Functional Areas of Network Management

OSI Reference Model

- OSI reference model defines five functional area of management,
  - Configuration
  - Fault
  - Performance
  - Accounting
  - Security
    - Collectively called FCAPS
      - Since its inception, the five areas of management functions have helped in structuring the network management research efforts.

Configuration

- Concerns with resource configuration such as,
  - Network path setup
  - Resource provisioning
  - Device configuration etc
    - In telecommunication networks today, configuration may also include user terminal configuration, user profiling and service personalization.

Fault

- It concerns with,
  - Fault detection
  - Identification,
  - Isolation,
  - Recovery and
  - Path protection etc.
    - Fault and service disruption makes fault management a highly regarded area of research.
    - With the increasing distributedness of systems and resources as well as the growing size and complexity of telecom networks, its is extremely difficult to identify network faults and be able to address them efficiently.
      - A lot of work has been investigated on path protection and restoration on optical networks.

Performance

- It concerns with quality of services(QoS) delivery of network services,
  - The monitoring of traffics,
  - Traffic control techniques
    - As telecom networks are shifted fully toward the digital packet switched network infrastructure and introduction of multimedia services spanning across both wireless and wired networks,
      - Performance management has gained increased attention.

Accounting

- It concerns with charging and accounting of user traffics.
  - Charging and accounting of user traffics.
  - This area is not a major focus area of research in network management.
  - More application service providers and usage based premium services (e.g. real time broadcasting) are being made available as part of telecom service offering, effective accounting management becomes a necessity.

Security

- Concerns with aspects such as,
  - Authentication, authorization, security accounting, access control and encryption etc.
    - Traditional telecom network was a tightly managed private network separate from the packet switching internet.
    - With the convergence of communication infrastructures, and the increased severity of security attacks on networks and services, security management has become the management problem to be addressed.

TNM Model

- As telecommunication network is a complex infrastructure spanning over networks, services, users, and business entities.
  - The OSI model does not provide a top down view of telecom network management.
  - The Telecommunication Management Network (TMN) framework defines a layered logical architecture consisting of,
    - Element management
    - Network management
    - Service management
    - Business management

Element management

- It provides a view on the collection of network elements, usually forming a subnetwork.
  - It also facilitates data between the network element and the network manager.
  - It is device and network technology specific.

Network management

- It provides end to end network view of the managed resources and devices.
  - It is device neutral mean not device specific.

Service management

- It provides contacts with customers and service providers.
  - QoS Assurances,
  - Service orders,
  - Billing information and
  - Trouble ticketing

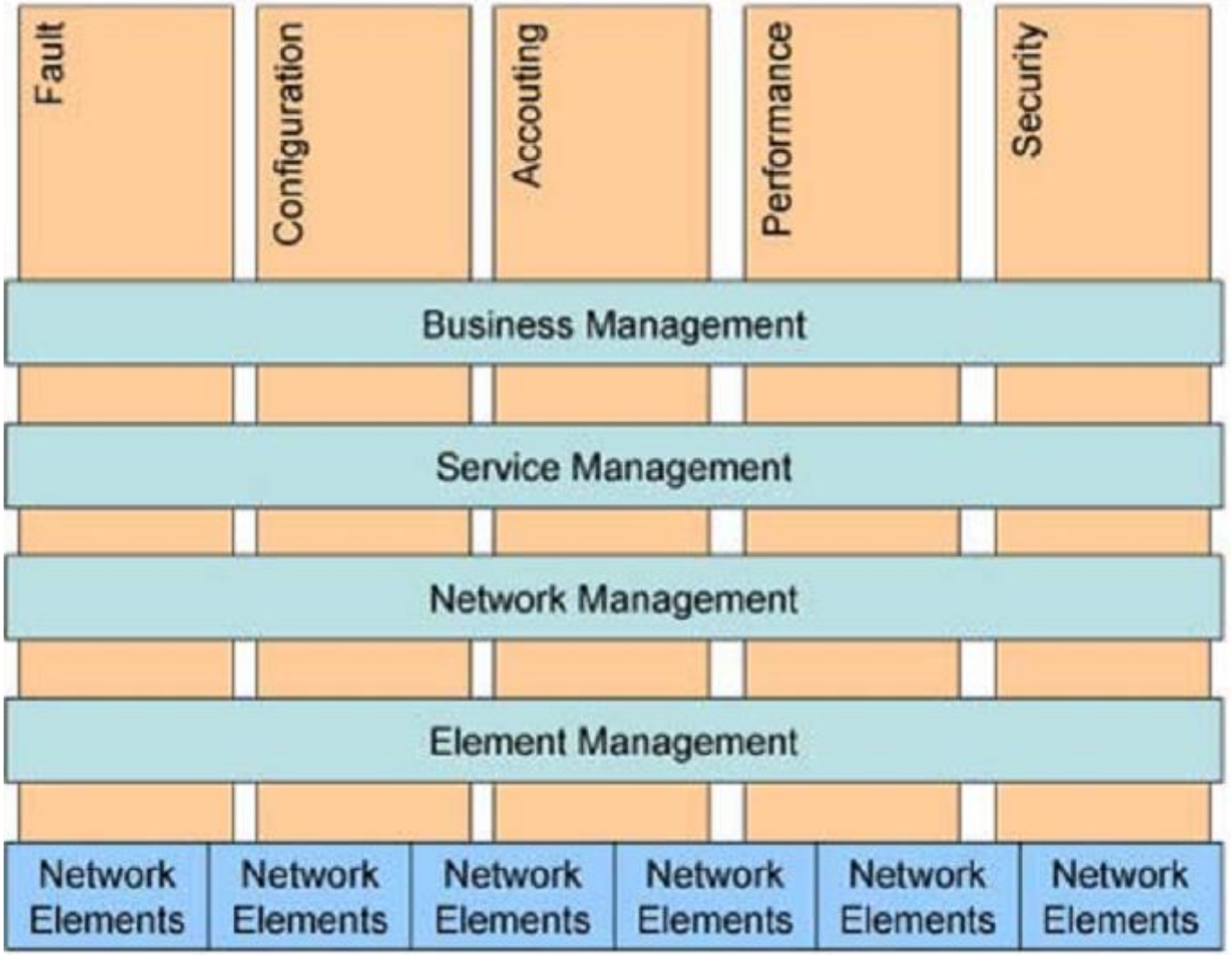
Business management

- Product and human resource planning
  - Business level view of the services and financial concerns.
  - Services regarding human facilitation.
  - What different services are necessary to run a successful business with win-win model, in terms of customer and service provider.

TNM Model

- It's a combined model of TNM according to the TMN and OSI models.
  - Shown on next slide

TNM Model


Fault
Configuration
Accouting
Performance
Security
Business Management
Service Management
Network Management
Element Management
Network Elements
Network Elements
Network Elements
Network Elements
Network Elements
Network Elements

Cont…

- Since its model establishment, the network and element management layering has been sufficient in structuring management views.
  - In this model there is not representation of the customers in this model.
    - Increase role of customers in management e.g.
      - User directed management and the necessity of user profiling for location and context tracking, there is an increasing requirement for representing the customers in the network and service management model.
      - The service layer is growing “fat”.
      - In the current service layer, one can see strong mix of multimedia services, personalized user services and 3rd party applications.
        - It is becoming more difficult to maintain a uniform and consistent view of service in a single layer.