Listen. Define. Deliver.

Market Confusion

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- IMS equipment market to reach $14 Billion by 2010
  - IDC, 2005
- IMS equipment market to reach $8.3 Billion by 2012
  - Informa, 2007
- What's happened?

Why?

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- "The barriers to large-scale deployment of IMS are varied and formidable"
  - Light Reading, July 2007
- Difficulties
  - building IMS into legacy networks
  - making the business case for IMS,
  - lack of IMS handsets and client software,
  - lack of obvious applications,
  - little progress in achieving commercial interconnect agreements,
  - lack of standardized service brokering and orchestration tools
  - confusion over the various standard releases for IMS.

http://www.lightreading.com/document.asp?doc_id=130131

NGN Framework Migration

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- IMS / NGN use SIP in core
- New services slow to emerge
- Legacy preservation is key element of strategy
- Legacy interworking is not a trivial issue
- Migration from TDM >> NGN complexities may be underestimated
  - Especially in terms of interworking functions

Why Migration is Important

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- All services depend on signalling
  - E.g. PTToC in roaming context
    - How does the IMS manage cellular roaming?
  - Location based services
    - IP Media Server plays messages, retrieves web data, but subscriber data is accessed via TCAP (to provide location updates)
- Even simple services may need information from network
  - multi party conferencing with users in mobile domain

Why Migration is Important

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- Integration of TDM service elements with NGN service framework
  - Preserves legacy services
  - Enables new services to be delivered to subscribers on legacy networks
- Millions of subscribers on traditional networks
  - Fixed, mobile, converged
- Interworking between signalling is critical for service delivery
  - Complex

Why Migration is Important

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- Many efforts
- Core signalling protocol in TDM domain:
  - SS7 family
- SS7 interconnection is required for many services
  - Typically leverage gateway to achieve this
  - Application unaware of needs of SS7
- Represents particular challenges
  - Can't not address

SS7 Interworking

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- Two key roles
  - Call Supervision (User Parts)
  - Services, data retrieval and management (Application Parts)
- Huge installed base
  - Even if new IP networks emerge, legacy will remain for some time
- Interaction with PSTN / PLMN is required for call supervision
  - ISUP interoperability
- SS7 provides comprehensive framework for subscriber management and service delivery
  - What will happen to this?

User Part Interworking

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- Why?
  - User Part signalling (IS**UP**, T**UP**, N**UP**)
- What?
  - SIP and H.323 are the primary IP signalling protocols
    - MGCP / MEGACO are designed for control of TDM / RTP conversion
- How?
  - SIP RFC 3398 / 3372 (SIP-T)

User Part Interworking

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- Issues
  - Behaviour: Overlap dialling / Message segmentation are not supported –
    - The gateway has to manage digit and data collection
  - Many ISUP messages do not have analogues in the SIP world
    - BLO / BLA / CGB
    - CCR

User Part Interworking

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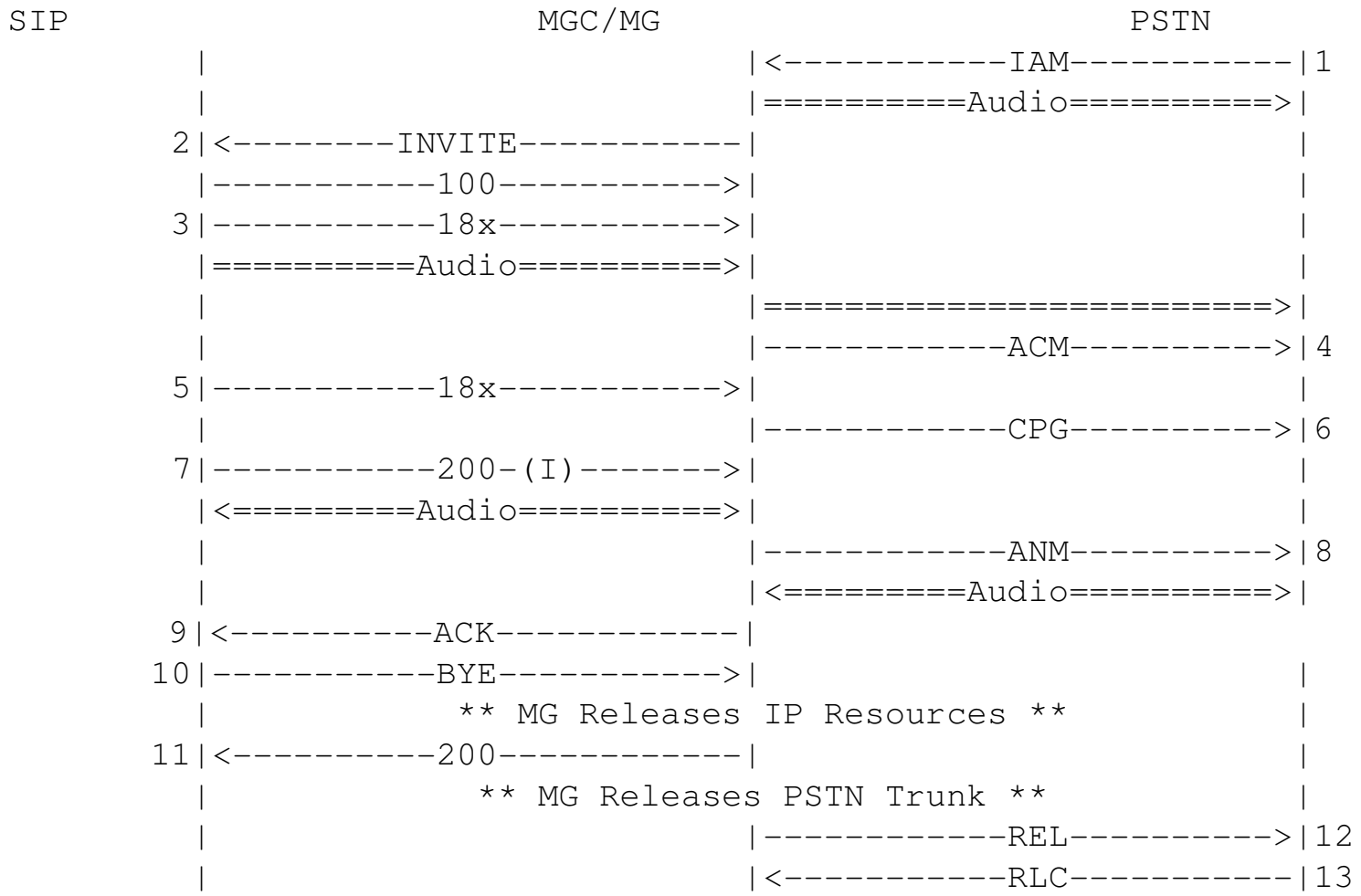
- Mapping is incomplete, but constitutes "best effort" and is sufficient for most cases
  - Depends on some degree of creativity in the gateway (e.g. Early ACM / Media), BLO
  - Supports SUS / RES, Transfer, etc.
- RFC 3578 overlap
- Q.1912.5 supports overlap / privacy issues
- SIP-T / SIP-I provide methods to handle other parameters / messages as MIME attachments

Basic Call Flow (Called Party Release)



Application Part Interworking

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- Why?
  - Application Parts (TCAP, INAP, MAP, CAP, IS41, etc) provide specialised instructions / commands relating to subscriber location, service profile, service delivery and data access
    - E.g. Number portability, translation or SMS
- What?
  - TCAP etc have no direct counterparts in the IP world
  - SIP interworking has been proposed

Application Part Interworking

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- Two approaches
  - Simple encapsulation of TCAP contents in IP packets
    - Internet Draft for carrying TCAP in SIP messages (Miller et al)
  - RFC 3976 IN / SIP interworking

Application Part Interworking

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- Simple encapsulation means that terminating node has to implement TCAP logic to perform actions
- XML payload to convey TCAP data
  - Up to 1000 bytes per message vs 272 in SS7 (v. efficient compressed binary) + SCTP + TCP
  - ANSI only
  - TCAP logic required
- RFC 3976 seems better fit

IMS Service Environment

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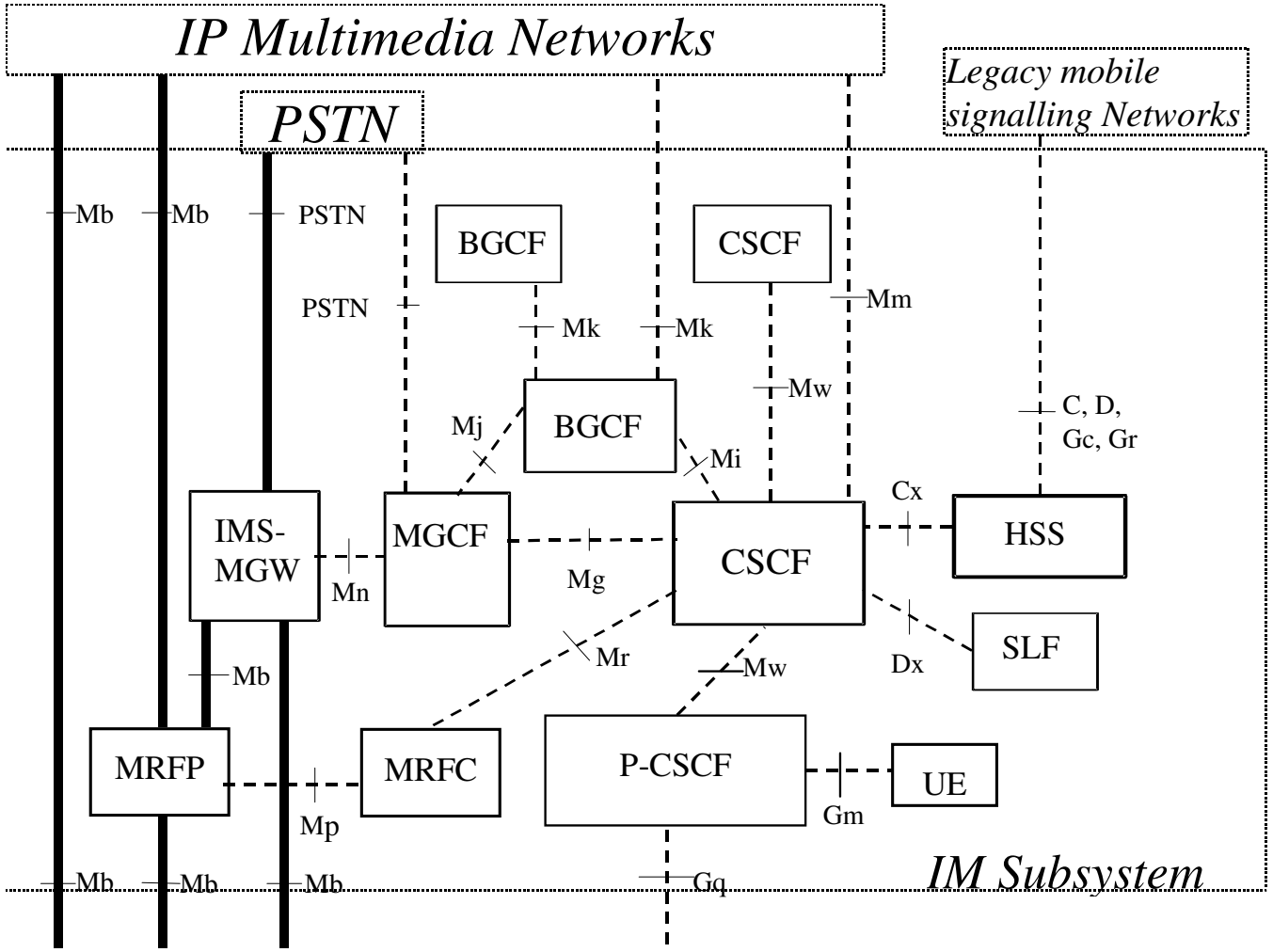

LEGEND: **BOLD** Lines: interfaces supporting user traffic DASHED Lines: interfaces supporting only signalling

Source: 3GPP TS 23.002 V6.4.0

IMS / NGN

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- IMS will be implemented
  - But not everywhere
- NGN architecture will be implemented
  - Select best elements
- Legacy interworking is a reality, not an RFC
- What can happen?

NGN Application Server Architecture

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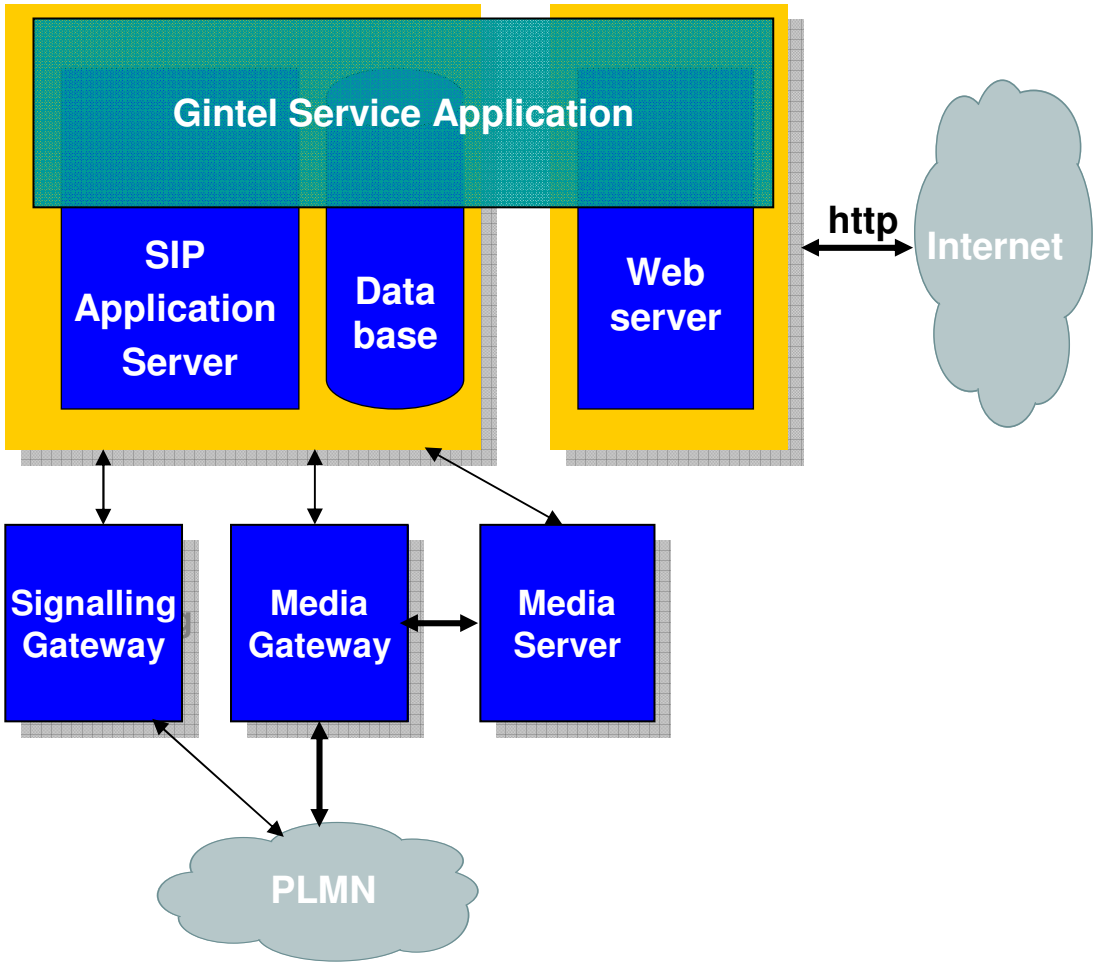

Case Study: NwN

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- Network Norway
  - 3RD Mobile Operator in Norway
  - Offering standard telephony
  - Strong business / enterprise focus
  - Hosted PBX offer

NwN Architecture

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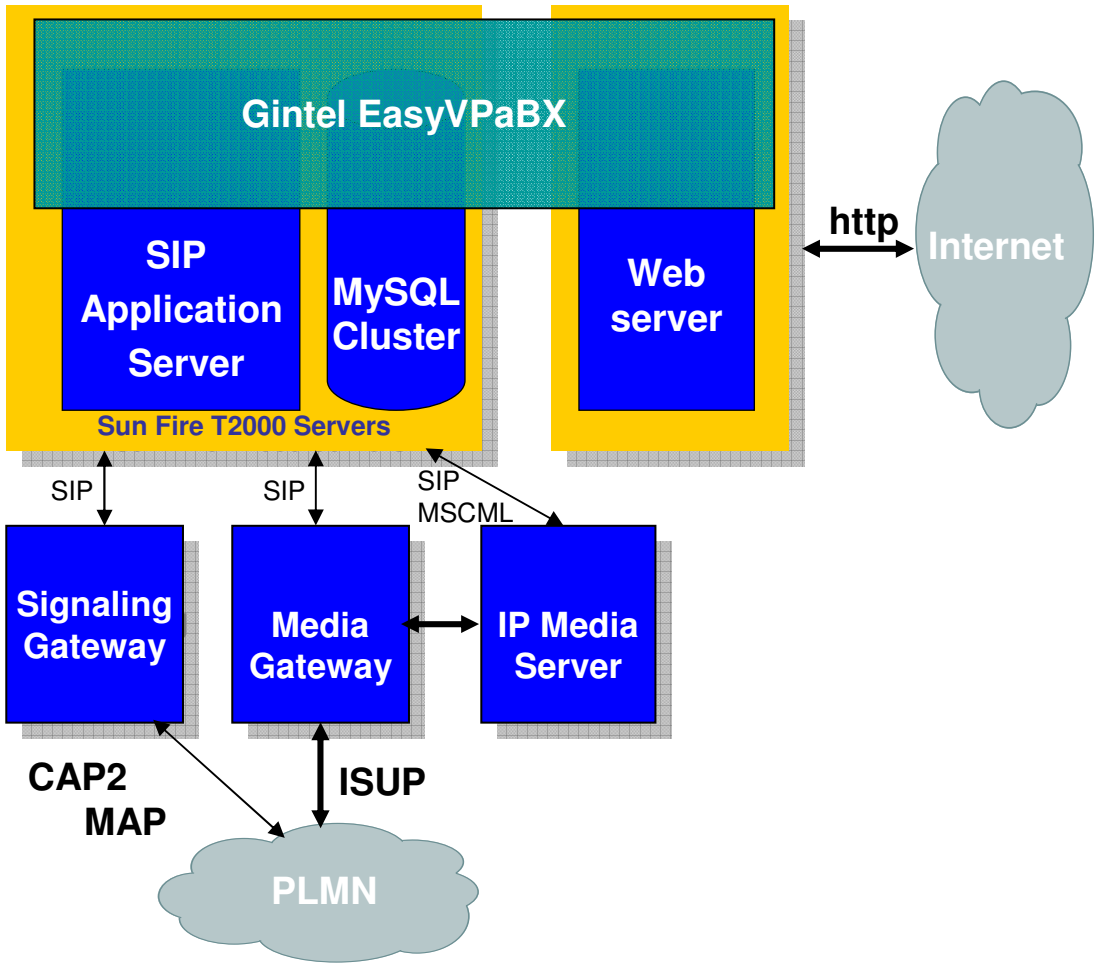

Adaptation to NwN

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- IN network in place
- IN call triggers should be invoked for services
  - E.g. A calls B, B has features set on virtual PBX
    - Barring / Queuing
- Triggers enable logic associated with given numbers
  - Net Centric services
  - Preserves IN, but adds new IP capabilities
  - Signalling overlay, avoids service node approach

Adaptation to NwN

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- Media stream buffering
  - TDM – RTP – TDM conversion for media sessions
  - Delays cannot be >300ms
  - Conversion process introduces delays
  - Have to tweak media gateways to ensure buffered audio delivered in timely manner

Live Deployment

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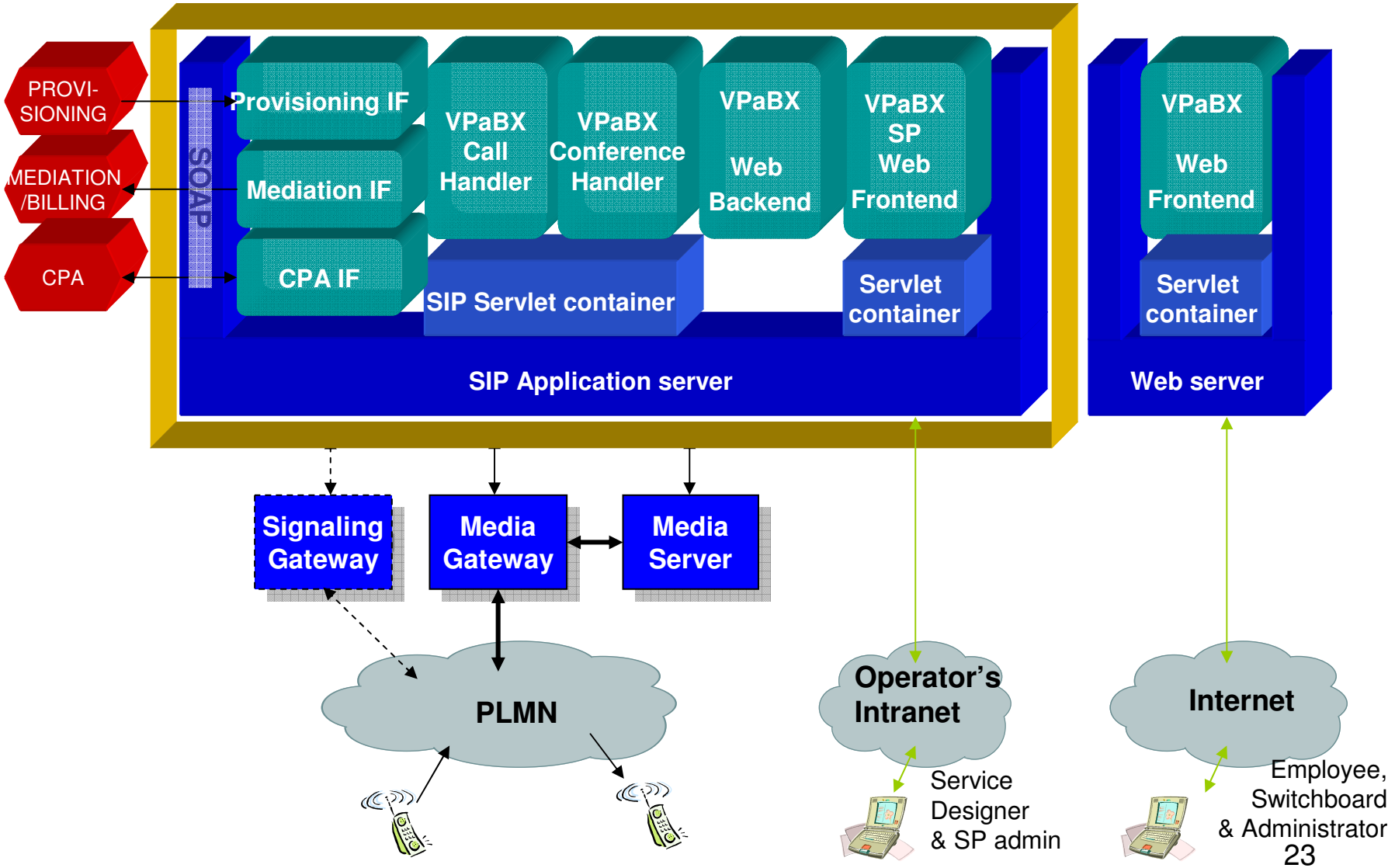

Lessons

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- NGN architecture provided application flexibility and model required
- IN integration vital for true net-centric service delivery
  - Watch out for proprietary versions
- Field adaptation required to launch service
- Deep knowledge of IN models required for true network independence

Conclusion

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- Legacy interworking is essential
  - Preserving legacy
  - Leveraging new services
- SIP / UP interworking is adequate
  - But may need customisation in future
- SIP / IN interworking is ongoing
  - Definitely needs customisation
- Field experience of legacy protocols still relevant to solving NGN deployment issues
- Success of IMS / NGN may depend on understanding these issues
  - Can't pretend they have all been solved

Thank You

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