End-to-end QoS control in Next Generation Networks

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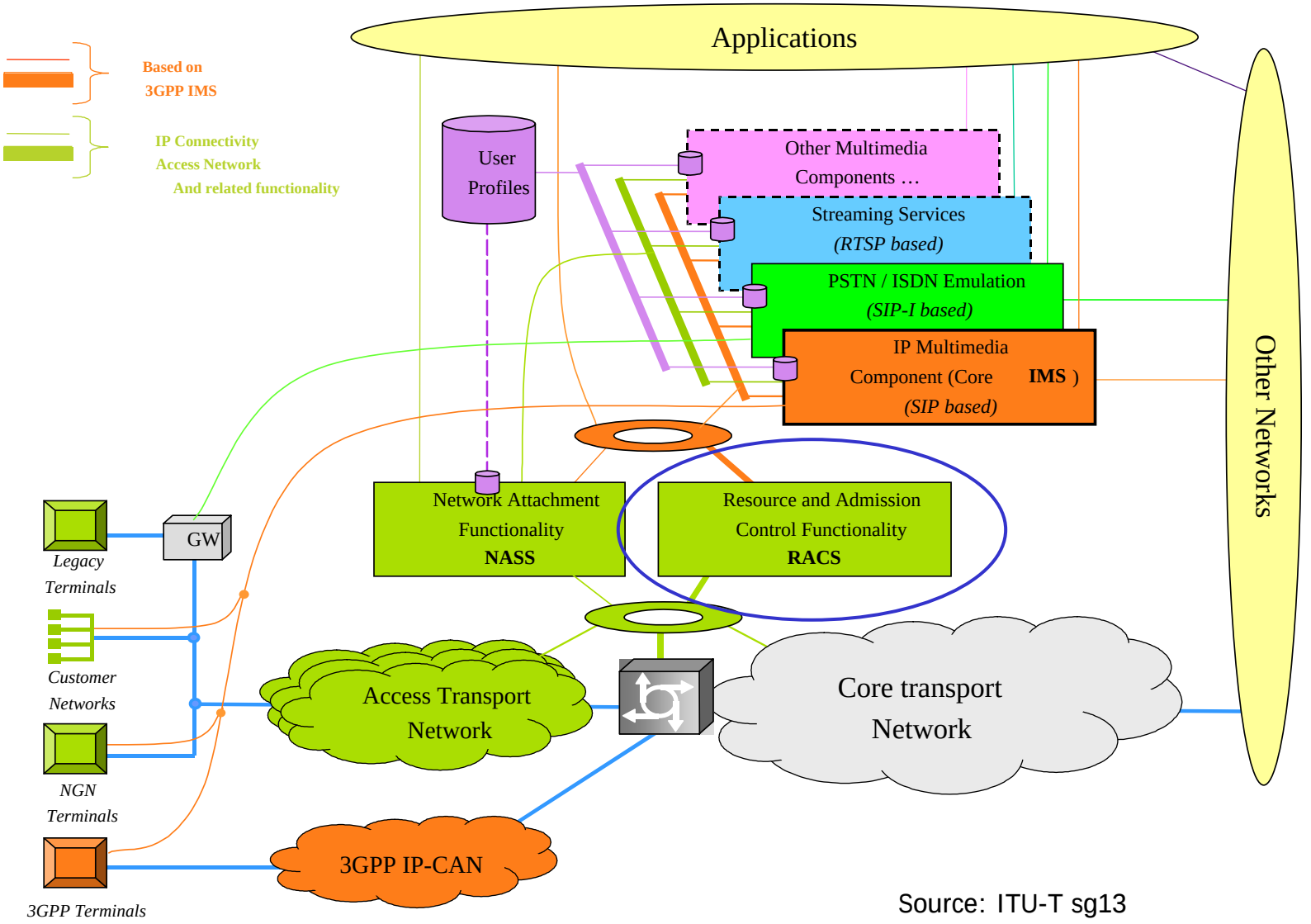
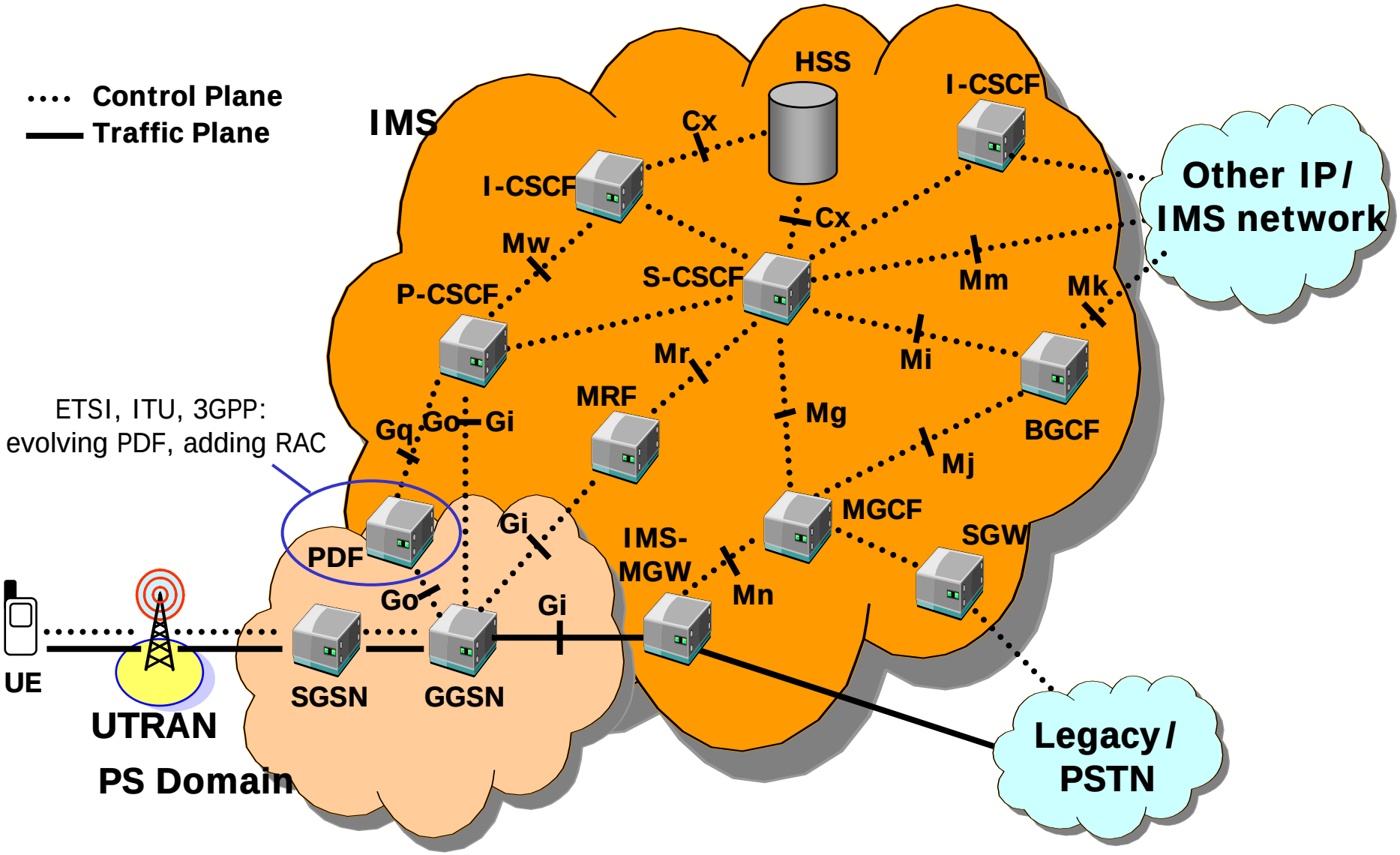
ETSI / ITU NGN architectural concepts

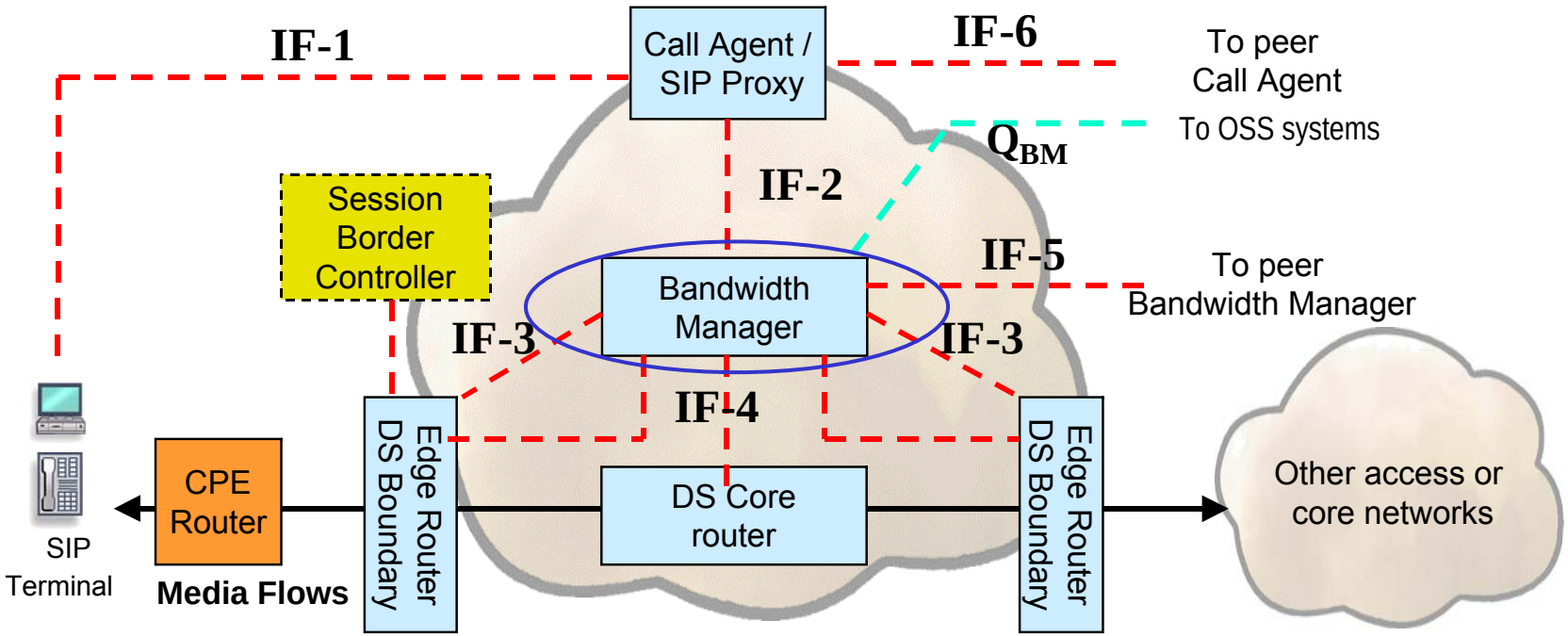


Source: ITU-T sg13

3GPP IMS Architecture (release 6)
Adopted by ITU-T and ETSI as a starting point



MSF physical architecture



NGN efficiency

Fixed-mobile convergence

- Roaming between fixed and mobile

IP convergence

- A common transport infrastructure

Call control convergence

- Unification by SIP

PSTN replacement

- Emulation (traditional handset and services)
  - Through access gateways
- Simulation (SIP phone + video and other services)
  - Through broadband access

Capex & Opex savings!

NGN services

Multiple services

- Conversational VoIP & video
- IPTV
- Content delivery (streaming)
- Bandwidth on demand
  - Fast download
- Dynamic VPN
- Real time applications
  - Gaming

Differentiated service offerings

- Enterprise and residential services
- Enable new revenue models

Triple Play !

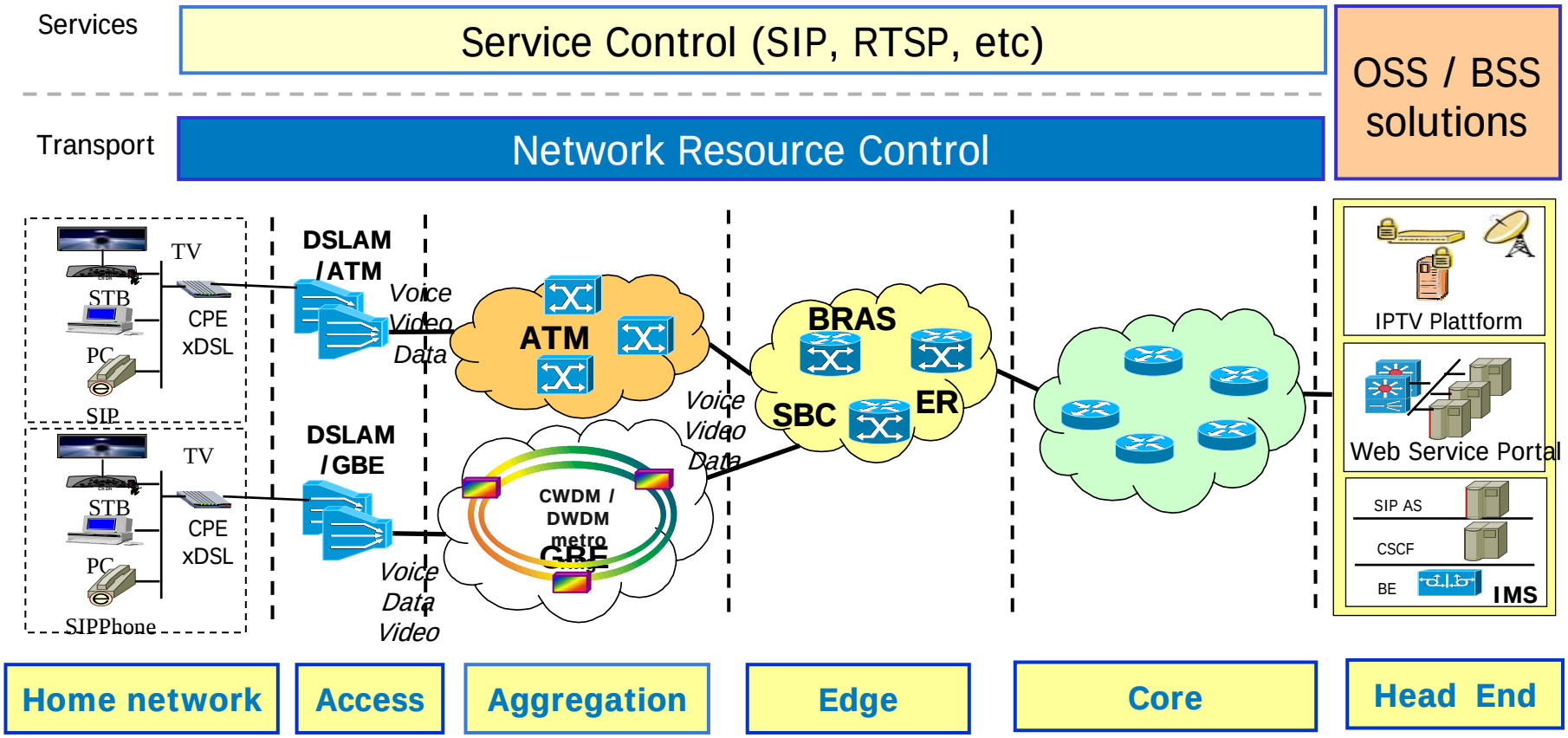
Voice
Video
Data

Revenue drivers!

End-to-end
QoS
the differentiator for value-added services

Resource and Admission Control (RAC) – Network Resource Control (NRC)

Note: We define NRC as a generic term for RAC



Multi-technology access: DSL, FTTP, CATV, UMTS, WLAN, WIMAX/WIBRO, PSTN
Converging to IP Diffserv and MPLS in core (and aggregation)

End to end QoS Control (access, aggregation, core)

Why Network Resource Control?

Necessary for providing new services and network/operational efficiencies.

The key component in NGN networks for end-to-end service control.

To support quality services (e.g, triple play) through contention points in the access

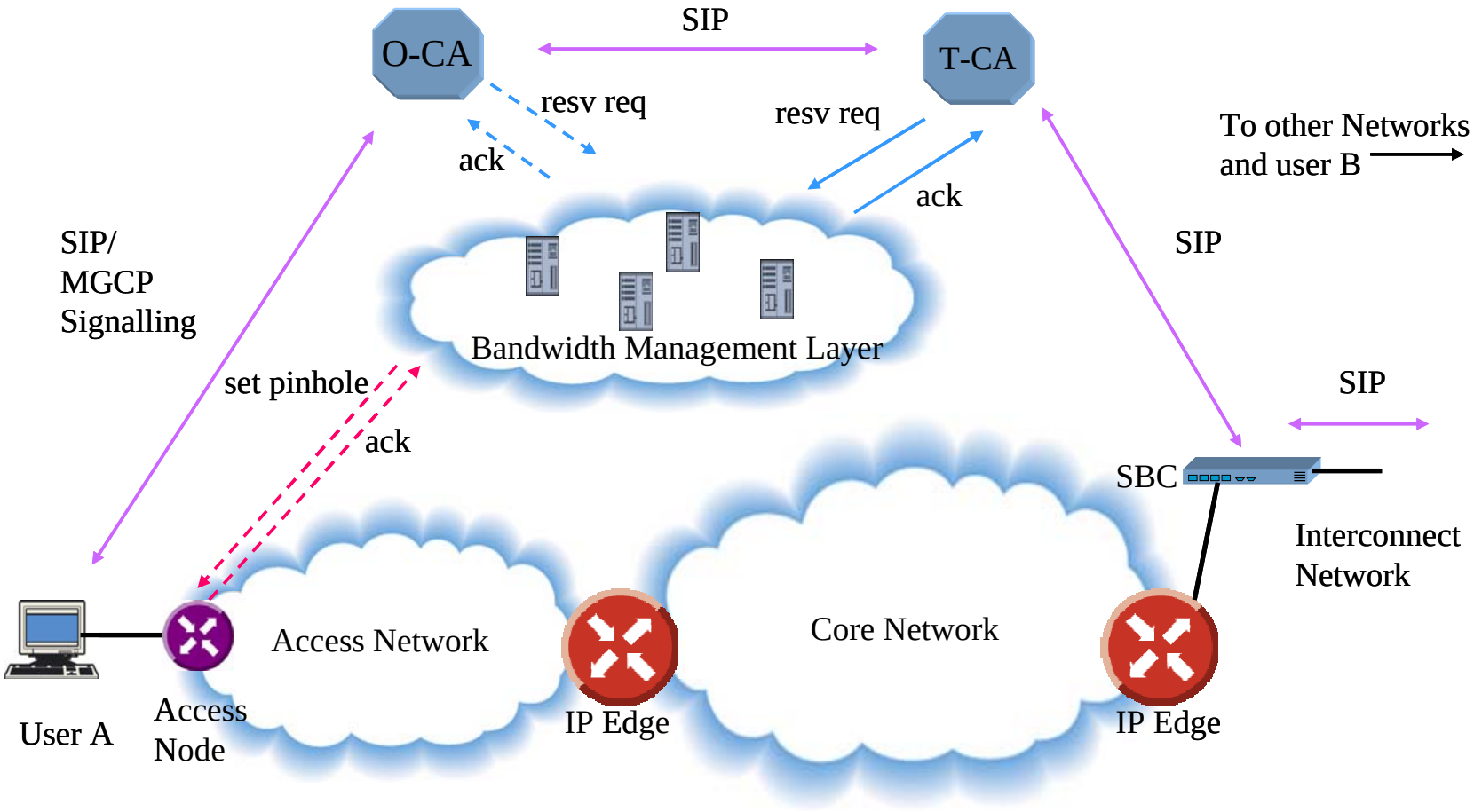
To simplify MPLS/diffserv provisioning in core

- NRC handles fine-granular real-time control
- TE tunnels with or without bandwidth allocations are supported

Deployable in current and future IP networks

- In access or core, or both
- Step-by step or major upgrade

Interface / Signaling example

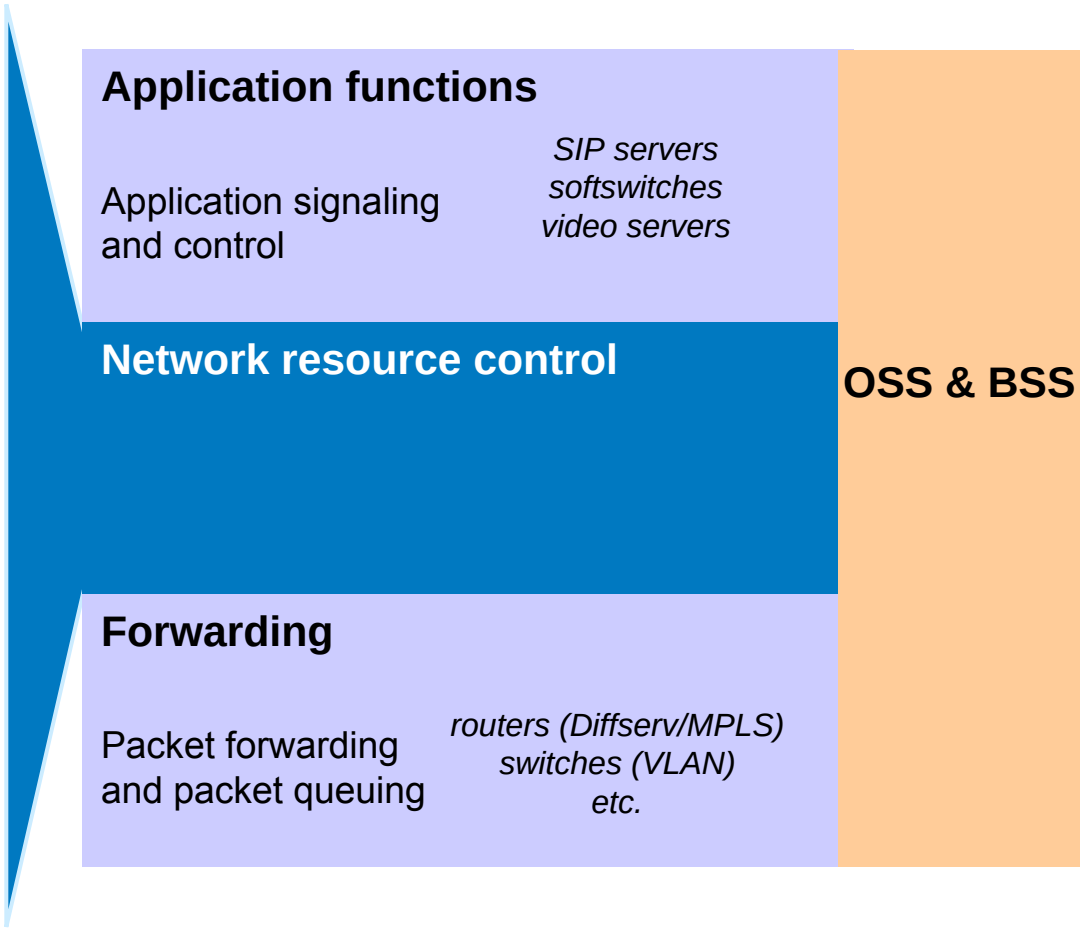


Source: MSF

Note: MSF bandwidth management layer = NRC

Network resource control (NRC)

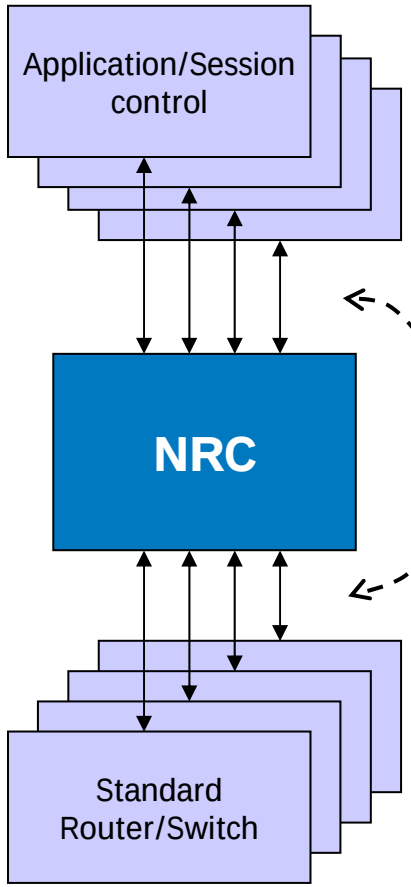
- Real-time admission control
  - Policy-based (PDF)
  - Resource-based (TRCF)
- Gate control
- NAT/FW control
- Resource control
- Complements QoS forwarding, e.g. Diffserv and MPLS
- Provides data to OSS & BSS



NRC rationale and instantiation

End-to-end QoS Control

- **Application independent**
- **Wholesale / retail**
- **Network independent**
- **Existing infrastructures**
  - L2 and L3



- ETSI TISPAN
- ITU-T FGNGN
- 3GPP IMS
- MSF

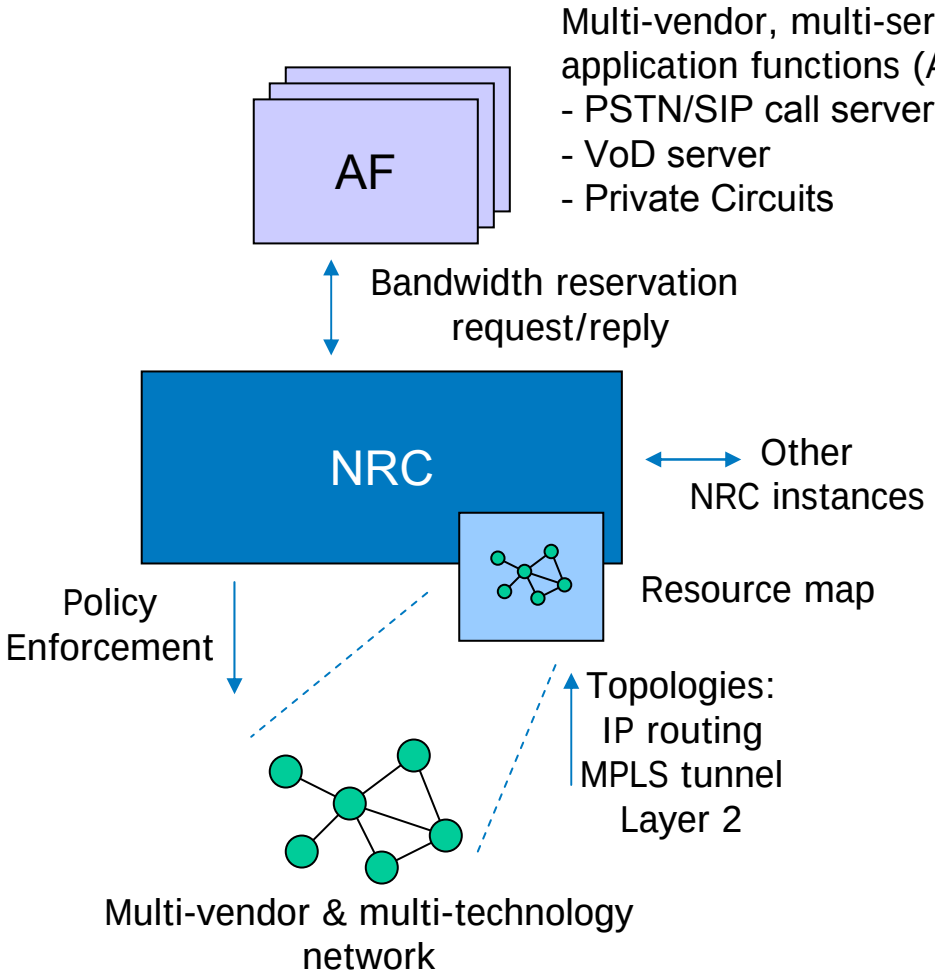
Open/standard interfaces

Multi-service

Multi-vendor

Multi-technology

NRC operation



Application driven call / session admission control

- Policy based and bandwidth based
- Per-call or aggregated
- Top town or combined top-down/bottom-up

Fine-grained dynamic network modeling and admission control

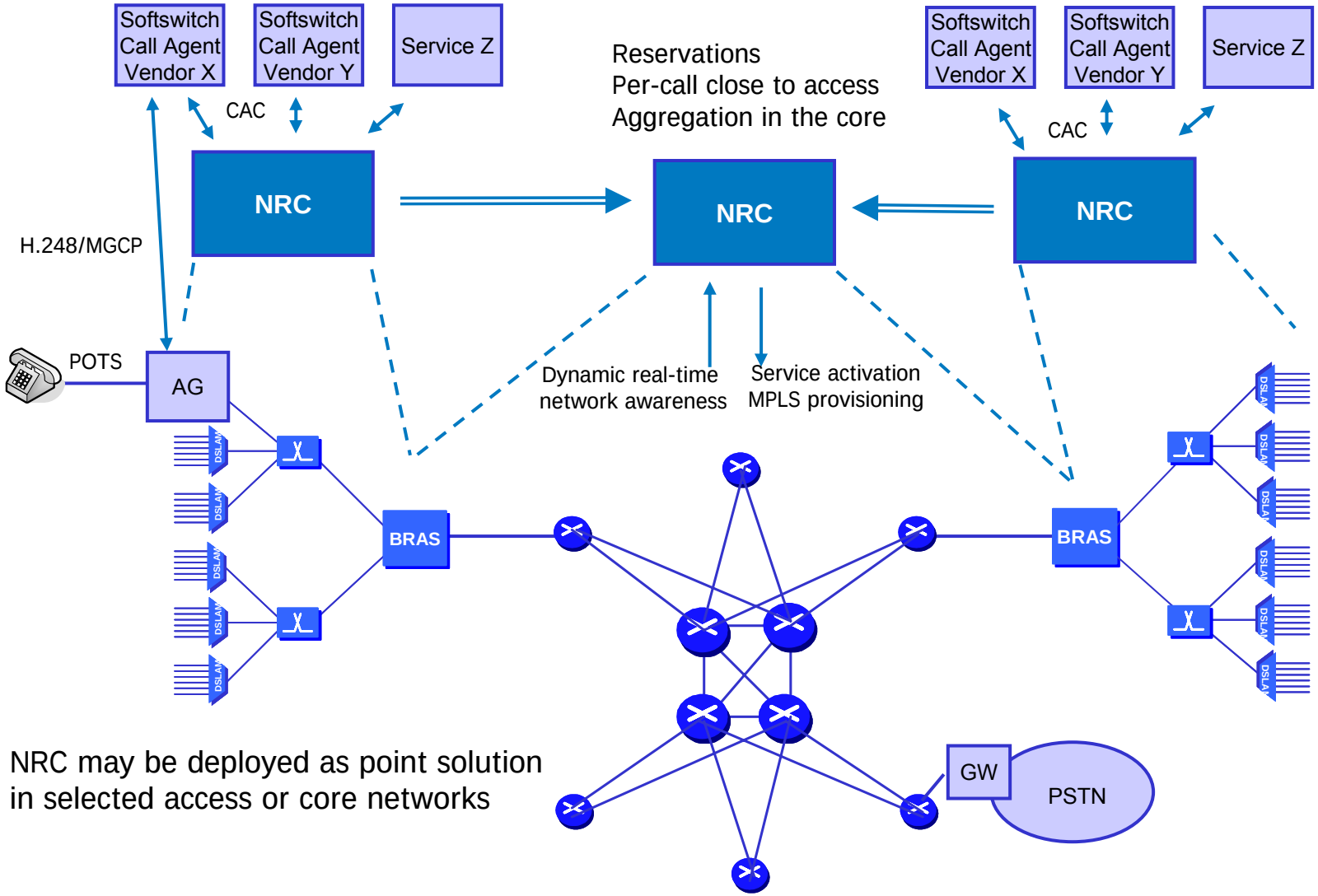
Policy enforcement / gate control

- When applicable, e.g., for broadband services and simulated VoIP (filtering, policing & marking)

Inter NRC

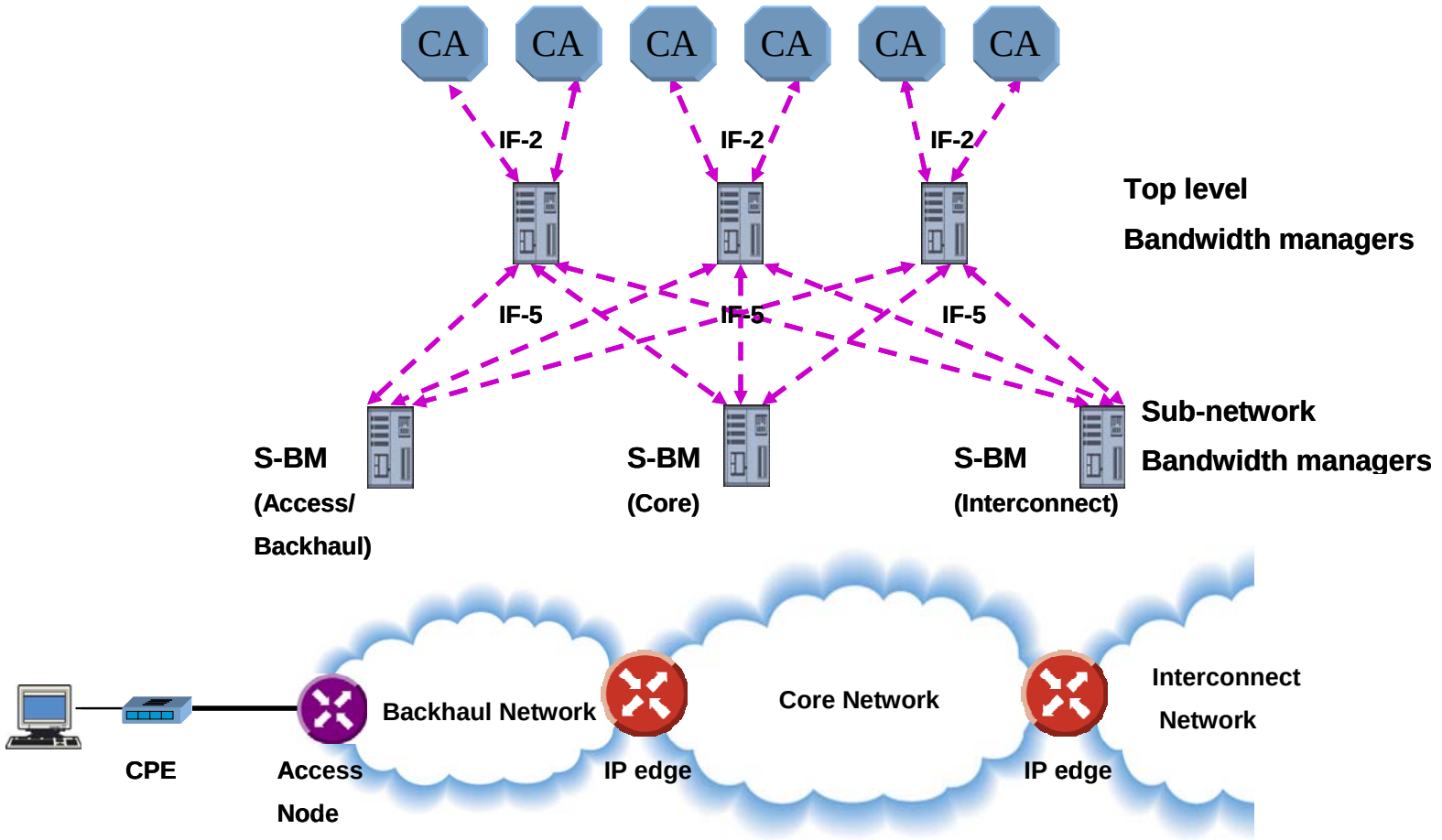
- Scalable aggregation and pre-reservation
- Distributed & hierarchical deployment
- Carrier grade reliability and performance

NRC end-to-end case study 1



NRC may be deployed as point solution in selected access or core networks

NRC end-to-end case study 2



Source: MSF

Note: MSF bandwidth managers = NRC

Priority calls (emergency calls)

Priority indicated in admission request from CAs

NRC saves some resources for immediately serving emergency calls

Solved by admission control

- Admitted traffic is forwarded as ordinary VoIP

Admission control may preempt ordinary calls to serve emergency calls (an operator policy)

- E.g. at network failures reducing available bandwidth

Operational aspects – feedback to provisioning and accounting

Examples

Service statistics (e.g. number of active/denied reservations)

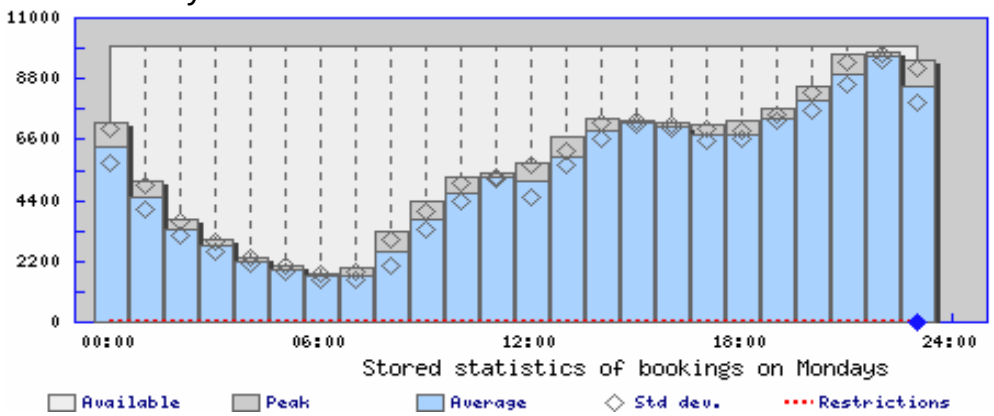
Topology aware booking levels

Network topology changes & failures

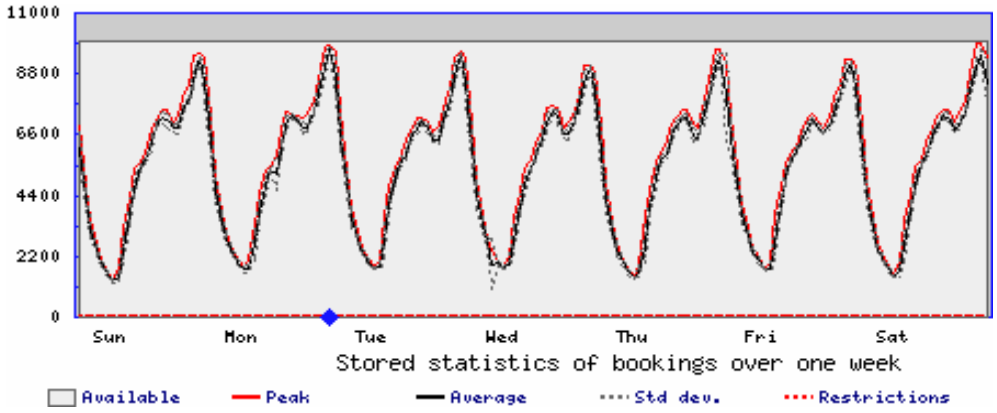
Accounting data (e.g. start/stop/change of reservations)

Alarms at selected booking levels

One-day stats



One-week stats



Summary of NRC values

New services and business models

- Speed to market (voice, video, data, etc)

Increased network efficiency

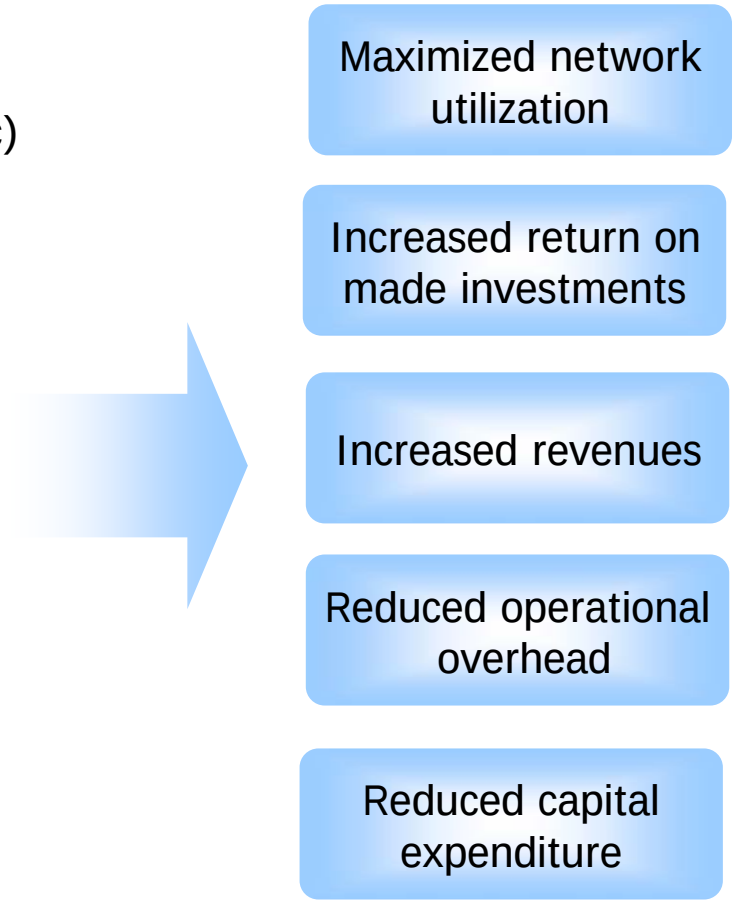
- Flexible cross-service resource sharing
- QoS across contention points

Increased operational efficiency

- Reduced MPLS provisioning
- Feedback to provisioning process

End-to-end QoS

- Stepwise deployment possible



More information

The NGN standards org and forums: **ITU, ETSI, 3GPP, MSF, etc**

The operax web: **www.operax.com**

Thank you for listening!