IEEE P1903 NGSON

NEXT GENERATION SERVICE OVERLAY NETWORKS

NGSON WEBINAR

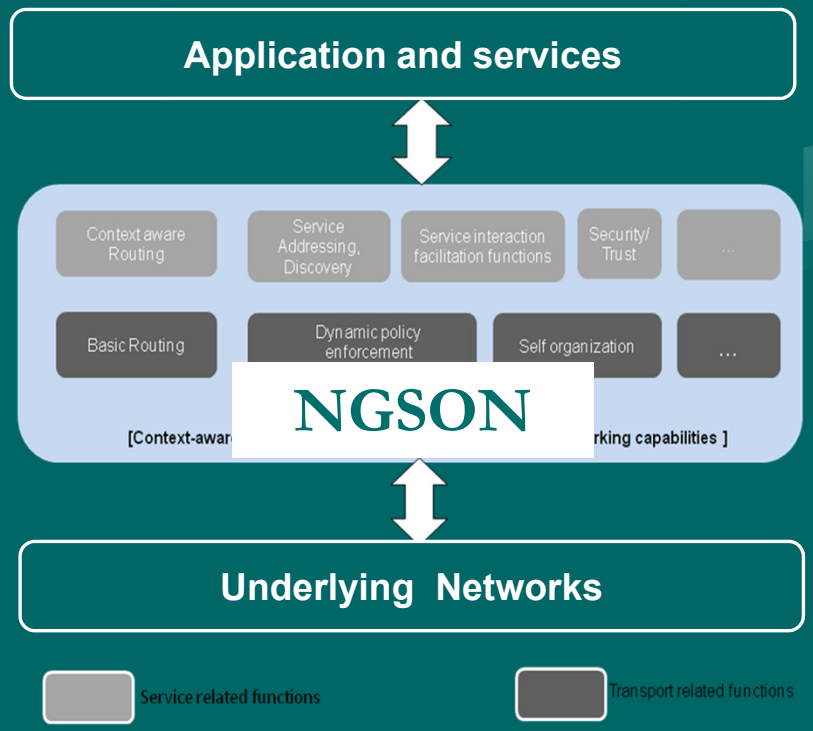
April 2013

INTRODUCTION:

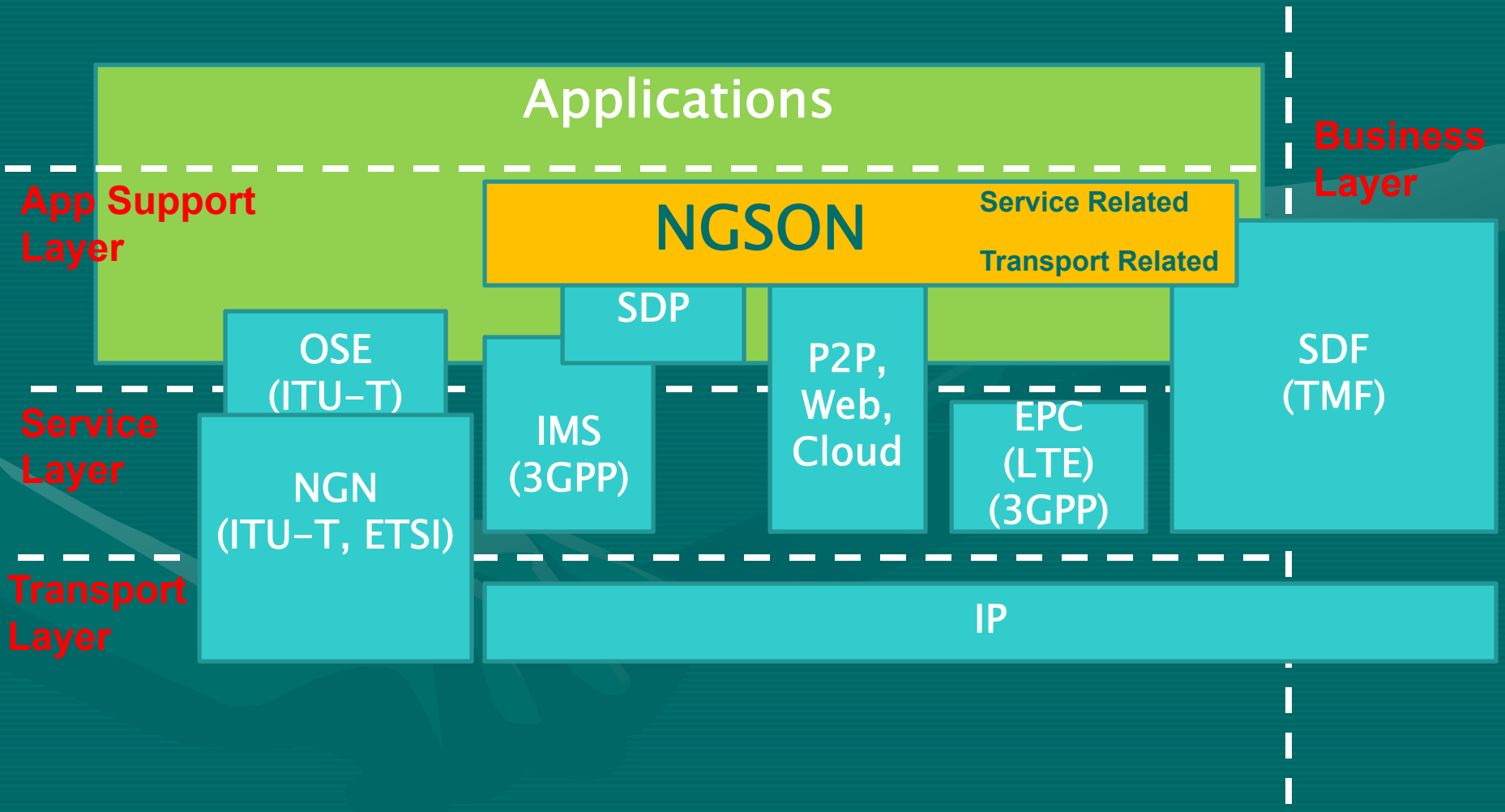
1. **Introduction to NGSON -**
   - Mehmet Ulema, Manhattan College, USA (5 minutes)
2. **The need for NGSON**
   - Chen Shan, Huawei, China(5 minutes)
3. **Reference Architecture**
   - Niranth, Huawei, India (10 minutes)
4. **Content Delivery, P1903.1**
   - Seung-Ik Lee, ETRI, Korea (10 minutes)
5. **Service Composition, P1903.2**
   - Yi Jong Hwa, ETRI, Korea (10 minutes)
6. **Self-Organizing Management, P1903.3**
   - Joe Lin, NCTU, Taiwan (10 minutes)
7. **Procedures for submitting contributions**
   - Lisa Perry, IEEE-SA, USA (5 minutes)
8. **Q&A (10 minutes)**

What is NGSON

- An IEEE sponsored effort to standardize a framework of IP-based service overlay networks
- A set of context-aware, dynamically adaptive, and self-organizing networking capabilities, including advanced routing and forwarding schemes



Position of NGSON Standards



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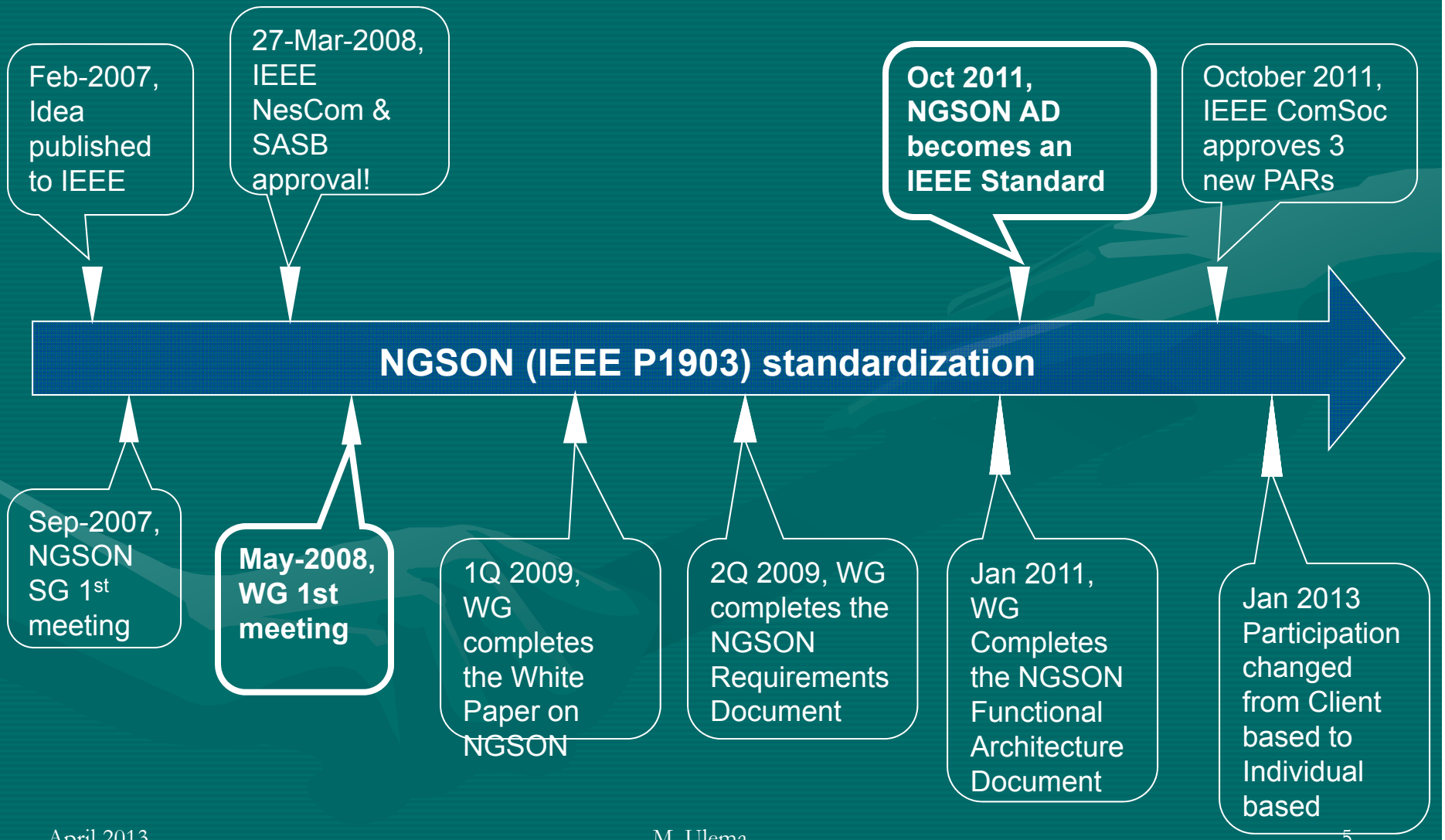

Document Status

• White Paper	Released	1Q09
• Requirements	Frozen	2Q09
• Architecture	Standardized	3Q11
• Technical Specs	Started	3Q11

New PARs Approved by IEEE

- Content Delivery (P1903-1)
  - Technical Standard for Content Delivery Protocols of NGSON
- Service Composition (P1903-2)
  - Technical Standard for Service Composition Protocols of NGSON
- Self-Organizing Management (P1903-3)
  - Technical Standard for Self-Organizing Management Protocols of NGSON

Where to Find us?

- **Website:**
  - http://grouper.ieee.org/groups/ngson/index.html

- **For questions:**
  - Mehmet Ulema: mehmet.ulema@manhattan.edu
  - Niranth: namogh@huawei.com
  - Lisa Perry: L.Perry@ieee.org

Why do we need NGSON?

Chen Shan
Huawei

(Apr-2013/IEEE/Webinar)

Current Challenges

Operators	Platforms	Services
Google	Google App Engine	Gmail, Google 日历, Google Docs, Google talk
amazon.com	amazon web services	YOUKU 优酷, WeChat, hulu
Microsoft	Windows Azure	帝释天, 飞信 Fetion, 百宝箱, music 12530.com, BLOG, 手机邮箱 http://mail.139.com
中国移动通信 CHINA MOBILE, verizon, at&t, vodafone	OMP (CMCC) 21CN (BT)	

Operator: More and more enriched services and content on the Telecom networks are forcing the bandwidth requirements to grow exponentially, the cost of operators to great increase.
Services: Exponentially increasing number of services and applications and their interactions.
Platform: To have a better, more "efficient" way of providing these services and applications interaction and operation management capabilities

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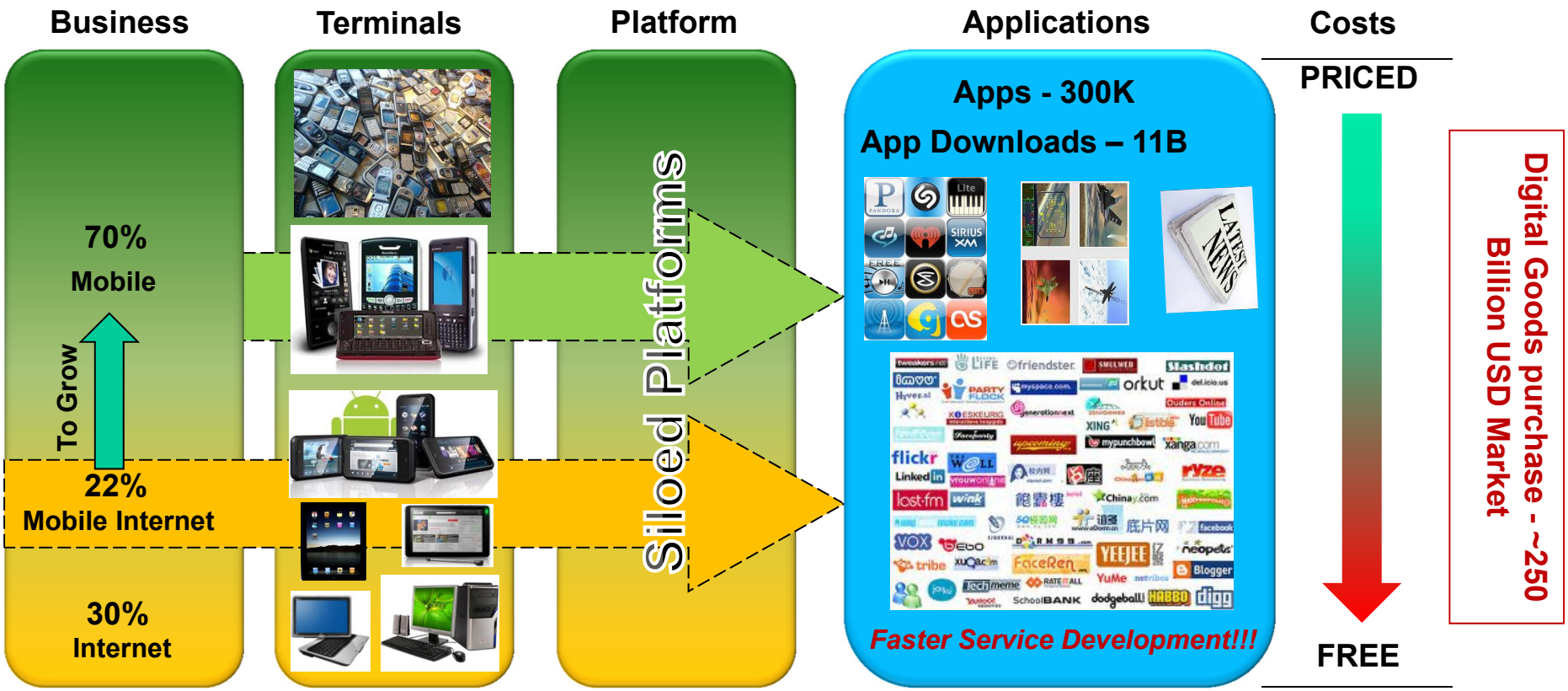
Opportunities

Telecom Market Scenario



Mobile Internet is challenging operators profitability and they need to think about transforming their networks and business model in the next 3 years (Developing country operators need to take important decision by Q3 2014. Business cannot be sustained by simply increasing the capacity or "dumb pipes") – TellLabs Study

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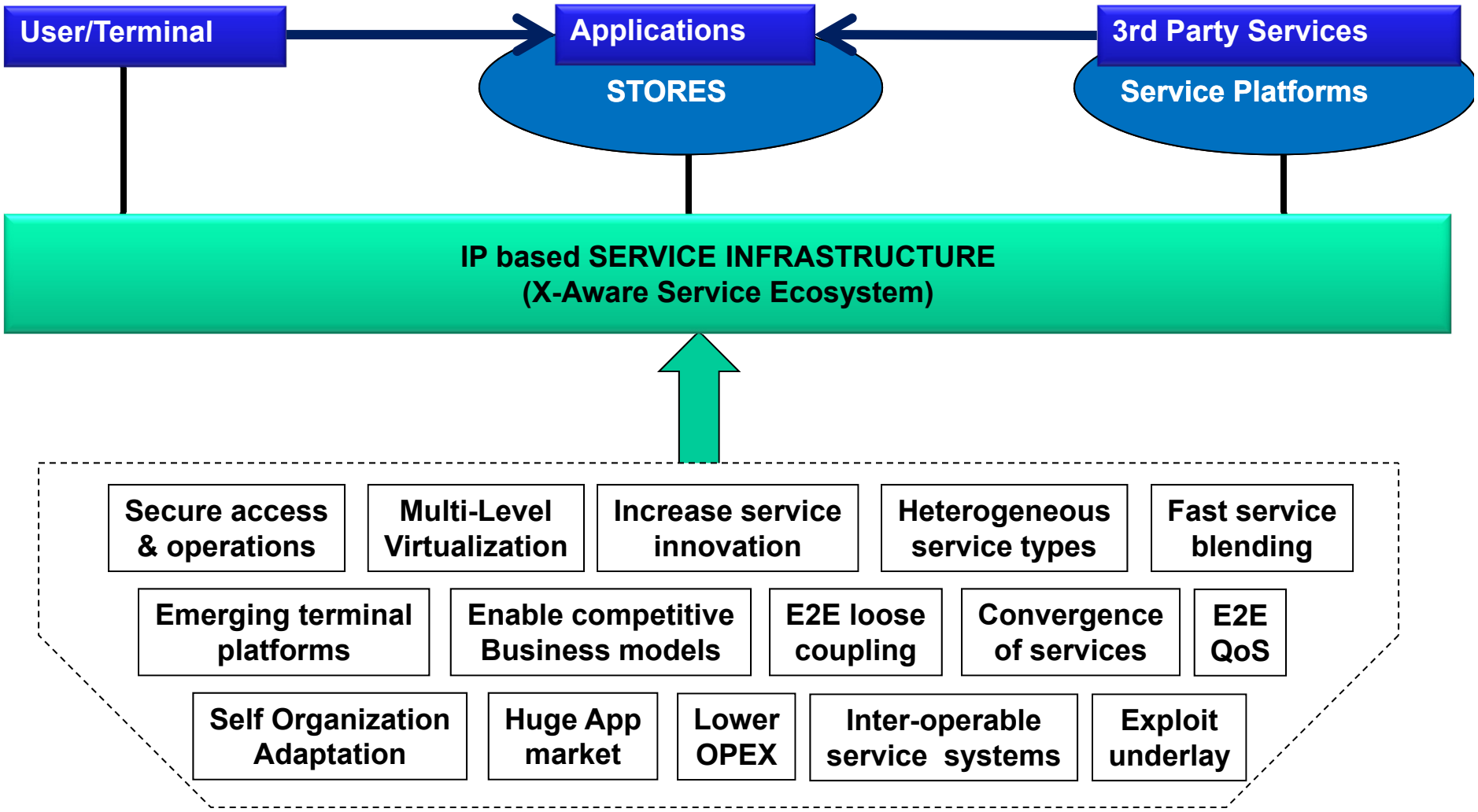
Telecom Stakeholders Perspective

- **Service providers:**
  - **Context Sensitive Applications (X-Awareness)**
  - **Personalization of Services based on User Data**
- **Telecom operator:**
  - **Application Acceleration System + Heterogenous Application and Services Controller + Co-ordinate QoS, Security, Bandwidth and Latency + Smart Cache.**
- **Subscriber:**
  - **Participation and profit sharing**
  - **Rich QoE and Privacy**
- **Platform:**
  - **Abundant Service Creation and Control Capabilities easily and quickly**
  - **Virtualization, Self Organization**

Strategy for NGSON standards



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Thank you!

Contact: chenshan@huawei.com

IEEE Standard for the Functional Architecture of Next Generation Service Overlay Networks P1903-2011

Niranth
Huawei

(Apr-2013/IEEE/Webinar)

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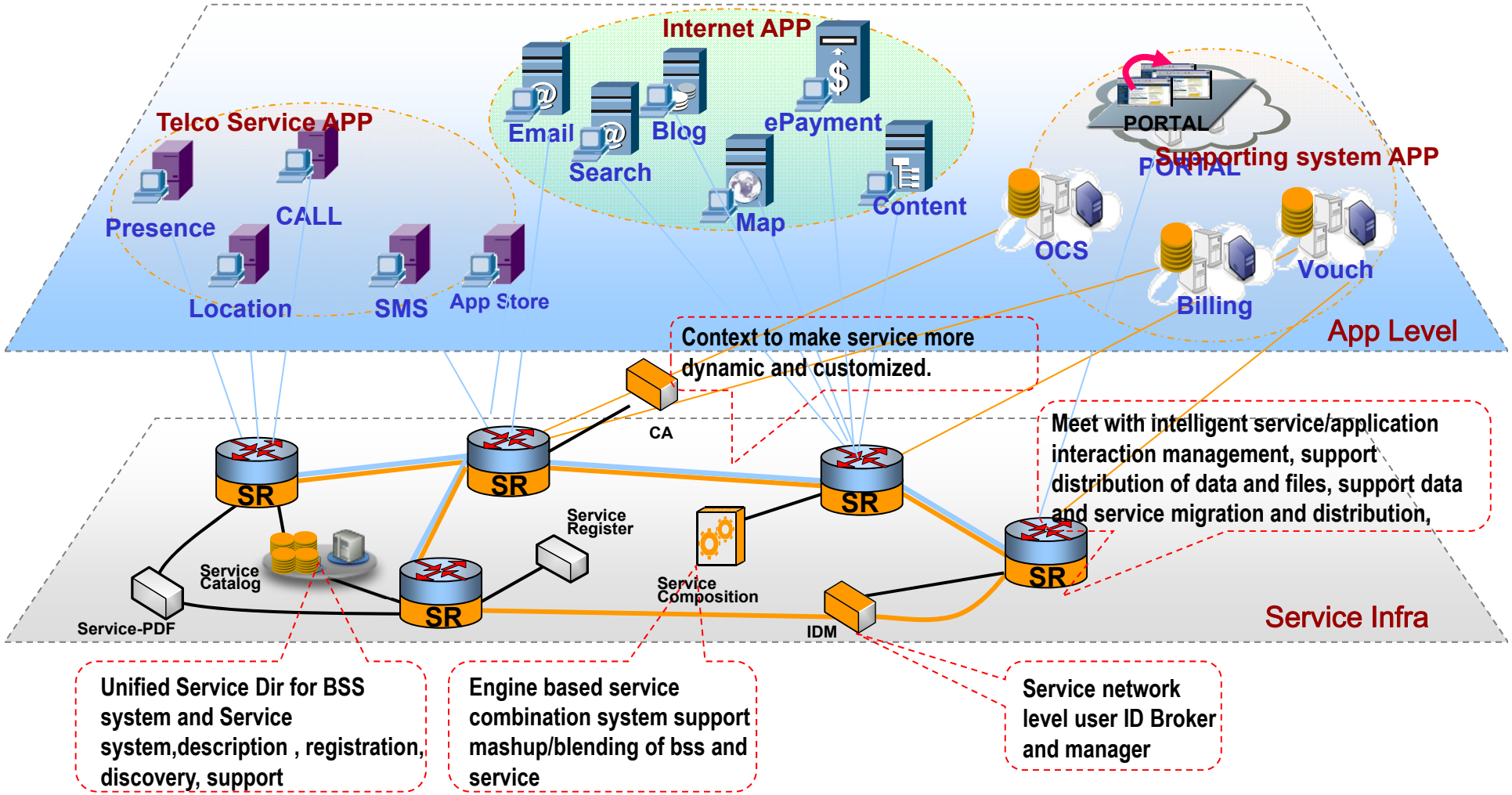
Agenda

- Background
- Introduction to NGSON Architecture
- Evolution with NGSON

Use Cases

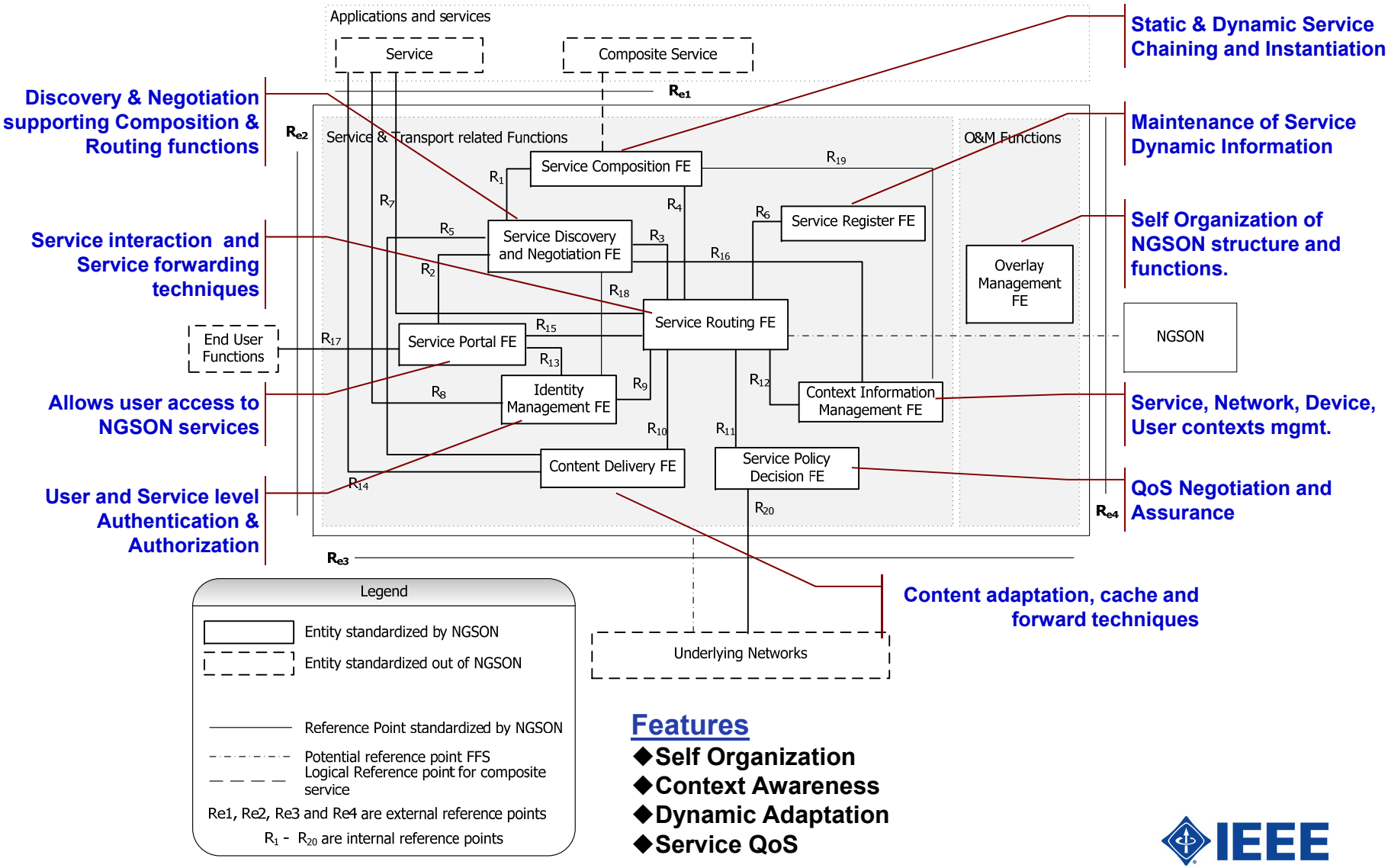
- Automated adaptation of Service Characteristics during (Multimedia – Video, Voice, Text) Service Delivery based on Contexts (Current Device Type, Mobility, Available bandwidth, Content Popularity, etc.)
- User centered Service Composition to create context aware and personalized services. Eg. Personalized Tour service, Content recommendation service, etc.
- Service Orchestration of the Service Delivery value chain by combining services from different industries (Web, Energy, Telco, Health, Governance)
- Self Organization of the Core Network and Application Layer to achieve OPEX optimization - adjusting the structure and functions of NGSON
- Opening APIs to Applications for Service Layer Operations thus allowing programmability of Service Delivery.

NGSON enables Service Ecosystem



NGSON Requirements

IEEE NGSON Architecture



Features

- ◆Self Organization
- ◆Context Awareness
- ◆Dynamic Adaptation
- ◆Service QoS

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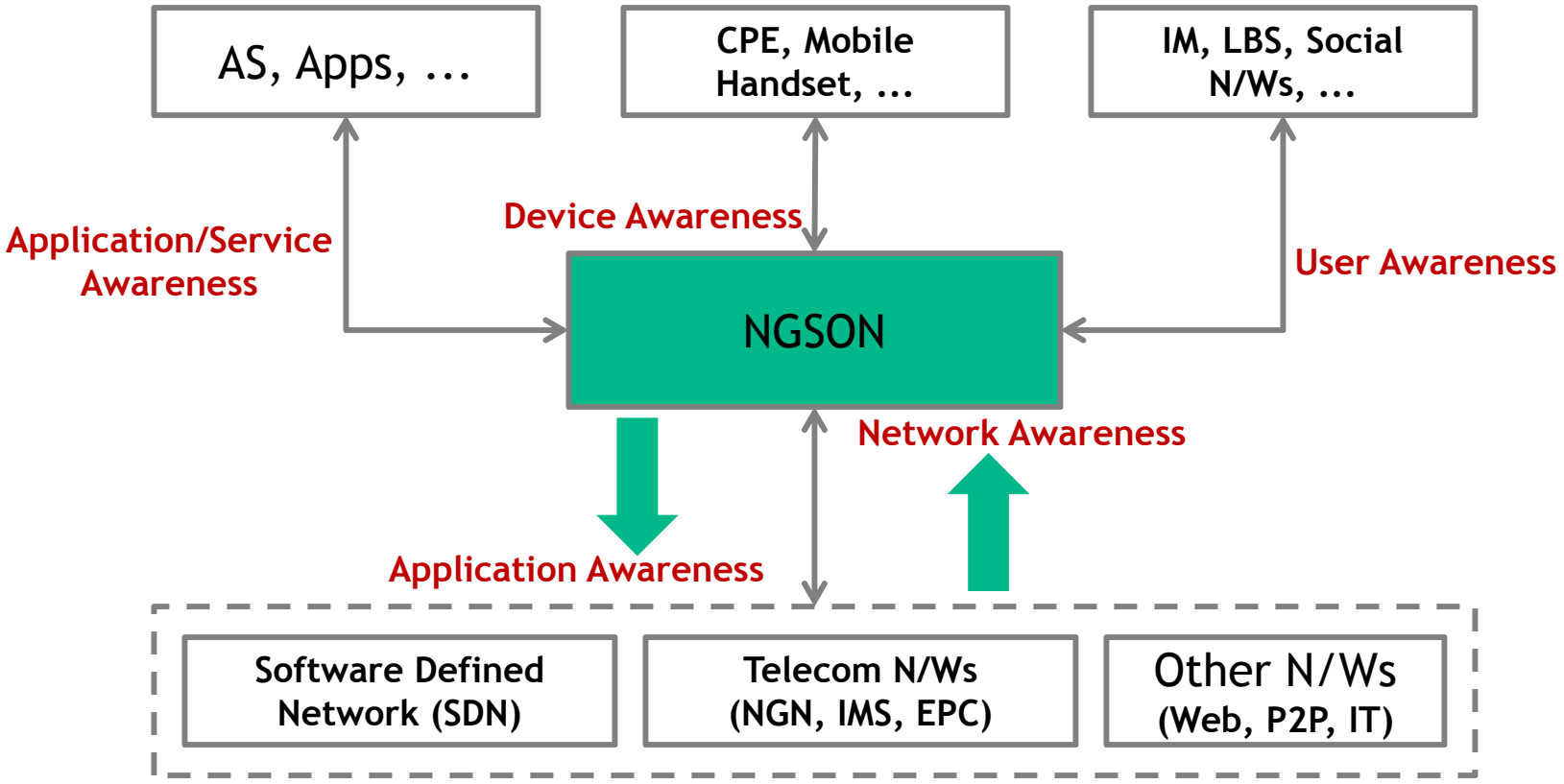
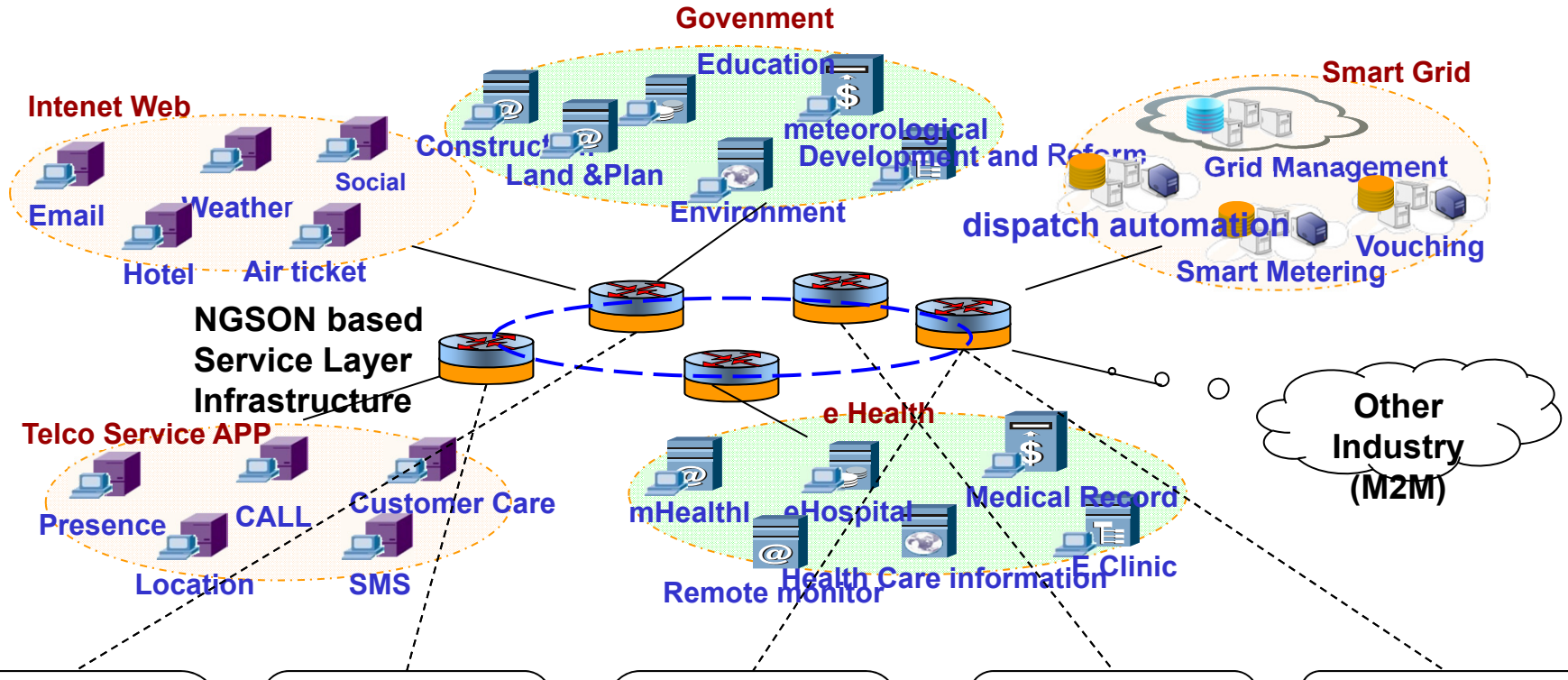
X-Aware Service Ecosystem



The BIG Picture



IMS
SR <-> CSCF
IDM <-> GUP
SPD <-> PDF
CD <-> MRF

Enhancing IMS Service Interactions

EPC (LTE)
SPD <-> PCRF
CD <-> P-GW

Construct the MBB App Layer for 3GPP EPC

SDP
Media <-> CD
Orchestration-SC, SR, SDN

Scaling SDP. Orchestration of value chain in multiple provider env.

Cloud
NGSON uses Cloud

Providing PaaS layer, building the SaaS, using IaaS

Other N/Ws
P2P, Web

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References

- **NGSON White Paper 1.0** http://grouper.ieee.org/groups/ngson/P1903_2008_0026-White_Paper.pdf
- **NGSON PAR -** http://grouper.ieee.org/groups/ngson/P1903_0001_r0_PAR.pdf
- **IEEE Standard for the Functional Architecture of Next Generation Service Overlay Networks" *IEEE Std 1903-2011* , vol., no., pp.1,147, Oct. 7 2011**

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Thank you!

Contact: namogh@huawei.com

NGSON Webinar, April 2013

P1903.1: Draft Standard for Content Delivery Protocols of NGSON

IEEE P1903 WG

Seung-Ik Lee (ETRI)
<seungiklee@etri.re.kr>

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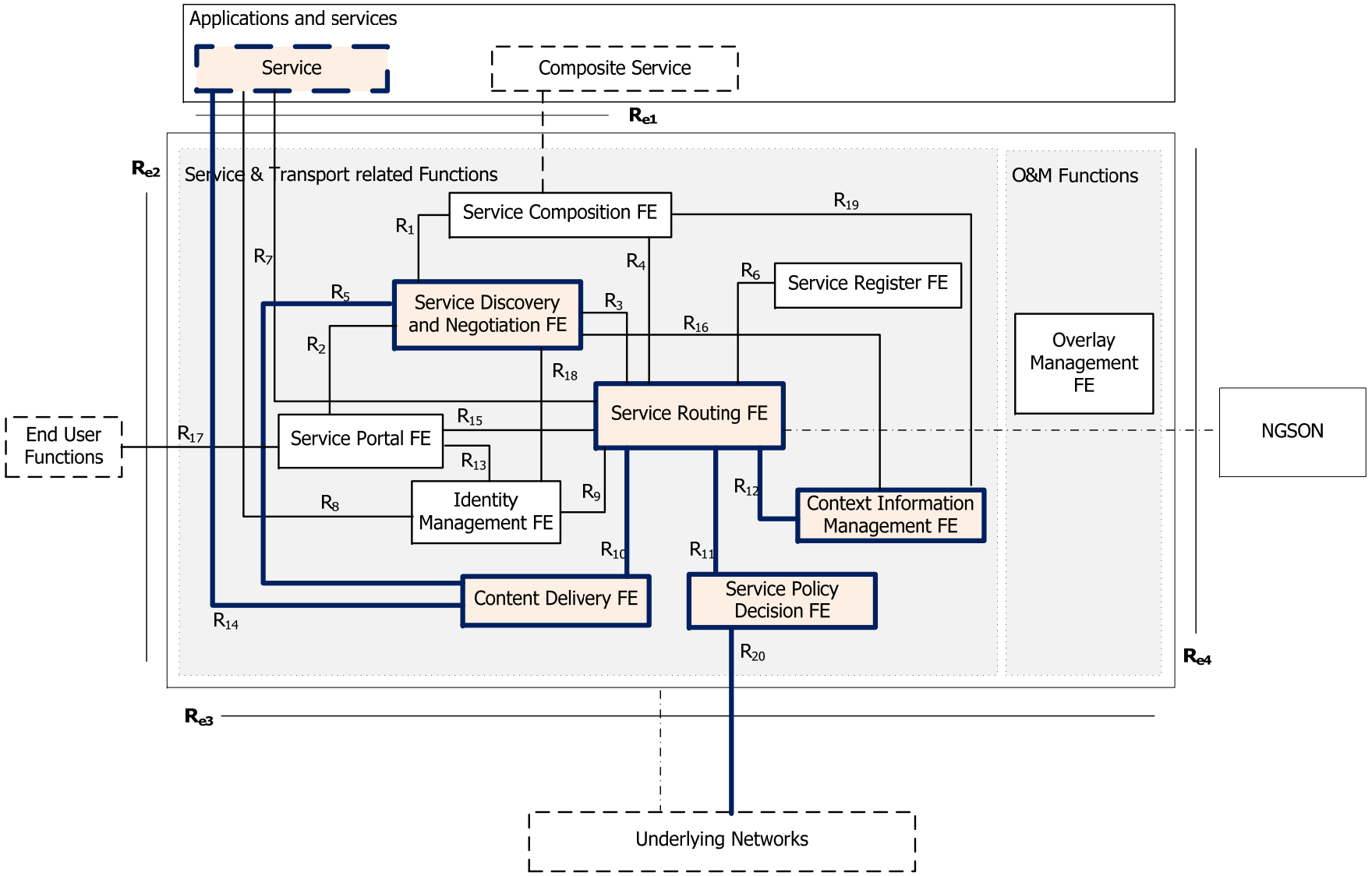
Contents

- Introduction
- Relevant FEs and interfaces
- Basic operations
- Use cases

Introduction

- Purpose of P1903.1
  - for network operators, service/content providers, and end users
  - to provide and consume content services based on advanced content delivery capability of NGSON
    - with context-aware and dynamically adaptive features.
  - to provide interoperability of content services between network operators and content providers.

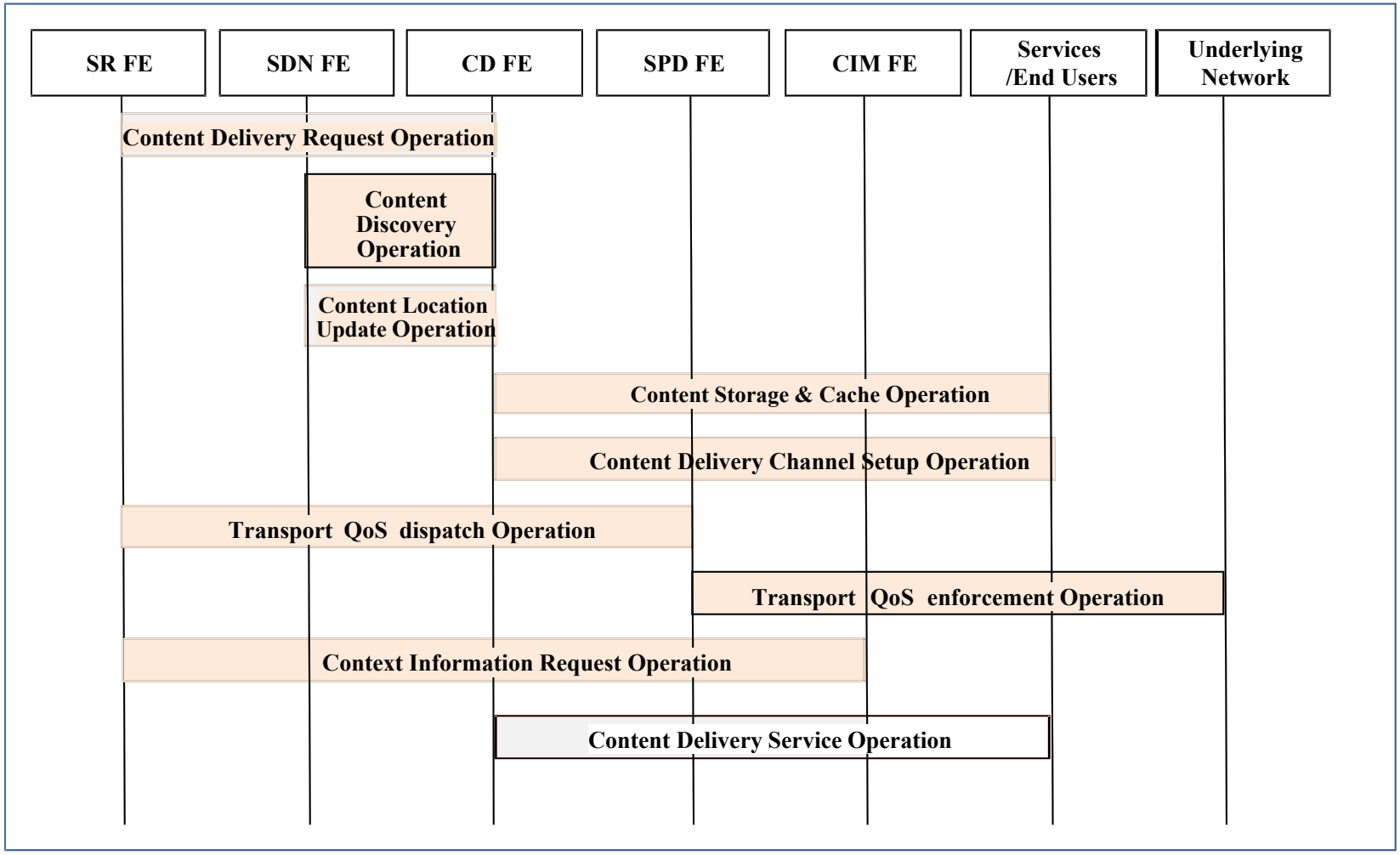
FEs and Interfaces for CD



FEs and Interfaces for CD

- CD FE
  - supports content delivery from a service to another service, from a service to an end user, from an end user to another end user, or from an end user to a service. It performs cache and forward functionalities.
- SDN FE
  - supports discovery and negotiation of services for content delivery using the service information published in NGSON.
- CIM FE
  - dispatches context information to SDN FE and SR FE to support their context-aware operations for content delivery.
- SR FE
  - provides the service routing capability in NGSON based on static and dynamic service information.
- SPD FE
  - is responsible for QoS negotiation and assurance during service interaction for content delivery.

Basic Operations for CD

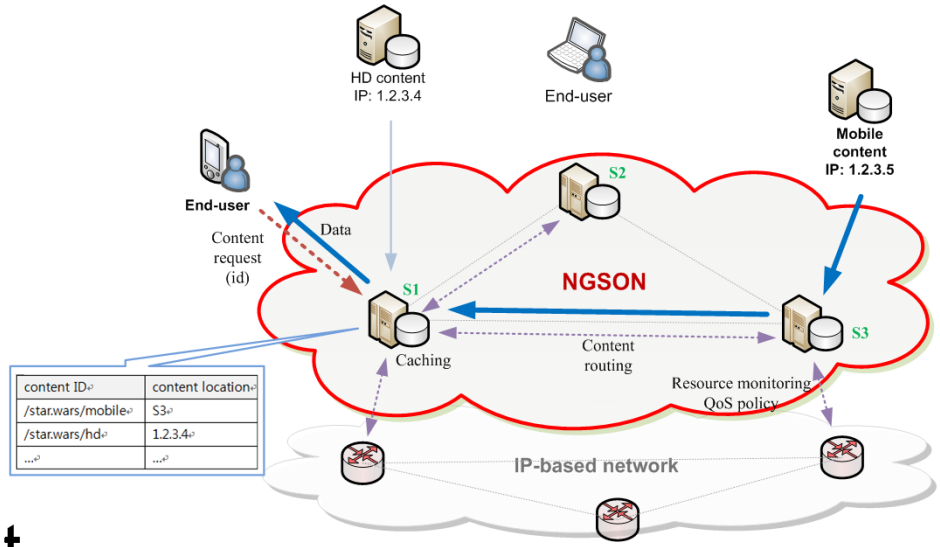


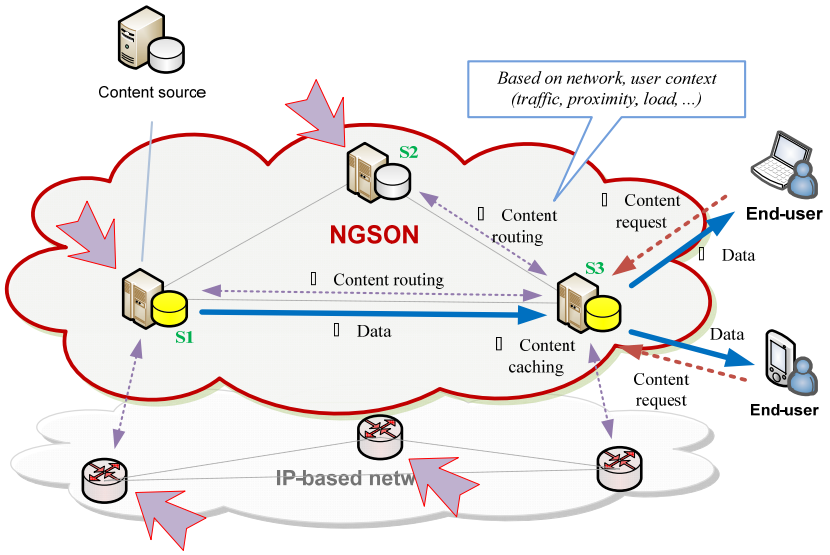
Basic Operations for CD

Protocol Operations	Reference Points	Description
Content location update	R5 (CD FE - SDN FE)	CD FE requests and updates content location information from(to) SDN FE
Content discovery	R5 (CD FE - SDN FE)	CD FE requests content location discovery from(to) SDN FE
Content delivery request	R10 (CD FE – SR FE)	SR FE forwards the content delivery request from end users and services to CD FE
Content storage & cache	R14 (CD FE – Service)	CD FE manages its storage and cache
Content delivery channel setup	R14 (CD FE – Service)	CD FE sets up delivery channel to receive contents from Services
Transport QoS dispatch	R11 (SPD FE – SR FE)	SR FE dispatches service QoS requirement to SPD FE
Transport QoS enforcement	R20 (SPD FE – Underlying Network)	SPD FE receives the information of transport related QoS from the underlying networks
Context information request	R12 (SR FE – CIM FE)	SR FE requests and receive the context information to(from) CIM FE
Content delivery service	R14 (CD FE – Service)	CD FE provides delivery of content to Services or End users

Use Cases

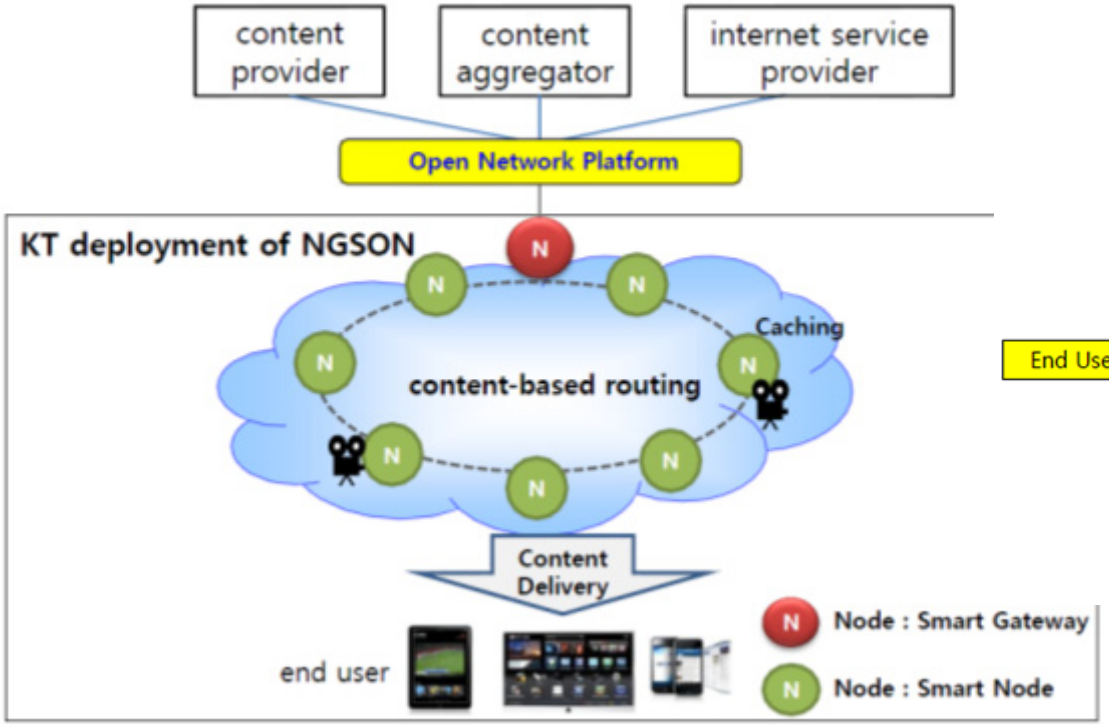
- Name-based content routing
  - the content is discovered based on content name rather than its location
- Context-aware content routing
  - the content caches or sources can be selected based on the user and network context (e.g., traffic, proximity, load)

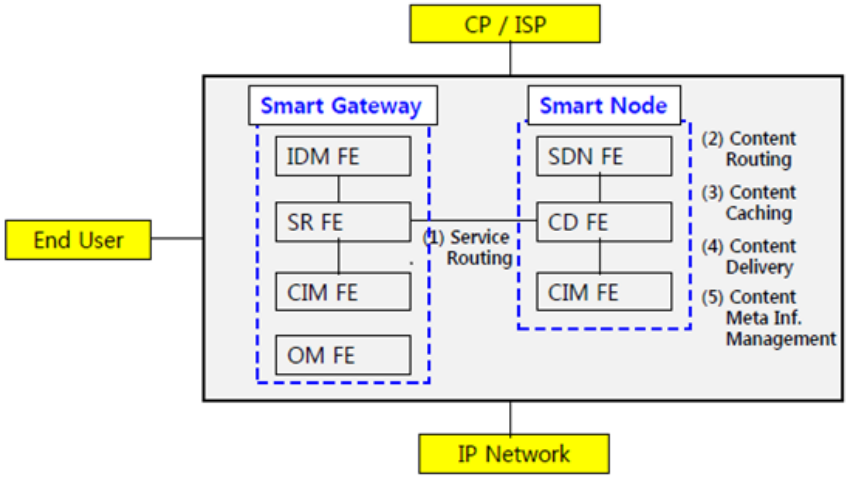




Use Cases

- Content delivery services in high quality and volume





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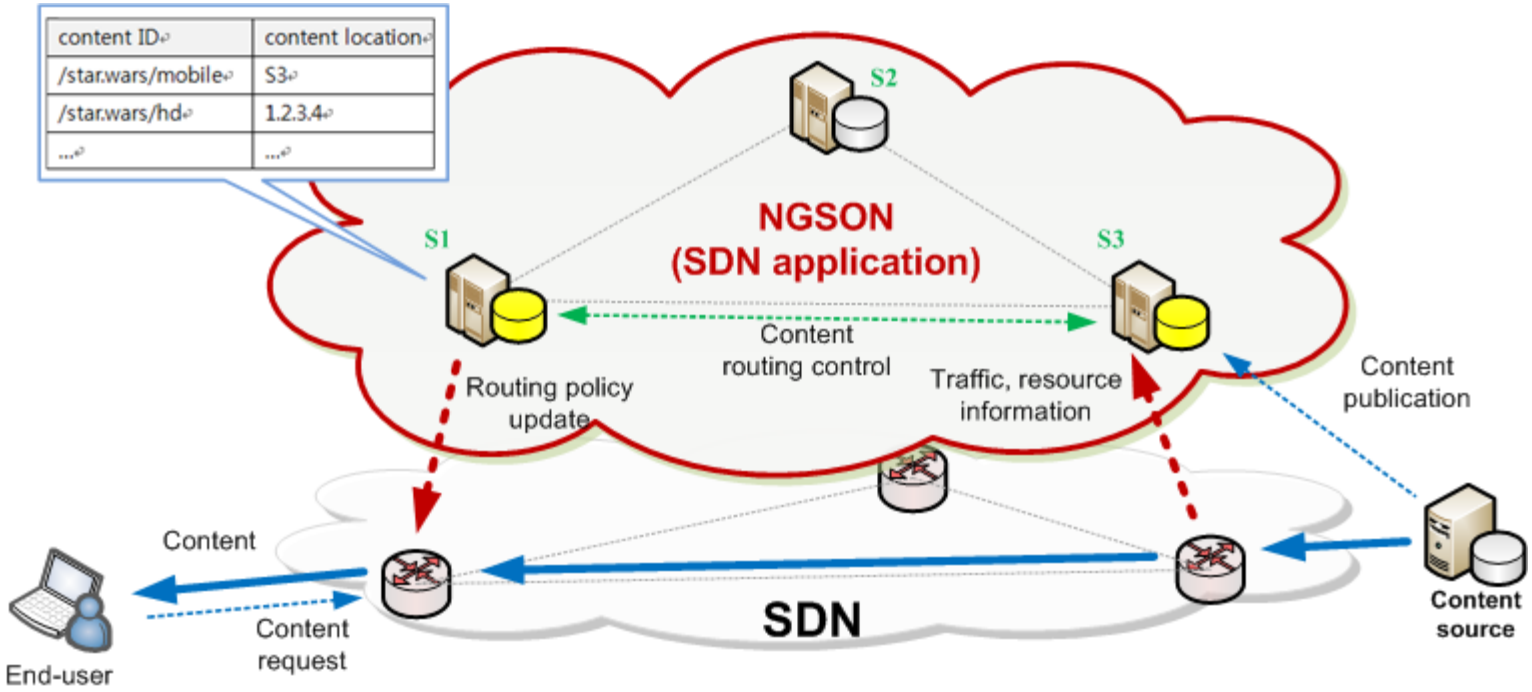
Use Cases

- NGSON as an SDN application



IEEE P1903.2

Draft standard for Service Composition Protocols of Next Generation Service Overlay Network

Jong-Hwa, YI

ETRI

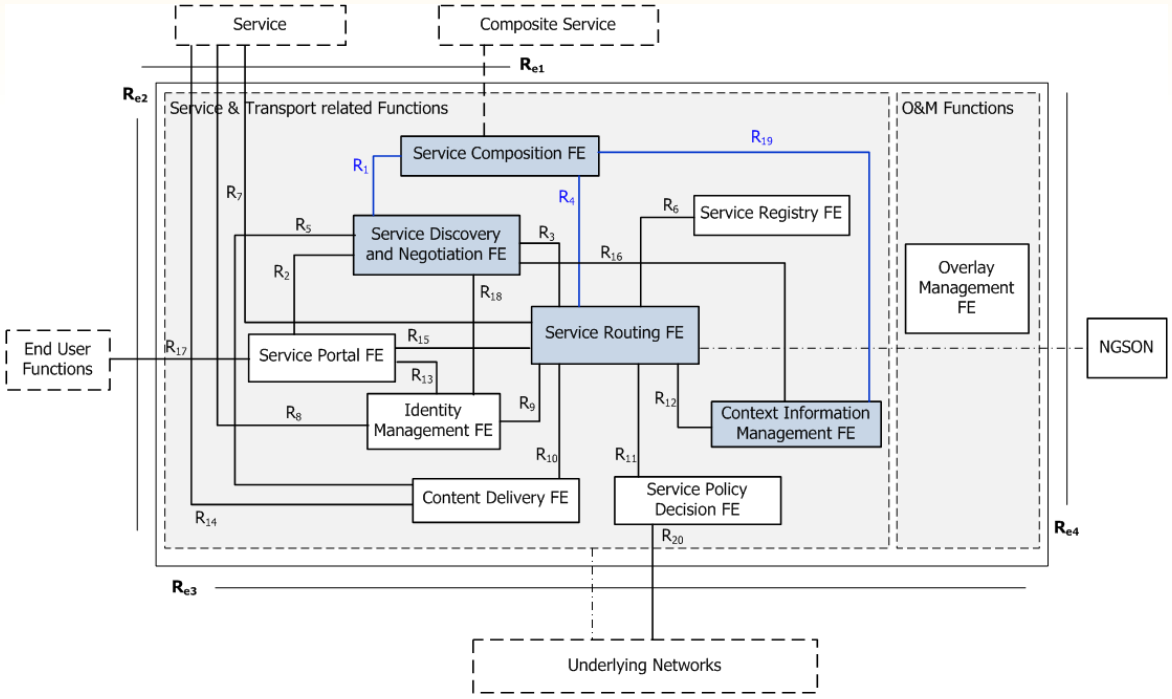
29 April 2013

IEEE P1903.2

- Project scope
  - This standard specifies protocols among Service Composition (SC) Functional Entity (FE), Service Discovery and Negotiation (SDN) FE, Context Information Management (CIM) FE, Service Routing (SR) FE and Service Policy Decision (SPD) FE to support service composition capabilities in next generation service overlay network. The capabilities of service composition aim to support service chaining and instantiation, specification interpretation, service brokering and execution, and context-aware and dynamically adaptive service composition.

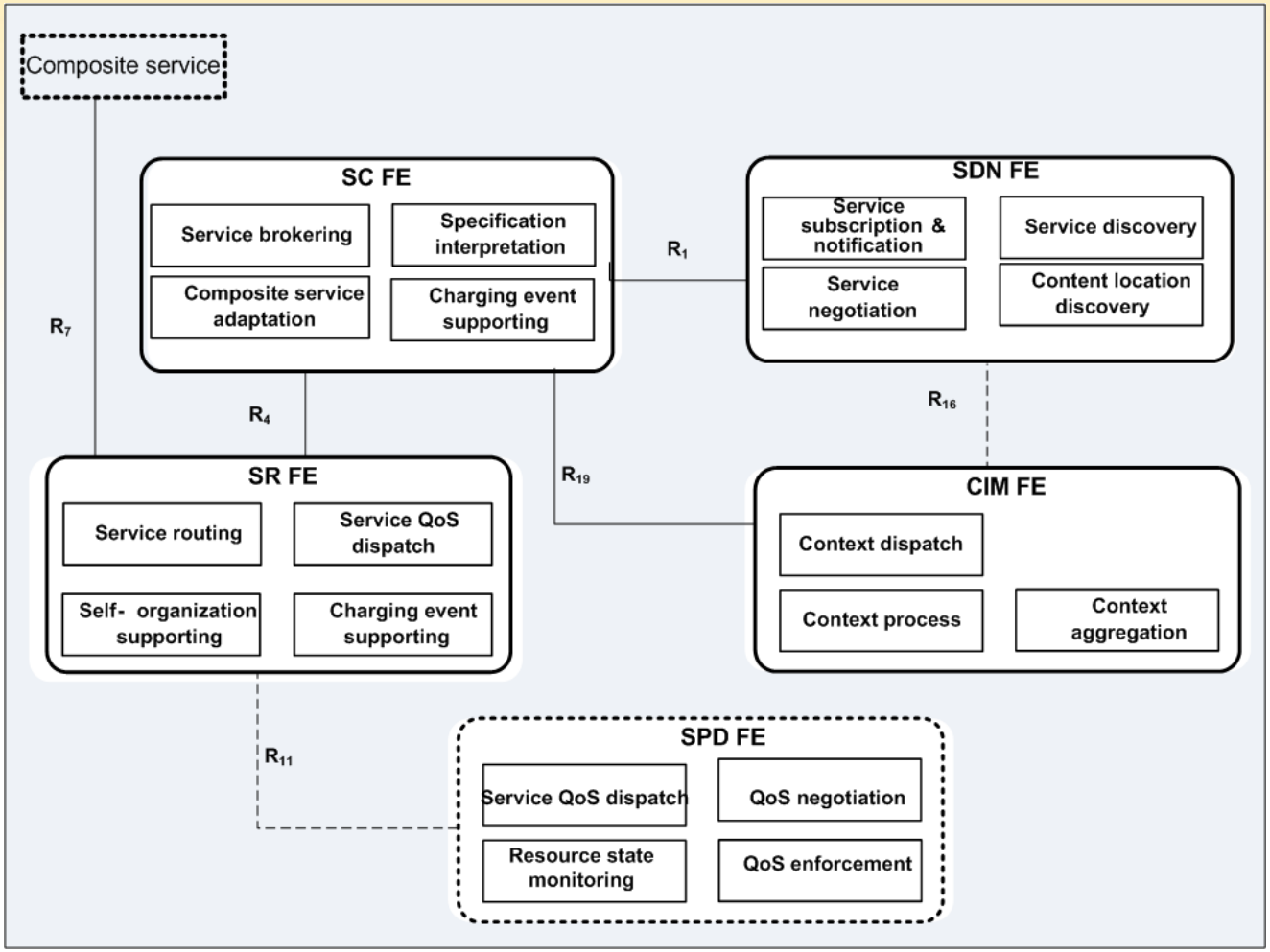
Functional Architecture

- Provide a framework of IP based context-aware, dynamically adaptive and self-organizing networks
  - Including service composition capabilities
    - NGSON takes a role of aggregating the interactions among multiple components services for a single composite service



Functional Entities involved in Service Composition

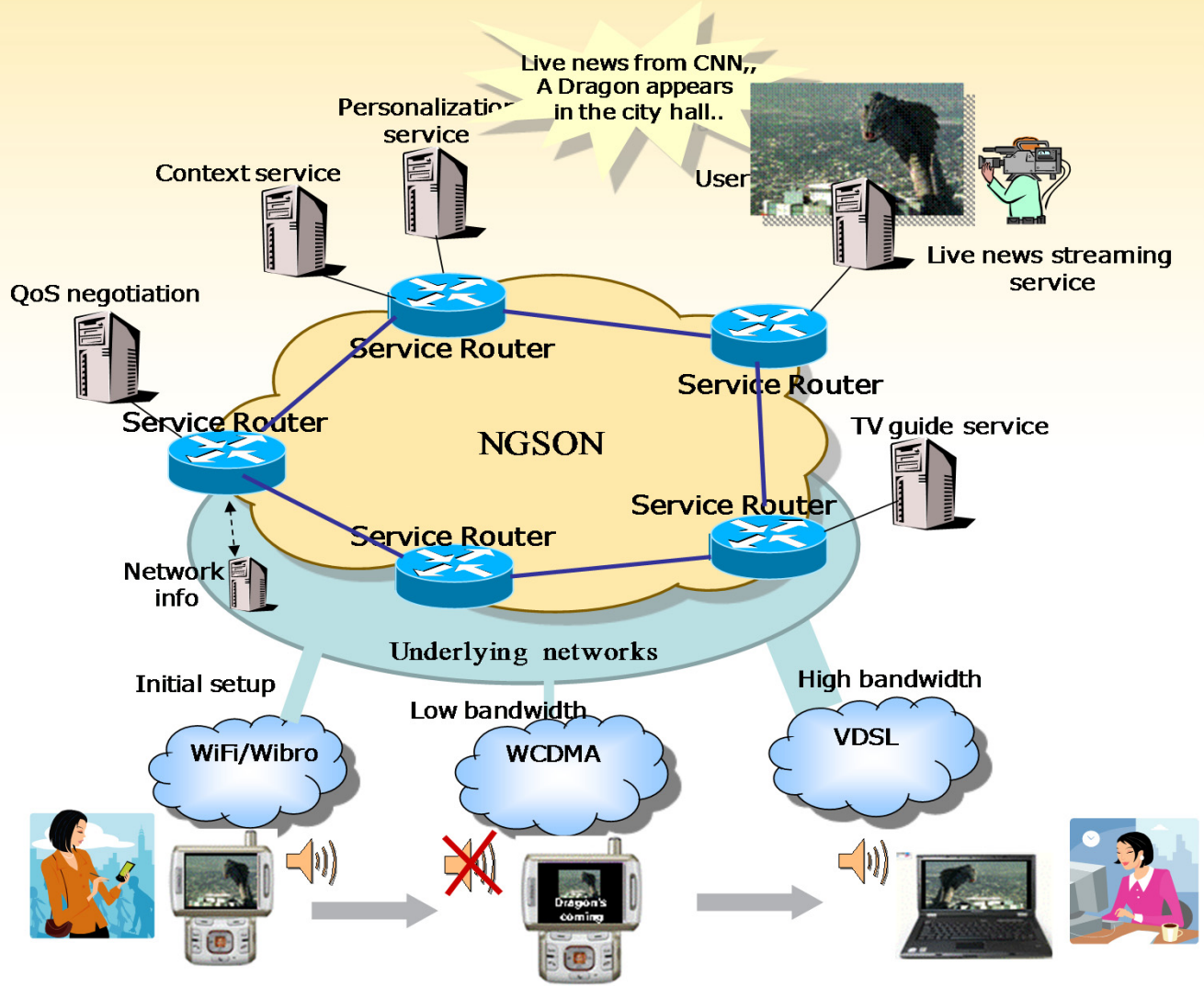
- SC FE
- SDN FE
- CIM FE
- SR FE



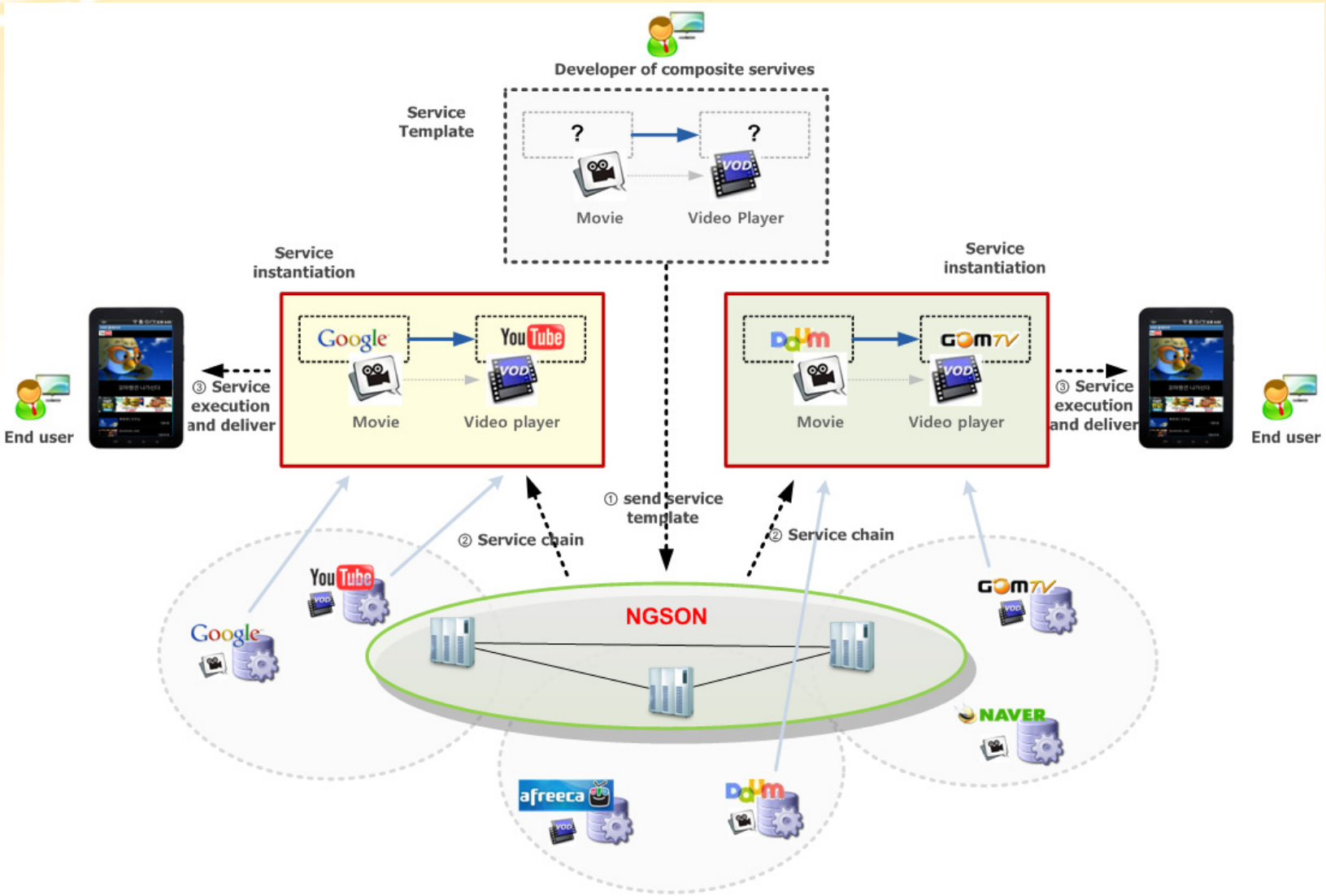
Service Composition in NGSON

- SC FE is responsible for execution of composite services
- Supports static & dynamic service composition
  - Static SC: during a service design and pre-provisioned before runtime
  - Dynamic SC: during a runtime
    - dynamic service chaining
    - dynamic service instantiation
- Main functions
  - Service brokering function
  - Specification interpretation function
  - Composite service adaptation function
  - Charging event supporting function

NGSON based service scenarios - Dynamic Service Composition



NGSON based service scenarios
- Smart streaming services



Current status of P1903.2

- Output document, July 2012
  - 1903-12-0015-00-WGDC-output-ts-service-composition
- Purpose
  - to enable network operators, service/content providers, and end users to provide and consume composite services based on advanced service composition capability of NGSON

Contents

Current status of P1903.2

- Service composition is one of the key functionalities of NGSON to support dynamic service adaptation using different types of contexts
- P1903.2 draft is in initial stages of development
- So, contributions are very welcome!

Thank you!

IEEE P1903(NGSON)
Http://grouper.ieee.org/groups/ngson/

SELF-ORGANIZING MANAGEMENT IN NGSON

Prof. Fuchun Joseph Lin
fjlin@ieee.org
National Chiao Tung University
April 29, 2013

國立交通大學

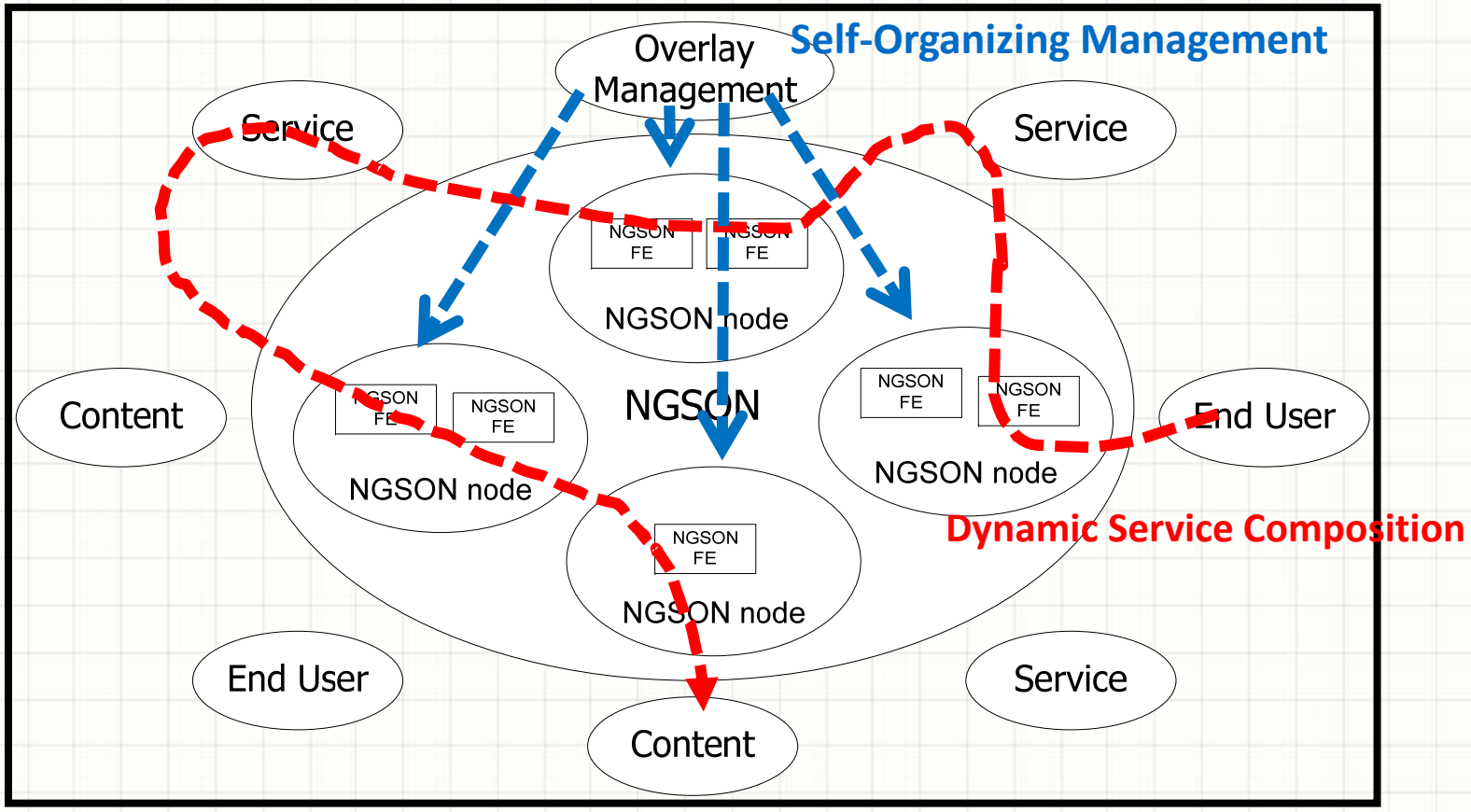
Outline

- Key Features of NGSON
- Self-Organizing Management of NGSON
- Operations for Self-Organzation
- Triggers for Self-Organization
- Self-Organizing Management Protocol Standards for NGSON

Key Features of NSGON (1)

- Intelligent Service Routing
- Context Awareness
- Dynamic Service Adaptation
- Dynamic Service Composition
- Self-Organizing Management
- Both Service and Content Delivery

Key Features of NGSON (2)



- NGSON nodes host one or several NGSON Functional Entities (FEs).
- Services and end users use NGSON to deliver service and content.
- NGSON supports dynamic service composition.
- **NGSON supports self-organizing management.**

Why Self-Organizing Management

- Optimize NGSON Operations for Operators via
  - Self-Configuration,
  - Self-Recovery and
  - Self-Optimization.

Self-Organizing Management of NGSON

1. If Controlled by Overlay Management
   - » Define Operations for Self-Organization
   - » Define Triggers for Self-Organization
2. If Not Controlled by Overlay Management
   - » P2P Self-Organizing Management

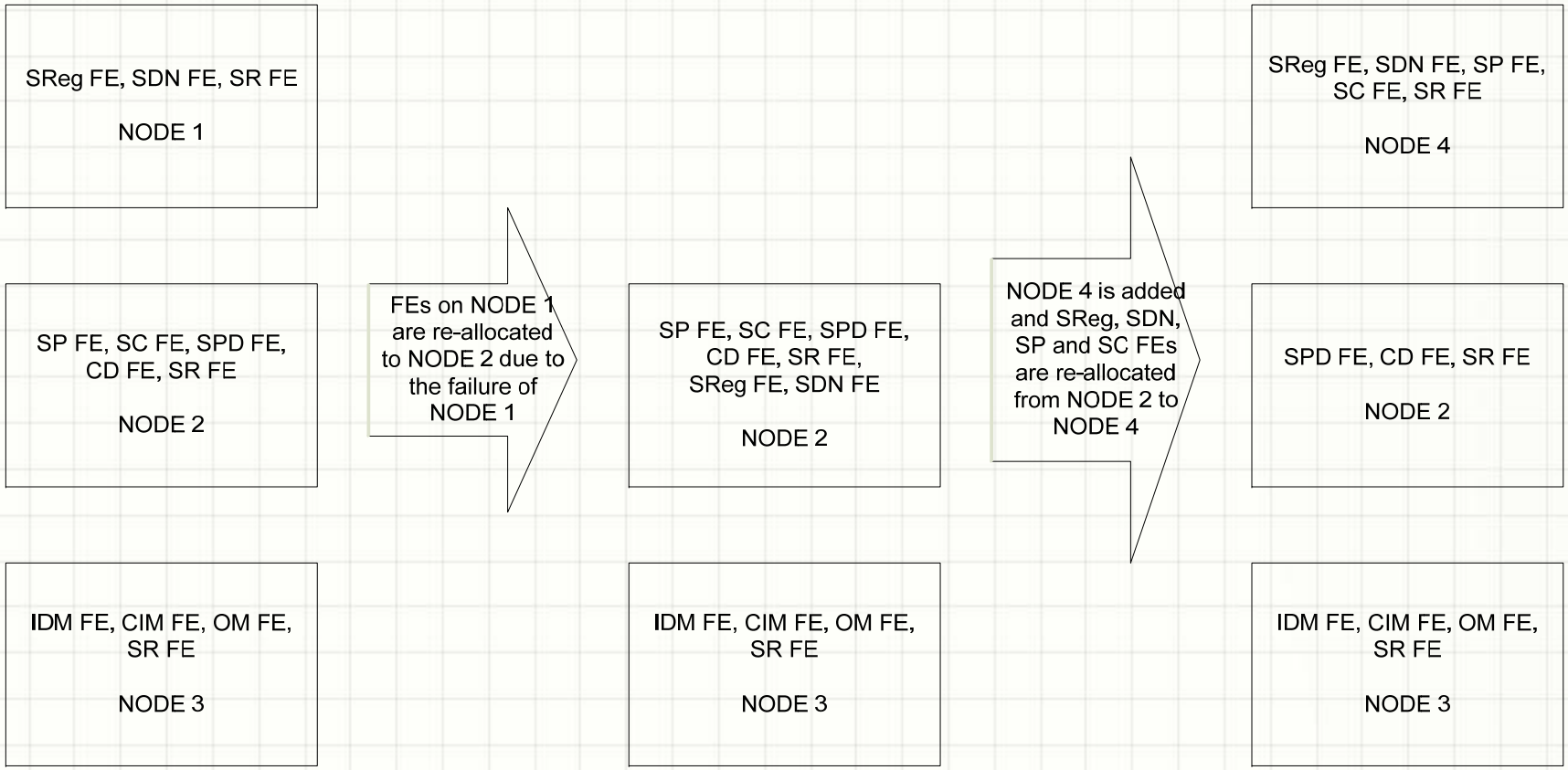
Operations for Self-Organization

- "Self-Configuration" Operations
  - ADD NGSON FUNCTOIN ENTITY
  - DELETE NGSON FUNCTION ENTITY
  - MOVE NGSON FUNCTION ENTIRY
  - COPY NGSON FUNCTION ENTITY
  - ACTIVATE NGSON NODE
  - DEACTIVATE NGSON NODE

Triggers for Self-Organization

- Two Types of Triggers
  - Self-Recovery (Deal with Failure Recovery)
  - Self-Optimization (Deal with Performance Optimization)
    - » Either for overload or under-load conditions

Self-Organization Illustration



Self-Organizing Management Protocol Standards for NGSON

- Self-organization is one of key features of NGSON as next generation overlay network standards.
- P1903.3 has been approved by IEEE in December 2011 to define Self-Organizing Management Protocol Standards for NGSON.
- The standards will address both OM-involved and non OM-involved self organization.
- You're welcome to join the WG in defining P1903.3 protocol standards.

Thank you!

IEEE STANDARDS ASSOCIATION

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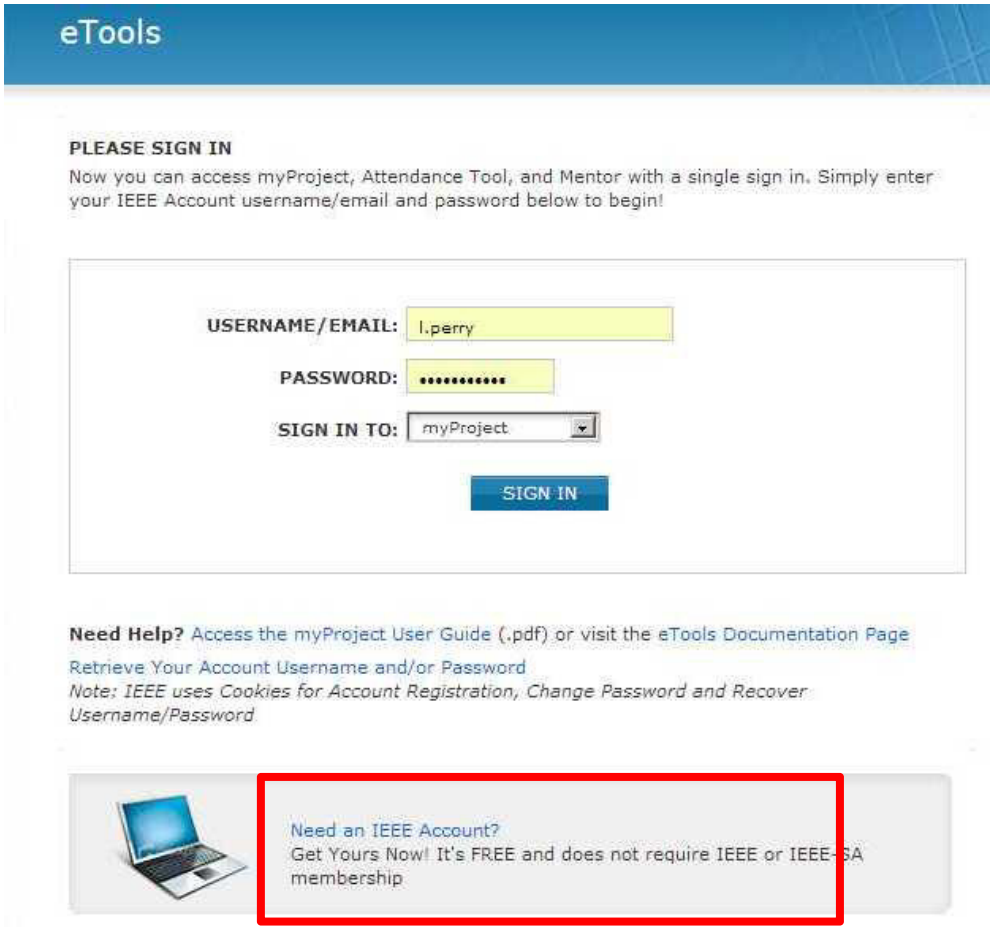
1903 Working Group— Submitting Contributions

Lisa Perry

29 April 2013

myProject

- Using your IEEE account Username and Password, log into myProject at https://development.standards.ieee.org/my-site
  - If you don't have an IEEE account, they are available to anyone and membership is not required!



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- Log in myProject at https://development.standards.ieee.org/
- On the myProject Home Screen, click "**Manage Activity Profile**."
- On the "Manage Activity Profile" page, scroll down and click on the "+" sign next to **IEEE Communications Society**.
- Click on the "+" sign next to the Sponsor, **Standards Development Board**.
- Scroll down and click on the "+" sign next to the **Next-Generation Service Overlay Network (NGSON) Working Group (COM/SDB/1903_WG)**.
- To join the project activity, scroll down and click to check the boxes next to **COM/SDB/1903_WG** and its three projects, **P1903.1**, **P1903.2**, and **P1903.3**.
- Click the "**CONTINUE**" button.

Manage Your Activity Profile (cont.)

- Confirm your interest area and enter your affiliation information.
  - The field will auto-populate as you type. Select from the list or type in your company/organization.
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1903 WG Document Repository

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- To access the repository, you can switch from myProject to Mentor by clicking the **eTools** tab in the upper-right corner of the screen and selecting "Mentor" from the "SIGN IN TO" dropdown menu.
- Once in Mentor, click the "mentor" dropdown menu to navigate to "1903" [Options will depend on your involvement level.]

Involvement Level	View public documents?	View private documents?	Post new documents & revisions?	Delete & correct documents?
Interested	Yes	No	No	No
Observer	Yes	Yes	No*	No
Potential Member	Yes	Yes	No*	No
Aspirant Member	Yes	Yes	No*	No
Nearly Member	Yes	Yes	No*	No
Non-Voting Member	Yes	Yes	No*	No
Voting Member	Yes	Yes	Yes	No
Working Group Officer	Yes	Yes	Yes	Yes

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