High Availability Models of Operation in Fibre Channel

Application to FCoE BB6

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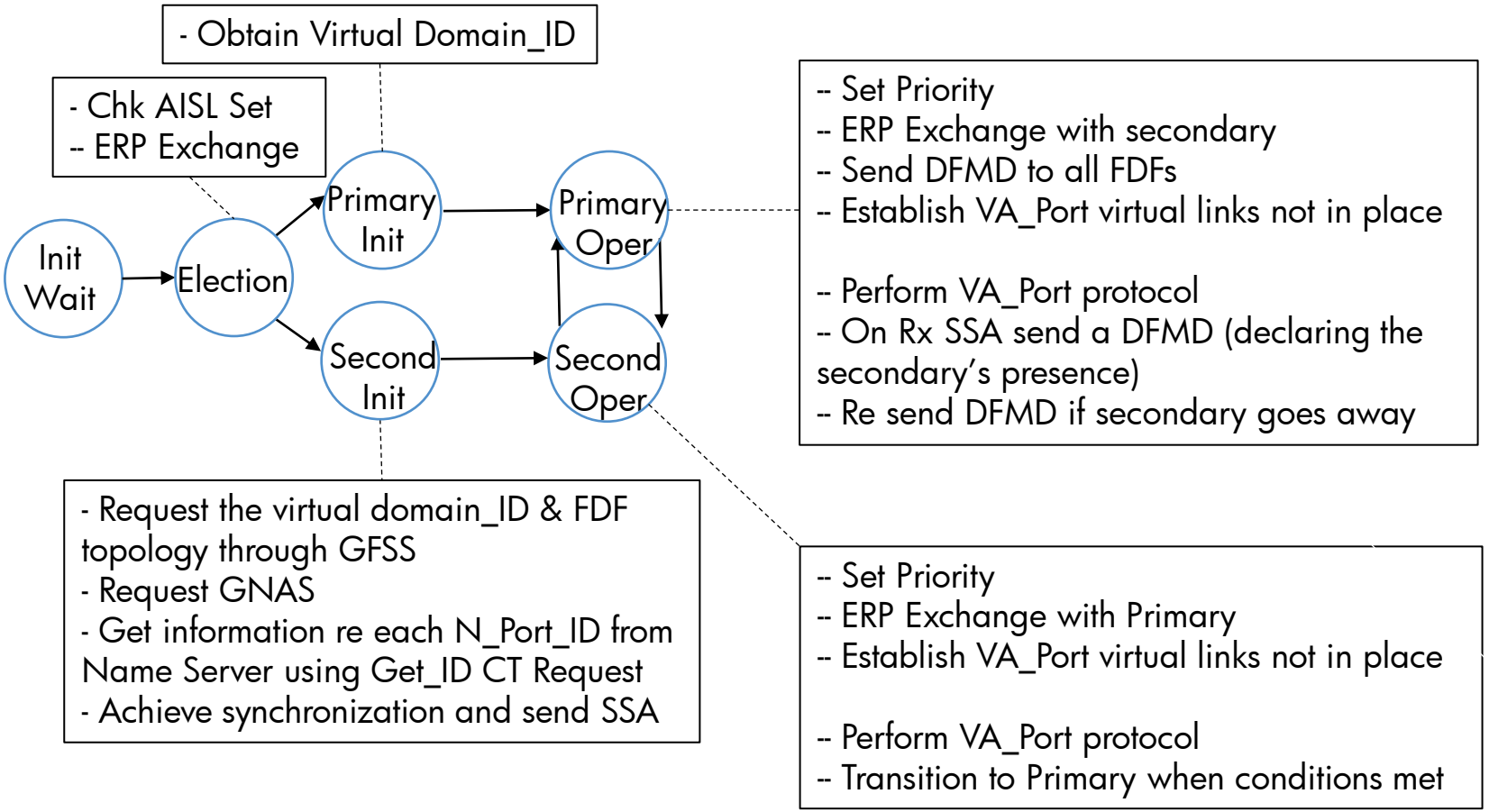
Outline

- Level set with current HA model in BB6 – 11-224v1
- Compare four operational models of High Availability in BB6
  - Assess their relative cost and x9s availability
- Show why use of a s/FCF for HA is optional

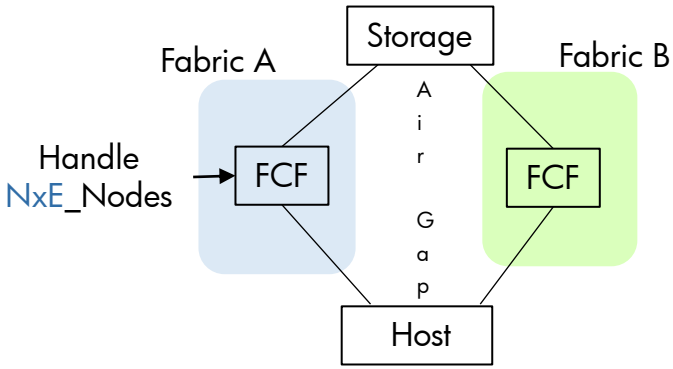
BB6 Controlling Switch Redundancy Model – 11-224v1



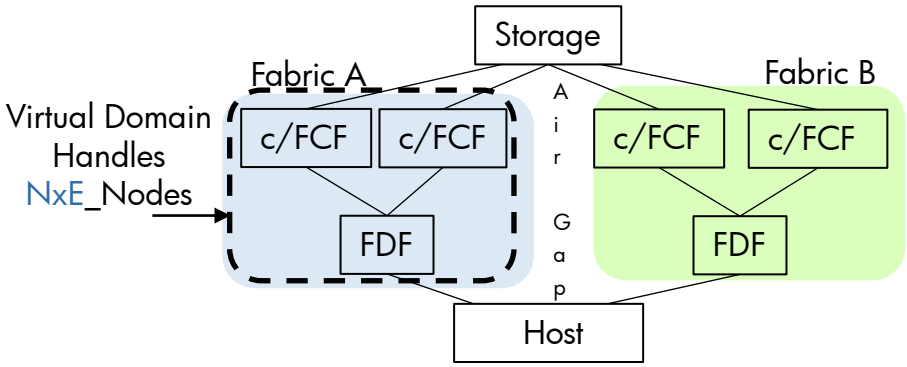
- Goal of 11-224v1 is to ***avoid single point of failure*** within a virtual domain

Cost of Active/Standby model of BB6 HA

Traditional (BB5) dual fabric design



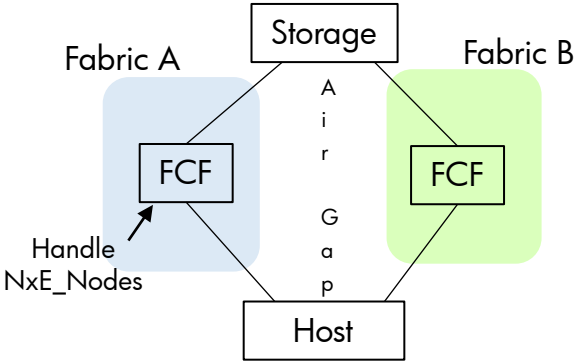
Model-1. Dual fabric design in BB6



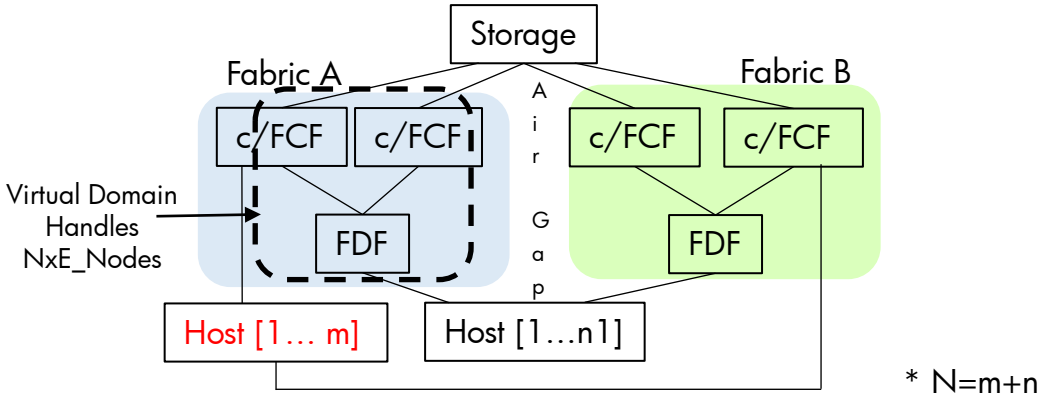
- Current operational model of HA in FC is dual fabric (A and B)
- Within a virtual domain BB6 introduces a secondary c/FCF for an active/standby model of operation
- ***1st observation:*** In BB6 HA, p/s FCF share the connection state and the two switches together carry the same number of connections N (xE_Node) as a single switch
  - In BB5 2x switches carry 2x N E_Node connections
  - In BB6 4x switches carry 2x N E_Node connections

Cost vs. High Availability in BB5 vs. BB6

Traditional (BB5) dual fabric design



Model-1. Dual fabric design in BB6

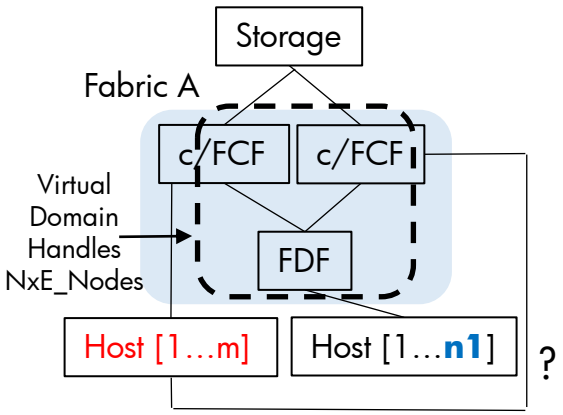


- ***2nd observation:*** E_Nodes e.g. Hosts [1,.., m] connected to an FCF's principal domain are not protected by the p/s FCF HA model
- So in order to achieve HA for these hosts we need another connection path e.g. dual fabric design
- Model-1, using both p/s FCF model and dual fabric significantly increases the cost of HA moving from BB5 to BB6
  - Are there models of operation which keep the cost the same?

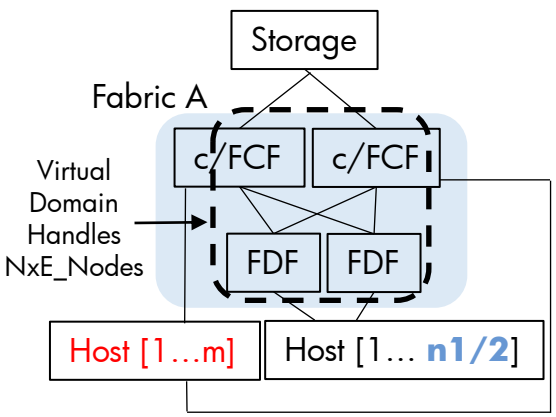
Likely BB6 operational model for HA

Single fabric HA designs in BB6

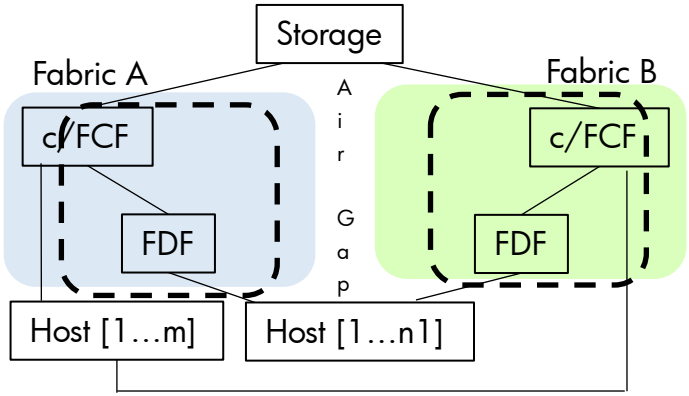
Model-2



Model-3



Model-4. Dual fabric HA design in BB6



* N=m+n

- Models 2 and 4 try to keep the HA cost equivalent to BB5 model of operation
- ***3rd issue:*** Single points of failure in Model-2
  - System Availability improves marginally with addition of the s/FCF; as number of x9s, is as good as the weakest link in the system
- Model-3, one way to remedy single point of failure, is similar to model-1 from cost perspective and is less likely to be deployed
- Model-4, does not use the BB6 HA and is in line with current FC operational model and cost structure
  - ***Hence BB6 HA in the form of a s/FCF is optional …***

Conclusion on current HA model

- Current HA model in BB6:
  - Either significantly increases the cost of dual fabric design
  - Or in the absence of a dual fabric introduces single point of failure for hosts
- Therefore a likely model of deployment is dual fabric with a single c/FCF per virtual domain (model-4)
- Hence using a s/FCF per virtual domain is optional and in its absence having alternative path from an FDF to adjacent FCFs for forwarding only, without sharing connection state, is desirable
  - This allows for load balancing to/from FDFs

Recommendations

- In current dual fabric FC HA model loss of one fabric results in loss of at least one connection from a host perspective
- BB6 can follow the same model of operation where loss of a c/FCF would result in loss of associated connections and a requirement for reconnect through an standby c/FCF
- This allows for deployment of a 1:n model of HA rather than the current 1:2
  - In this model there is no connection state synchronization
  - Simply a heart beat to allow for failure detection or forced switch over
  - The standby c/FCF declares itself as the new c/FCF to impacted FDFs
  - And life goes on
- The 1:n model reduces the cost of HA by 1/(n-1)

Thank You