

Topology Schema

Martin Swany



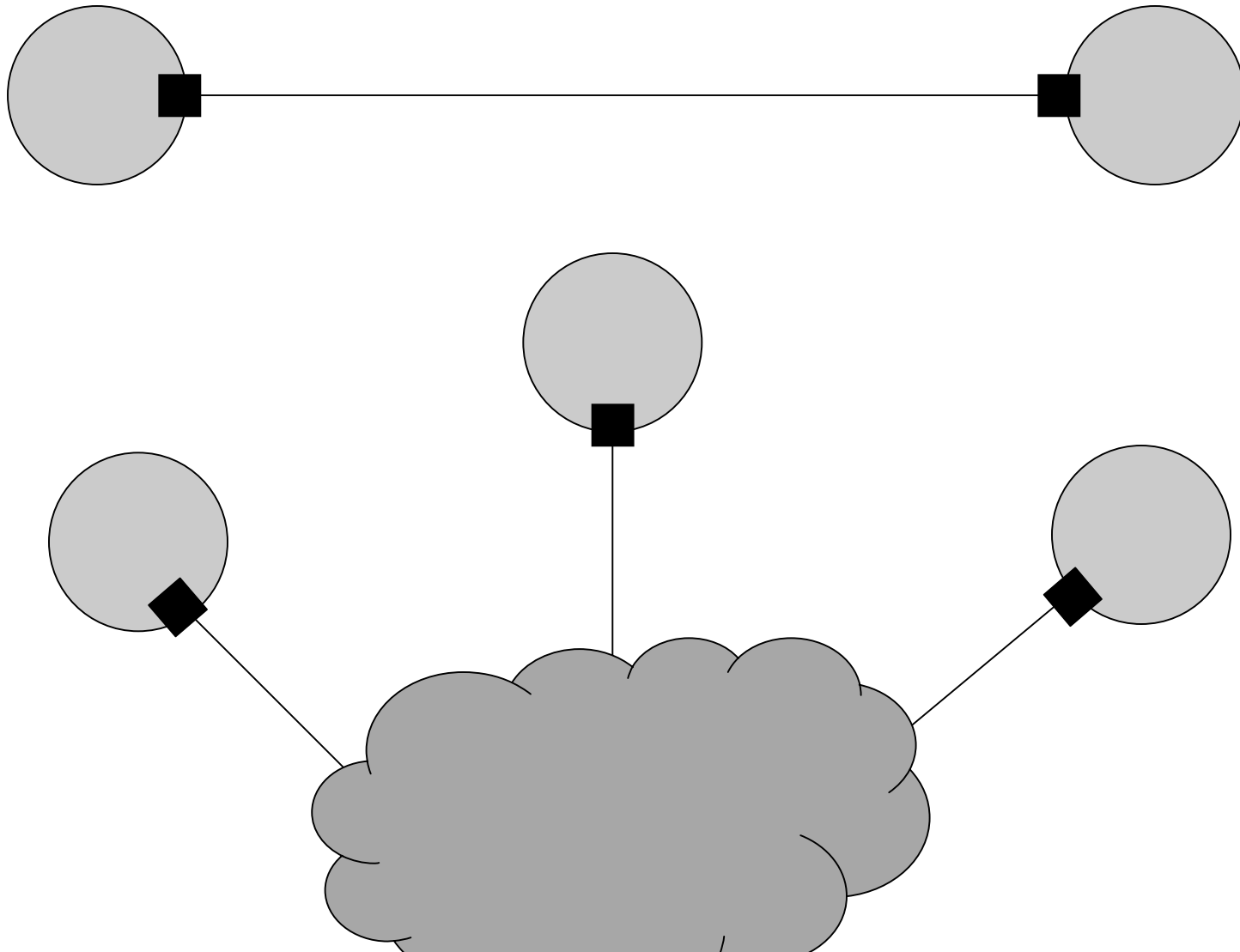
perfSONAR



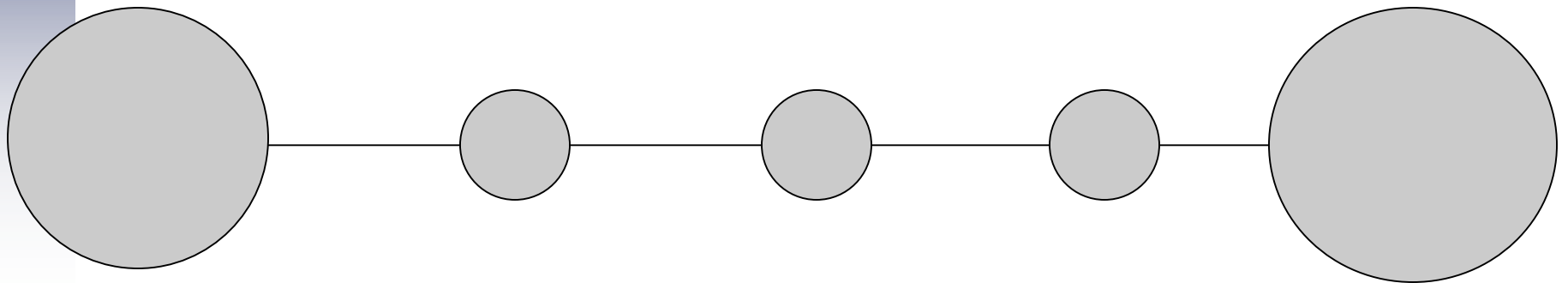
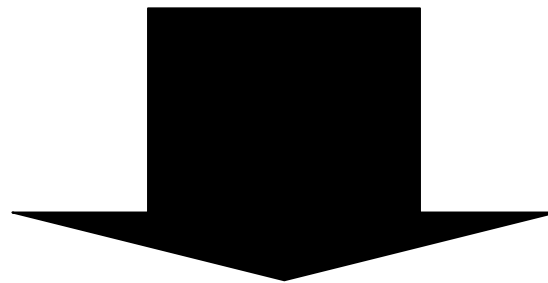
Topology Schema

- Topology schema grew from network measurement schema from the NM-WG in the OGF (the basis of perfSONAR)
 - Reusable “Subject” elements for common cases
 - Also reduces redundancy
 - Relationships between measurement Subjects
- Same basic structure at all layers
 - Networks are *graphs*
- Key elements:
 - Node
 - Port (renamed from Interface)
 - Link
 - Network
 - Path
 - Relation
 - New element replacing ID/IDREF structure

Topology



Topology - Recursive Links



Version 3 Topology Schema

- Structured by layers and the same elements recurring there
- Varied by namespaces
 - Reuse visualization logic, etc.
 - Validate layer- or technology-specific attributes
- 4 Layers: Base (both abstract and L1), L2, L3, L4

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<nmwg:store xmlns:nmwg="http://ggf.org/ns/nmwg/base/2.0/"  
  xmlns:nmwgt="http://ggf.org/ns/nmwg/topology/3.0/"  
  xmlns:nmwgtl3="http://ggf.org/ns/nmwg/topology/l3/3.0/"  
  xmlns:nmwgtl2="http://ggf.org/ns/nmwg/topology/l2/3.0/">
```

Hierarchy of Namespaces

- Recent work
- Use technology-specific namespaces
 - <http://ogf.org/ns/nmwg/topology/sonet/3.0/>
 - <http://ogf.org/ns/nmwg/topology/sdh/3.0/>
 - <http://ogf.org/ns/nmwg/topology/ethernet/3.0/>
 - <http://ogf.org/ns/nmwg/topology/ipv4/3.0/>
 - <http://ogf.org/ns/nmwg/topology/ipv6/3.0/>

Relationships between Subjects

- Elements at the same layer have relationships
 - A link is related to 1two interfaces
 - At Layer2 or Layer3
- Elements of the same sort have relationships between themselves at different layers
 - A Layer 1 Interface (physical NIC) can have one or more Layer 2 Interfaces, which can each have one or more Layer 3 Interfaces
- Node is special
 - Since a Node doesn't really have any higher-layer characteristic independent of its Interfaces

Relationships between Subjects

- Recursive definition of links
 - Logical links consist of physical links
- A path is an ordered lists of links
 - Similar to above but we need to introduce an Index attribute
- Networks
 - Physically consist of links but that is not always the most convenient logical view
 - Special element to which Interfaces or Links belong

Current Status

- Document for Version 3/3+ schema is (nearly) ready
- The Network Markup Language WG (NML-WG) in the OGF will take up this effort
- The Internet2 DCN is using this schema for interoperability with GEANT2 and ESnet
 - DRAGON-style interaction will still be possible, but this is the schema used in the WS interface
 - Ideally, this facilitates a close tie between dynamic services and monitoring
- Unification of monitoring and control schematas

NML-WG

- Meeting next week at OGF-20 in Seattle
- Extensible namespace-based ontology
- This could allow short-term rendering into both NDL and NMWG “styles”
- We have worked on translations between from NDL to NMWG
 - Interesting proof of concept
- In some sense, making that easy and unambiguous is a good first step