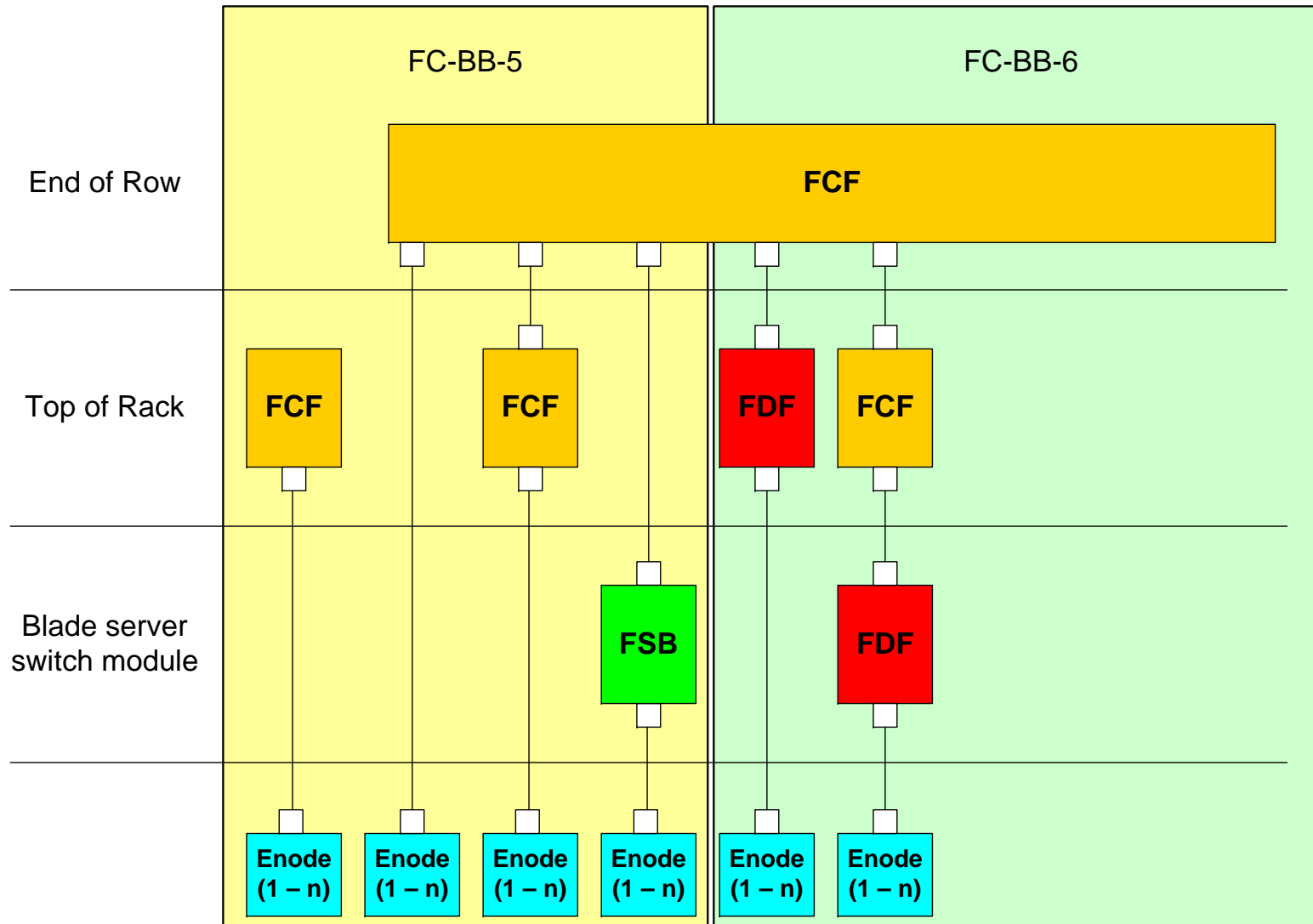
# Topology Overview



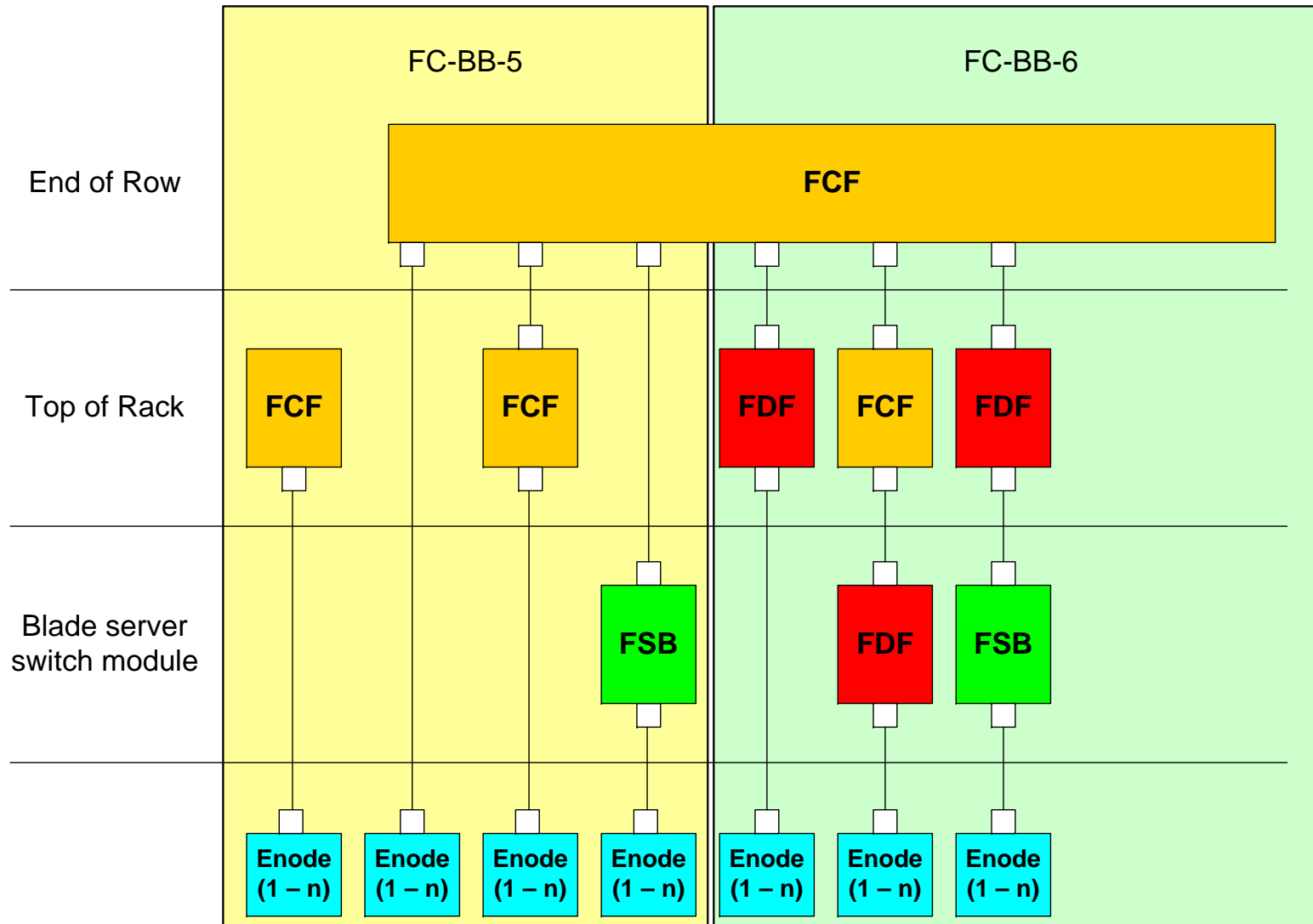
# Topology Overview



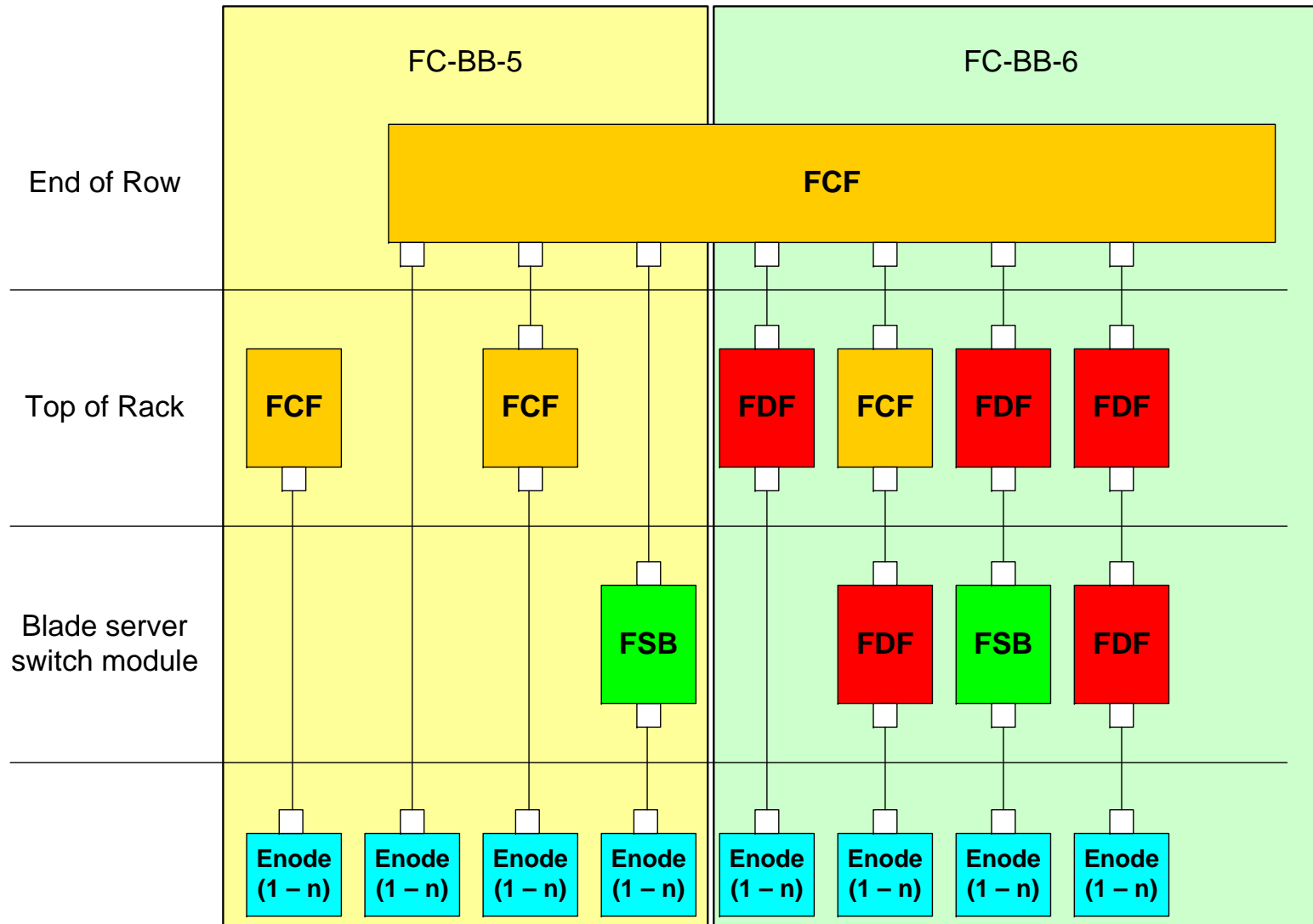
# Topology Overview



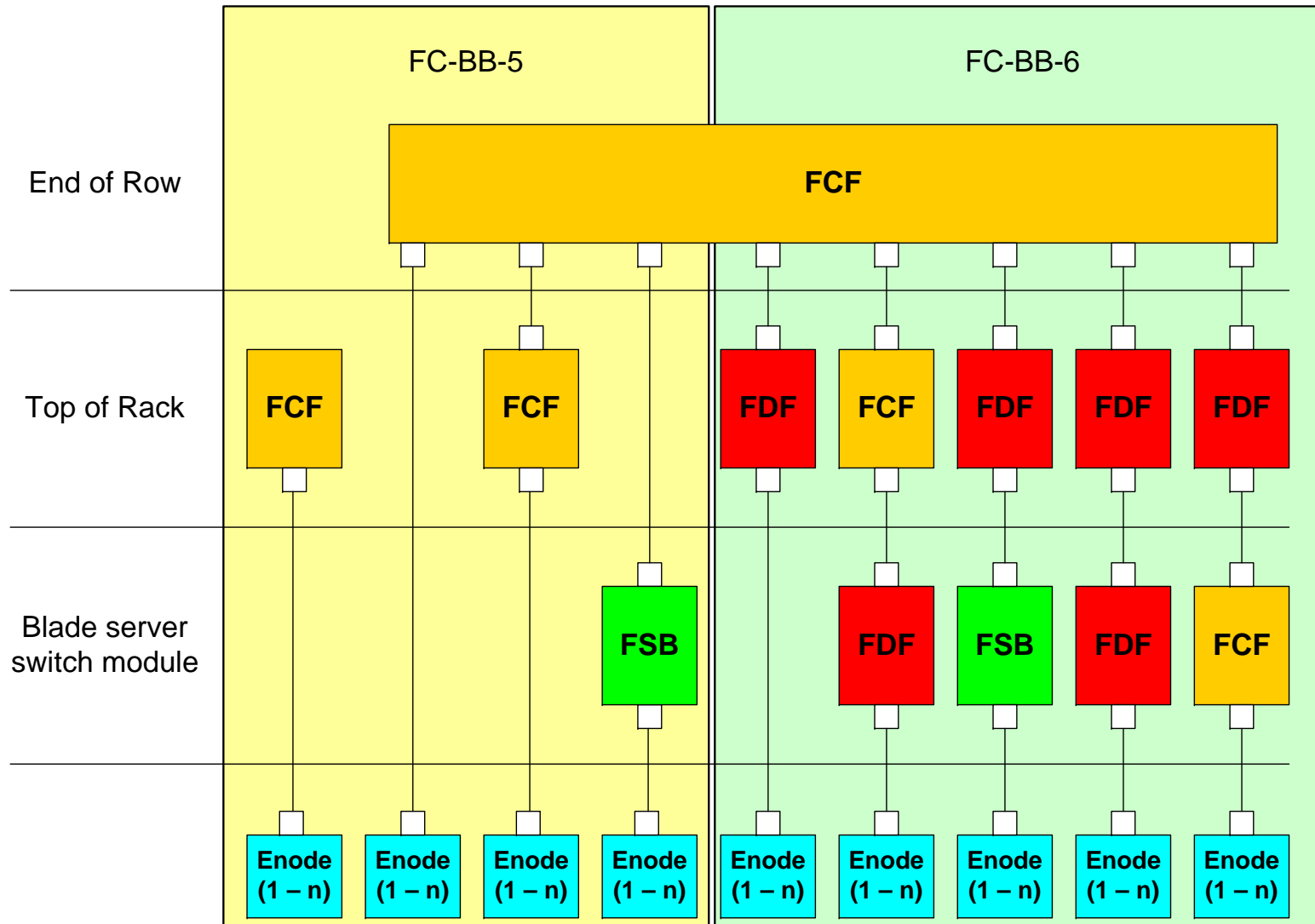
# Topology Overview



# Topology Overview



# Topology Overview



# Top of Rack configuration summary



Server Type	Switch Module	Top of Rack	EOR	Supported by FC-BB-5?
Rack	N/A	FCF	10G	YES
Rack	N/A	FCF	FCF	YES
Rack	N/A	FSB	FCF	YES
Rack	N/A	FDF	FCF	NO
Server blade	FSB	FCF	FCF	YES
Server blade	FCF	FCF	FCF	YES
Server blade	FDF	FCF	FCF	NO
Server blade	FSB	FDF	FCF	NO
Server blade	FDF	FDF	FCF	NO
Server blade	FCF	FDF	FCF	NO

\* Topology Support statement should pertain to operational state rather than physical configuration

# Agenda



- Concerns
- Review of realistic topologies
- **FDF Requirements**

- **Interoperable**

- FDF and FCFs must be interoperable in a heterogeneous vendor environment
- This is not the same as FCF <-> FCF interop (VE\_Ports, FC-SW, etc)
- A FIP Based solution is preferred

- **Lightweight**

- FDF to pass through all FIP and FC control from ENode to FCF
  - Including Link Keep Alives
- FDFs just do data path routing and zoning enforcement
- Controlling FCF provides:
  - FC services
  - RSCN support
  - Address Assignment
  - FIP Processing
- FDF provides:
  - FCoE data routing (frame type = FCoE) (At the FC Layer and the MAC Layer)
  - Hard Zoning (based on Fibre Channel Addresses and MAC Addresses)
  - Security (ACLs, FIP Snooping)
  - RSCN Support
- FDF is a FCoE aware FIP Snooping Bridge with lightweight FC functionality
- Don't use ISLs (VE\_Ports) between FDFs or FSPF routing.

- **FLOGI/Name Server**

- Zoning information and FLOGI ACC need to be interlocked such that the Enode does not attempt communication before zoning is set up. FLOGI processed by FCF
- Include zoning info in FLOGI ACC FIP response? (In addition to other mechanisms for additions and deletions from SAN.)
- Nameserver updates need to behave as they do in FC (preserve relationship to FLOGI or Name Server Session begin/end)

- **RSCN**

- RSCN functionality has to be preserved and completed in timely manner

- **High Availability**

- Solution must provide HA options
- Redundant FDFs/FCFs
- Redundant links between FDF and FCF and between FDFs

- **Common Goals**

- No Changes at the ENodes required. ENodes operate the same as FC-BB-5
- Routing at the FC Layer rather than the MAC layer
- Single FC Domain shared by Controlling FCF and FDFs
- As few changes as possible to FC-SW

- **Ease of management**
  - Management provided by the controlling FCF?
- **Support for realistic topologies**
  - FDF <-> FSB?
  - Multi-hop FDFs?
  - FCF <-> FDF <-> FCF?
- **Define FDF personality**
  - Station vs. Bridge?
  - From 10-130v1: From the Ethernet perspective the FDF is a “station”, it is not a “bridge” Therefore it does not participate in ST or TRILL

## Conclusion

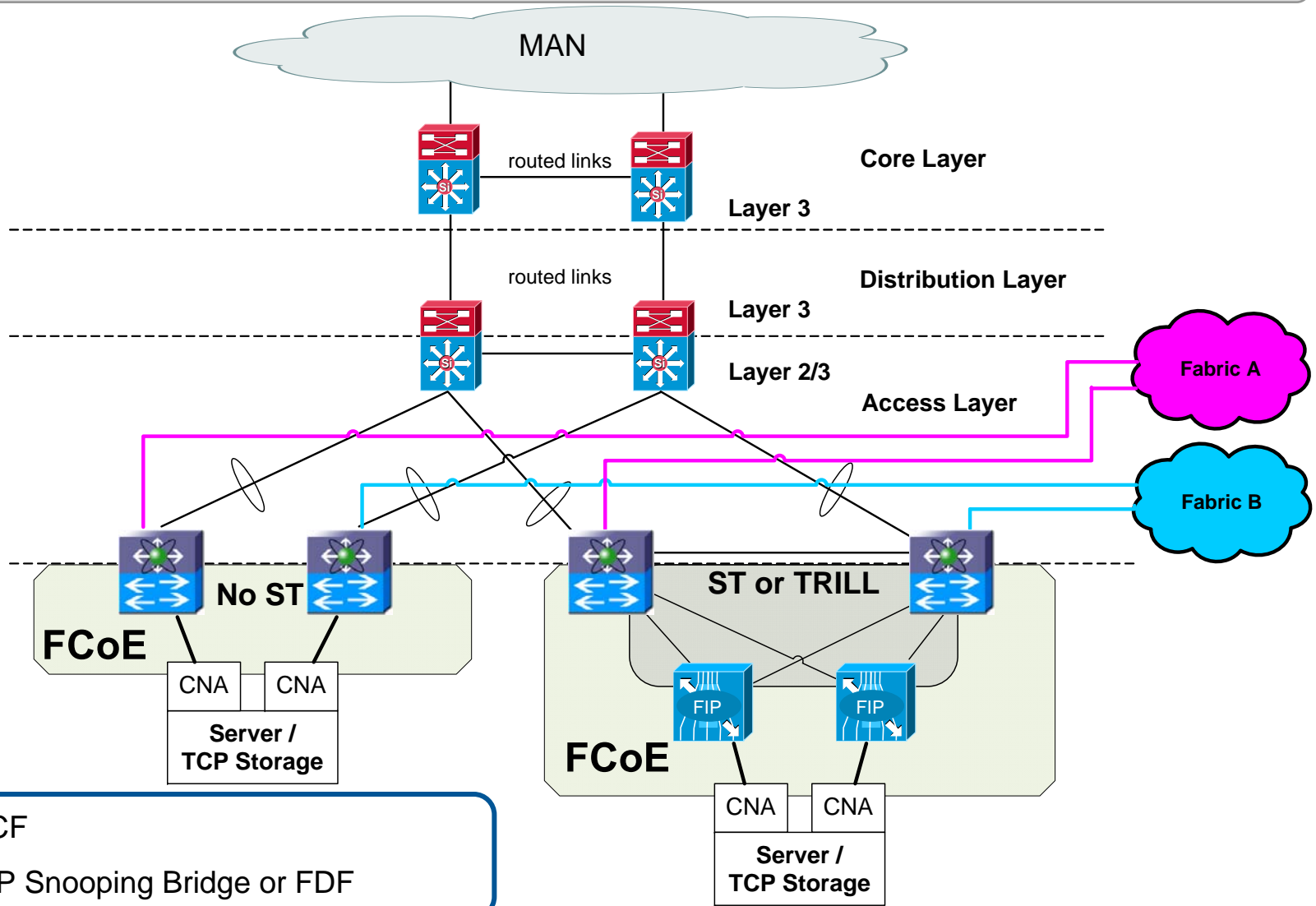


- **Vendors have individually voiced opinions that interoperable solutions are key to being successful in FCoE deployment**
- **Proposals to date have common goals but diverging implementations.**
- **EMC, HP, and IBM will continue to help drive interoperable solutions in FC-BB-6 and manage them to an agreeable set of requirements.**

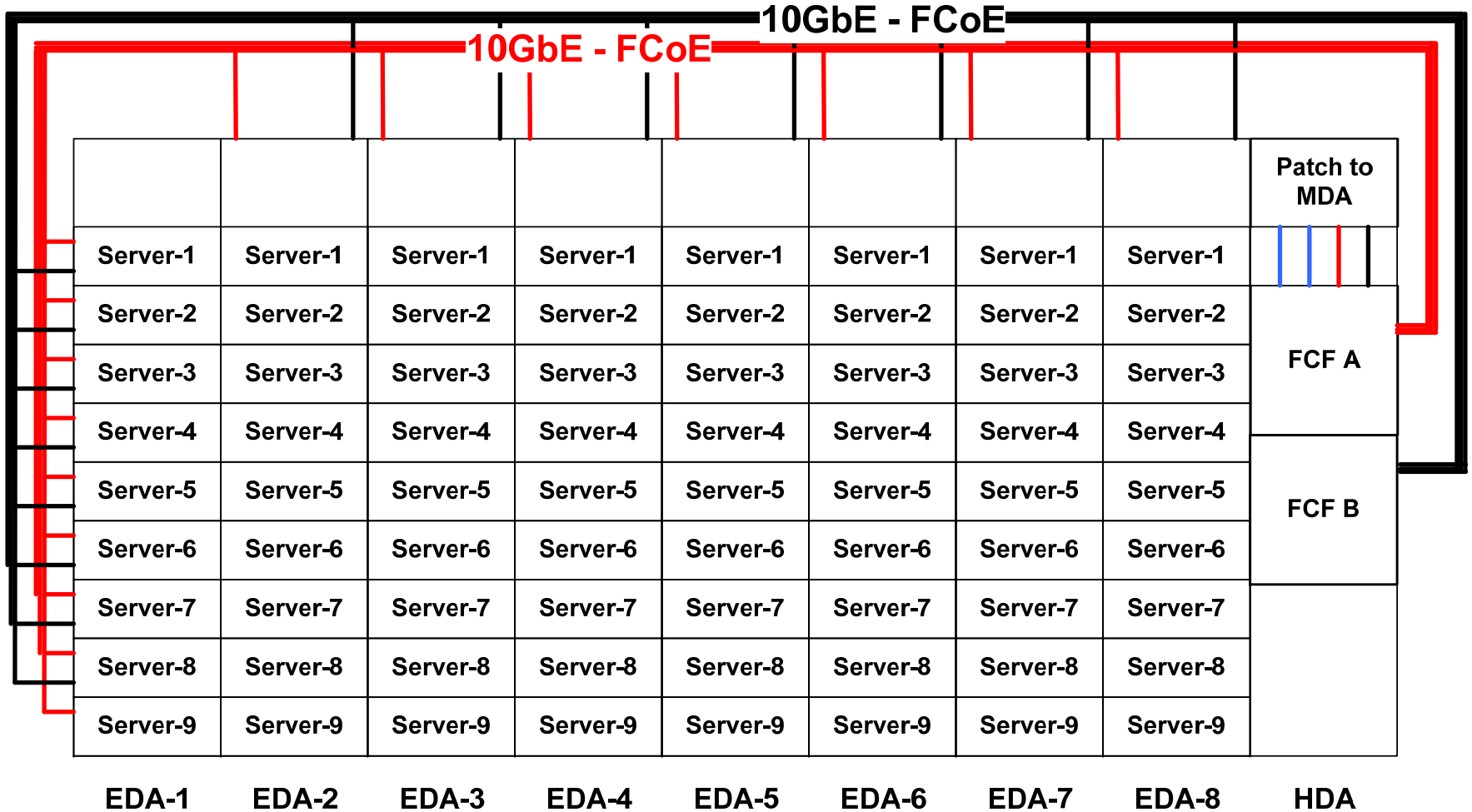


# Backup Slides

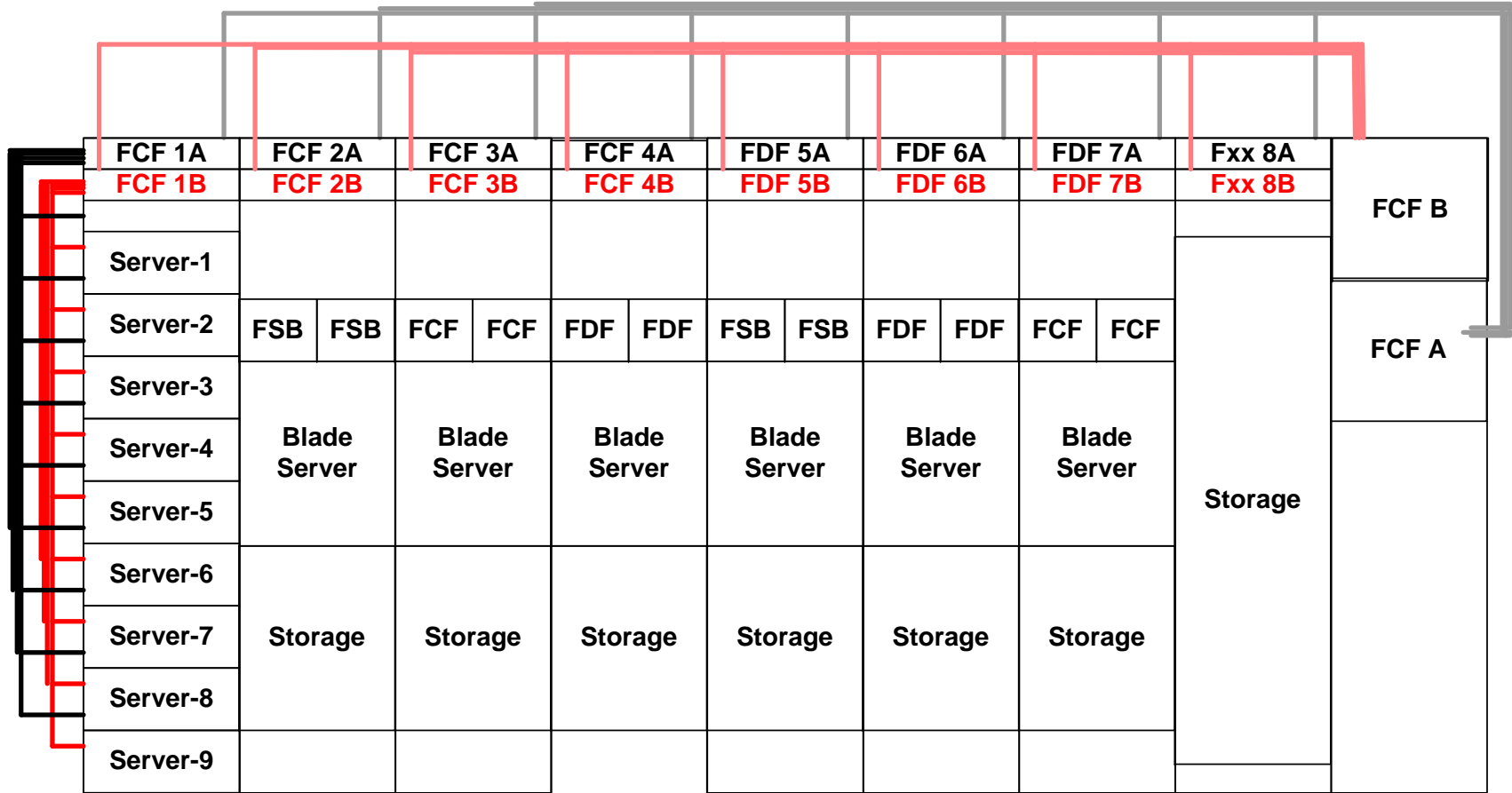
# Topology Overview



# End of Row



# Top of Rack



Fxx = FSB/FDF/FCF

FSB = FIP Snooping Bridge