Network Interconnect Resiliency Requirements

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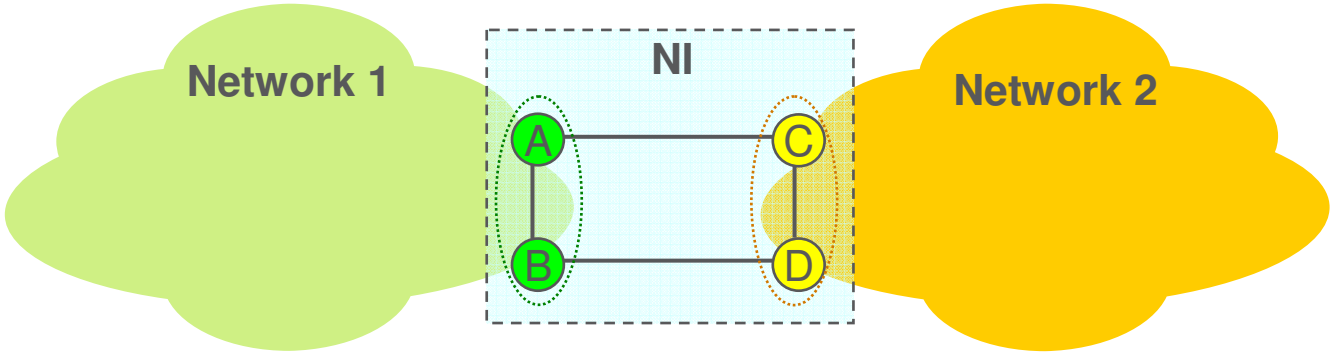
Target: Peering interconnect

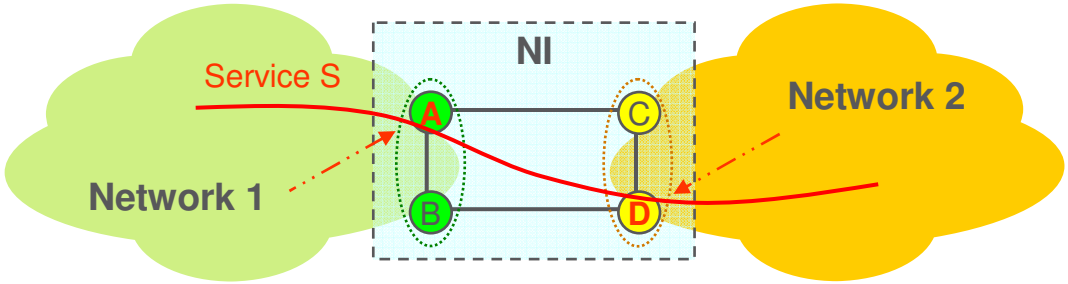
- The two independent providers have equal rights, none of them is inferior to the other; thus
- The network providers may have independent decisions
- The **Network Interconnect (NI)** has to adapt to providers' decisions and provide the connectivity
- NI has its own control: the **Network Interconnect Protocol (NIP),** which is independent from the control of the attached networks



R1 – Independent service assignments

- A provider may select an NI node for a service independently of the peering provider's selection
- The service assignment is done by the provider (either by configuration or by a protocol run by the provider)

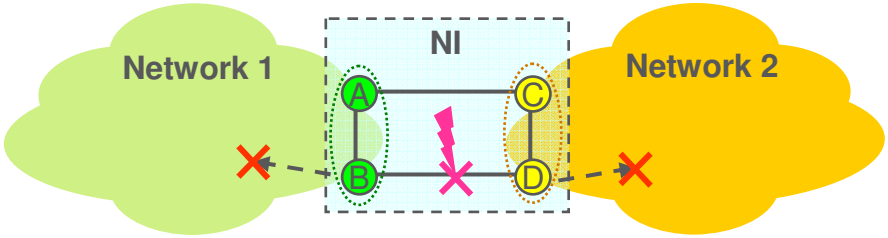
- For example
  - Network 1 selects NI node A for service S
  - Network 2 selects NI node D for service S



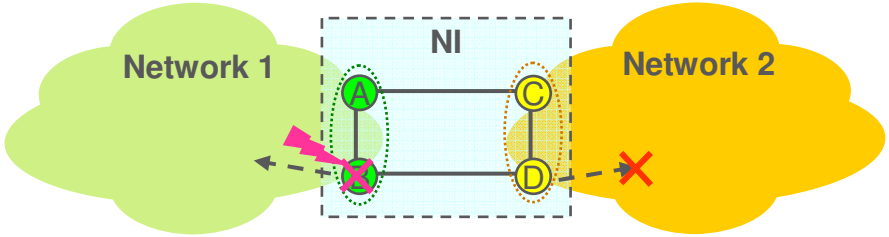
- Bundling maybe supported

R2 – NI failure isolation

- NI failure should not cause state change in the provider networks' control protocols
  - Link failure
    - NI failure should not cause state change in any of the attached networks



  - Node failure
    - Affects the provider network comprising the node
    - Provider has to re-assign affected services



    - NI failure should not cause state change in the non-affected network

- Provider network failure may cause state change in the NI (e.g. a service is re-assigned due to a failure)

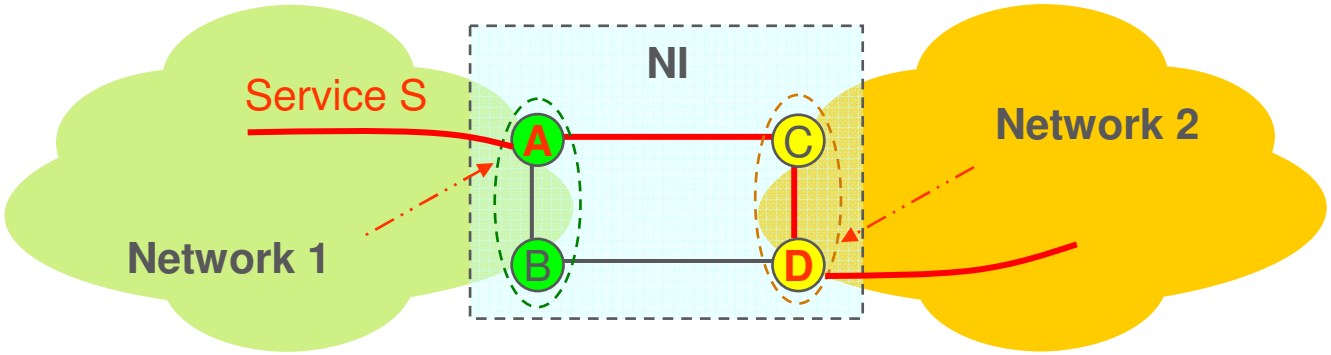
R3 – Failover time

- Link failure
  - NI should provide sub 50 msec failover time for link failures

- Node failure
  - No failover time constraint
  - The provider has to re-assign the affected service(s)
  - NI then adapts to the service re-assignment
    - Time constraint could be put on NI adaptation

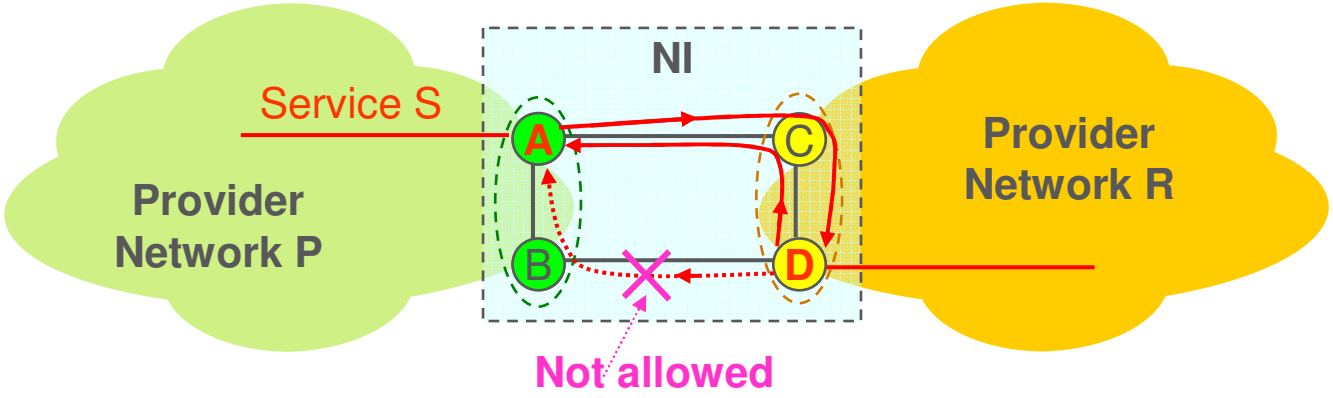
R4 – Connectivity

- NIP should provide connectivity between the attached networks
- NIP should adapt to service assignments



R5 – Congruency

- The same path should be used in the NI for the two directions of a service

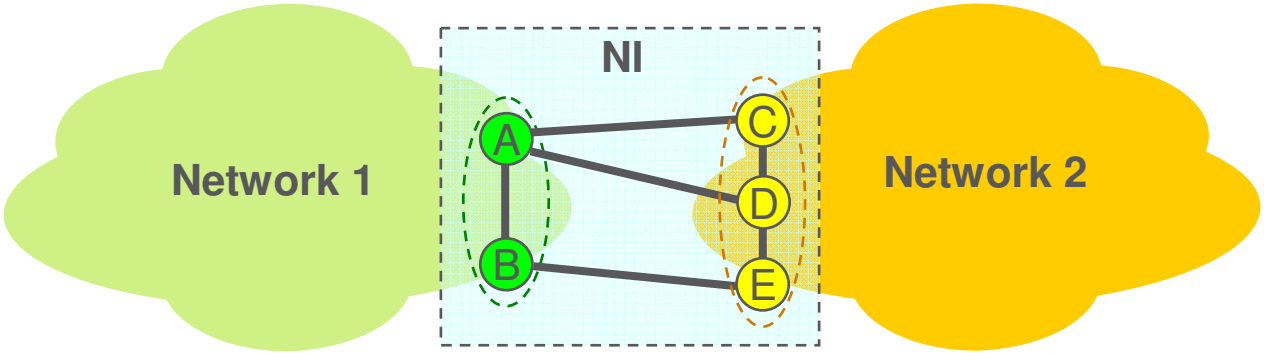


- Forwarding path may not be optimal due to the independent assignments
  - Providers may agree in the service assignments in order to use a direct link
  - Or one of them may relax service assignment for optimal path

R6 – NI topology

- NI topology should be at least two-connected
- Connection between NI nodes of the same provider
  - An NI node should be connected to at least another NI node belonging to the same provider
  - The connection maybe physical or virtual
- Arbitrary topology otherwise
  - NI protocol should handle arbitrary number of NI nodes

Example:



Consequence – Load balancing

- Service by service assignment provides support for load balancing