Topology Use Cases

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Topology Use Case & Reqmt's Drafts

- ## Use Cases
  - ### draft-amante-irs-topology-use-cases-00
    - Shane Amante (Level 3), Jan Medved, Stefano Previdi (Cisco), Tom Nadeau (Juniper)

- ## Requirements
  - ### draft-medved-irs-topology-requirements
    - Jan Medved, Stefano Previdi (Cisco), Hannes Gredler (Juniper), Shane Amante (Level 3)

draft-amante-i2rs-topology-use-cases-00

- Framework for a Topology Server function

- Use Cases
  - Capacity Planning Operate at different time scales, but critical requirement to incorporate information from multiple data sources: statistics & inventory data warehouses
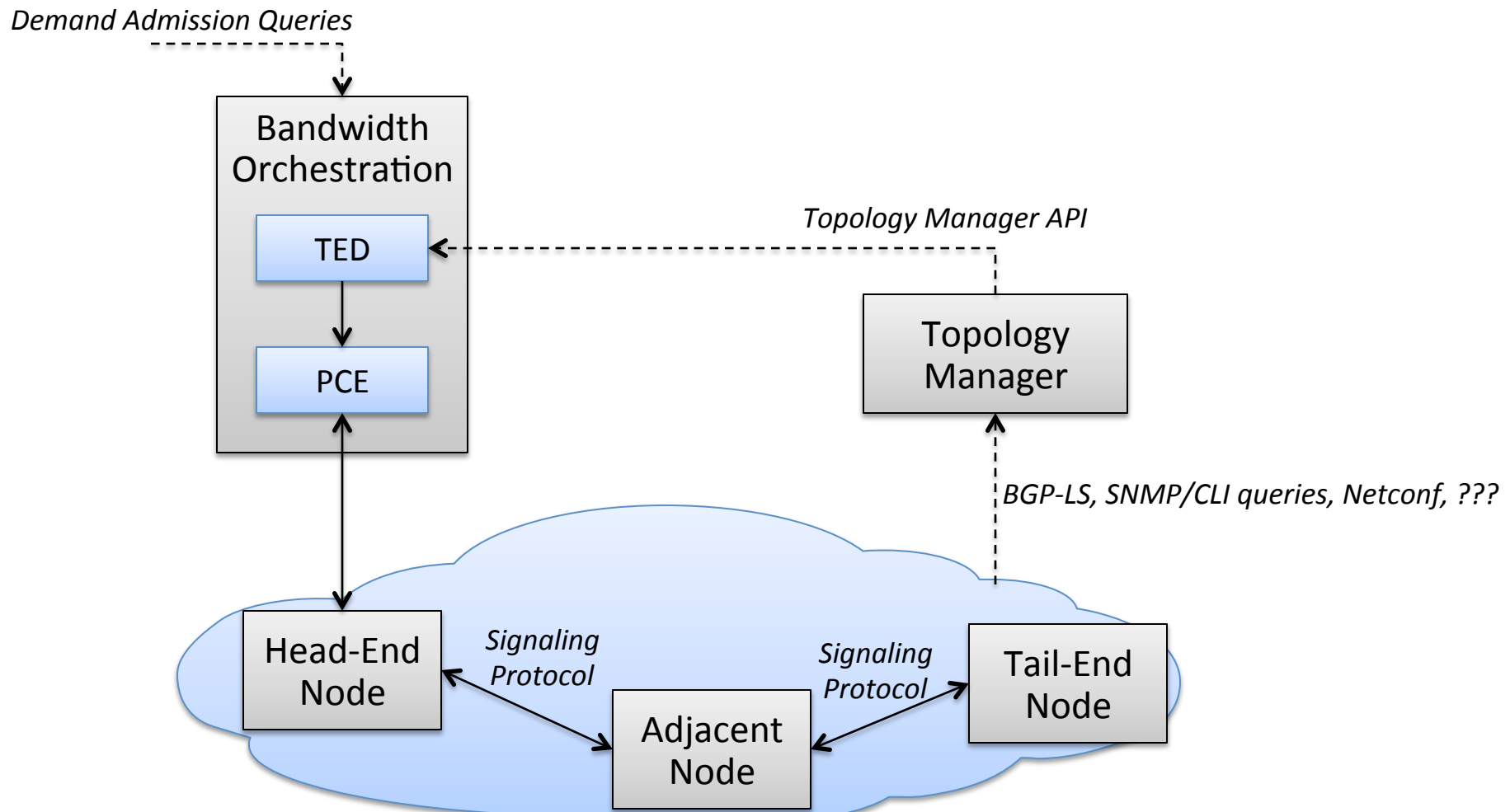 - VPN Path Computation Element (PCE)
  - ALTO Server

Topology and Related APIs

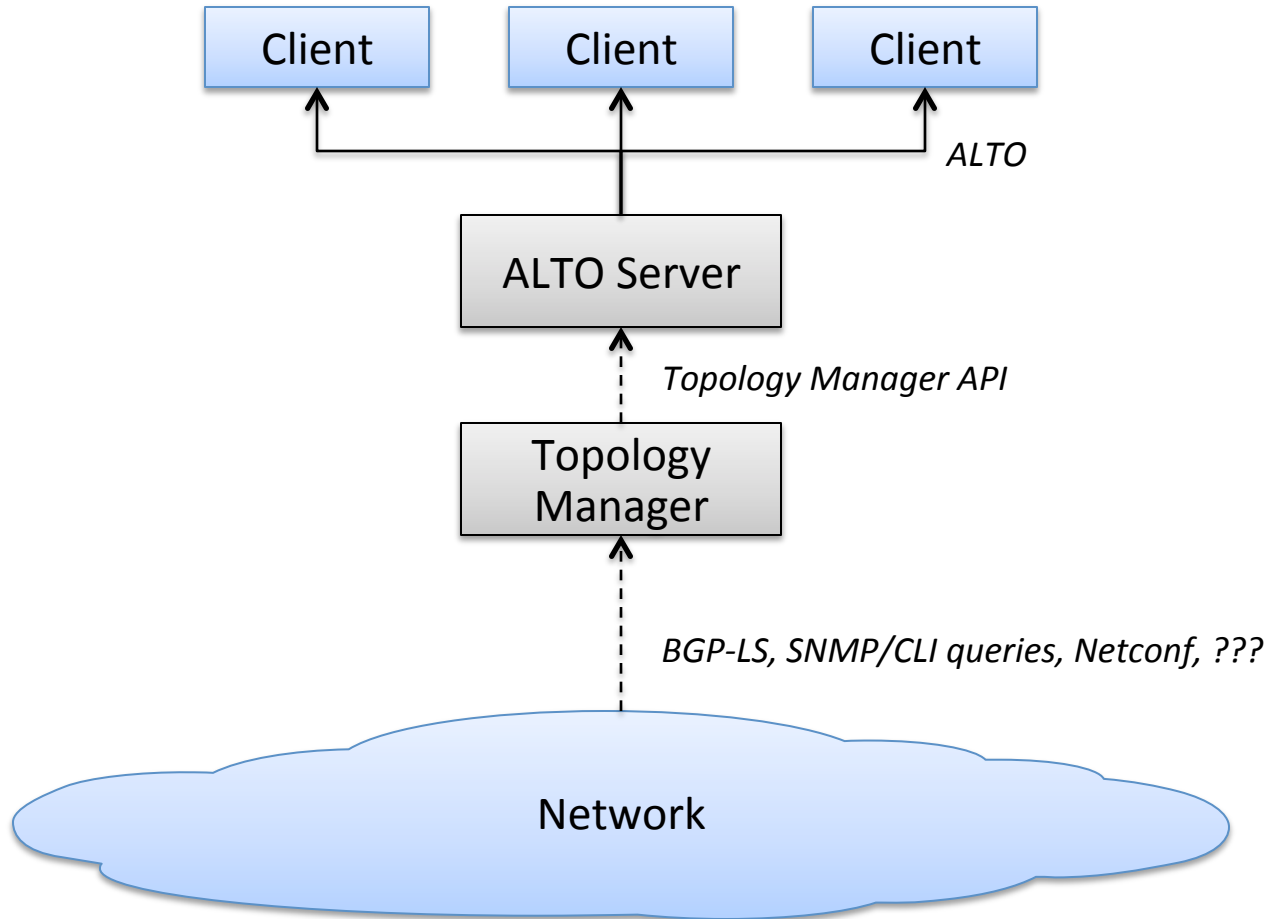

IRS Use Cases & Requirements Drafts
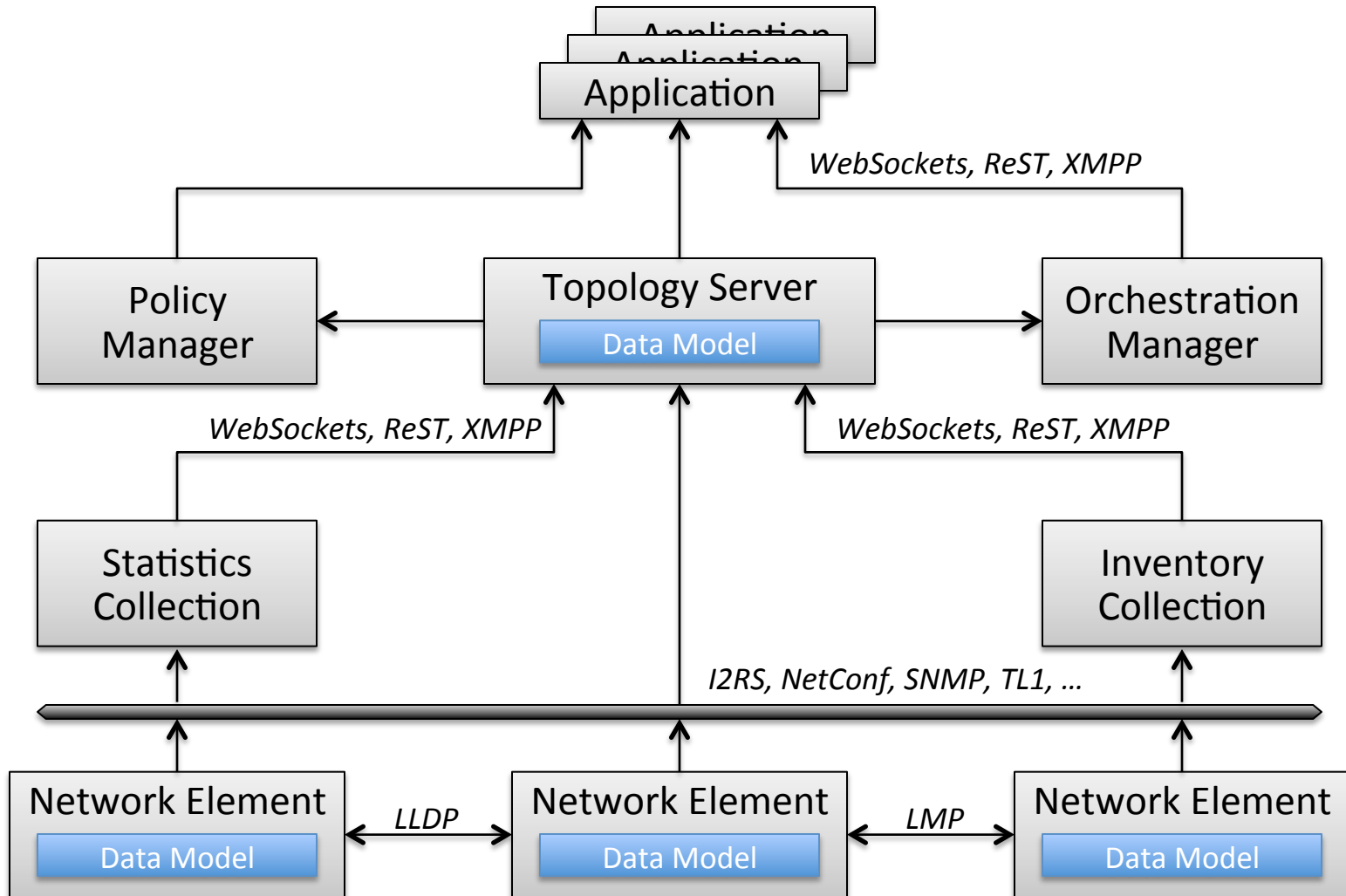
Use Case 1: Capacity Planning

- Problem:
  - Lacking normalization & sanity checks of underlying inventory data
  - Infrequent updates of inventory info
- Solution:
  - Extract inventory from NEs and other sources (physical, optical, Ethernet and IP/MPLS layers)
    - Physical layer paths needed (e.g. cross-connect panels)
  - Statistics collection
  - Normalized view of the overall topology required

Use Case 2: Path Computation Element (PCE)

Demand Admission Queries

Bandwidth Orchestration

TED

PCE

Topology Manager API

Topology Manager

BGP-LS, SNMP/CLI queries, Netconf, ???

Head-End Node

Signaling Protocol

Adjacent Node

Signaling Protocol

Tail-End Node

Use Case 3: ALTO Server

Client Client Client

ALTO

ALTO Server

Topology Manager API

Topology Manager

BGP-LS, SNMP/CLI queries, Netconf, ???

Network

Use Case 4: Service Router

Client DNS Client

ALTO

Services   →   Service Router

Topology Manager API

Topology Manager

BGP-LS, SNMP/CLI queries, Netconf, ???
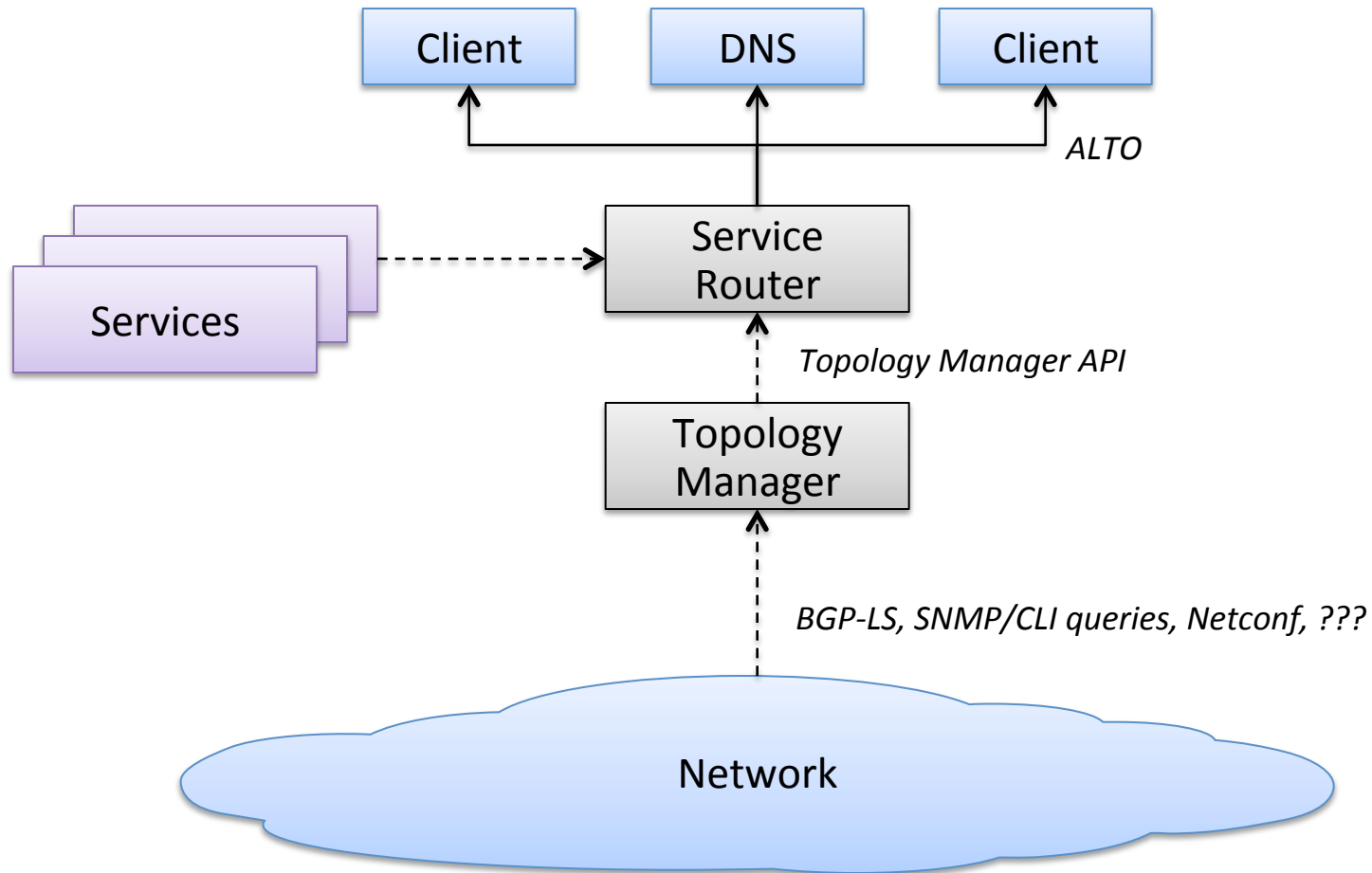
Network

Use Case 5: VPN Services Provisioning

- L3VPN and l2VPN services provisioning require common and up-to-date normalized view of the IP/MPLS network
  - Instantiate new services at the appropriate places in the network
  - Validate that ACL's are configured properly
- Topology Manager used to identify the set of Services PEs: with:
  - Appropriate uplink bandwidth
  - Appropriate access circuit capability
  - Appropriate capacity to realize the requested VPN service.

Use Case 6: Troubleshooting & Monitoring

- Provide an up-to-date view of a L2VPN or L3VPN service for a particular customer
  - Diagnosing a service fault/error
  - Augmenting existing service

draft-medved-irs-topology-requirements-00

- Reqmt's for 'Topology Manager' function of draft-amante-irs-topology-use-cases
- Topology Manager (TM) constructs virtualized views of global network topology for consumption by Clients
- General:
  - Define standards-based data models with common vocabulary to describe various network components
- Data Model:
  - Layer-2 & higher Data Model Reqmt's
  - MUST capture Visible & 'Invisible' Network Components
  - Hierarchical representation, composition and summarization of network components into real or virtual/abstract depictions of network topologies
- Northbound (Client) API
  - Efficient, flow-control-capable protocol for large data transfers between TM & Clients
  - MUST support publish/subscribe capability
  - MUST support 'non-Routers' as Clients, (up to now Clients needed to run a dynamic Routing Protocol to learn of network topology or events).
- Southbound (Network & Device) API:
  - Requirements on Network Elements to enable topology data collection
  - More comprehensive set in draft-rfernando-irs-framework-requirement-00

THANK YOU