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Technologies for Fixed, Mobile and Broadcasting Convergence

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Hideaki Tani
NEC Corporation

Presentation Outline

- Remarks on Convergence
  - FMC and FMBC
  - FMBC as a new information media
- Technologies for FMBC Services in NGN
  - Media Quality Assurance
  - Flexibly Configurable Terminal
  - Flexible Service Creation

Remarks on Convergence

- ***Convergence*** has been discussed for a long time…
  - Satellite, ISDN, ATM, Internet and so on…
  - Mainly focused on reducing CAPEX/OPEX by sharing common resource and platform
- ***Fixed-Mobile Convergence (FMC)***
  - opened a unified interface to anytime & anywhere services
  - Convergence should mean "***choosing whichever you want***", not hiding the difference between Fixed and Mobile
  - A ubiquitous service follows a user and provides information with the optimized format
- ***Fixed-Mobile-&-Broadcasting Convergence (FMBC)***
  - Is this just delivering TV programs to FMC terminals? – ***NO!!***
  - An FMBC service should be a **new information media** which utilizes ability of personal & bi-directional feature and linkage with other network applications

FMBC as a new information media

- The new information media ***FMBC*** should be:
  - providing a new communication method to users and providers
    - Dialects, negotiations and collaboration between customers and enterprises
    - Using a small/medium scale broadcasting methods
  - controlling the media streams with meta-data and human interaction
    - Applicable to commercial advertisement and promotions
    - Also to Web 2.0 type collaboration in a user community
  - delivered to anytime, anywhere and in optimal format
    - On-demand, time-shifted, downloaded, in a proper format
    - Received by a browser phone, a big screen TV, or a personal area network (PAN)

Collection of features

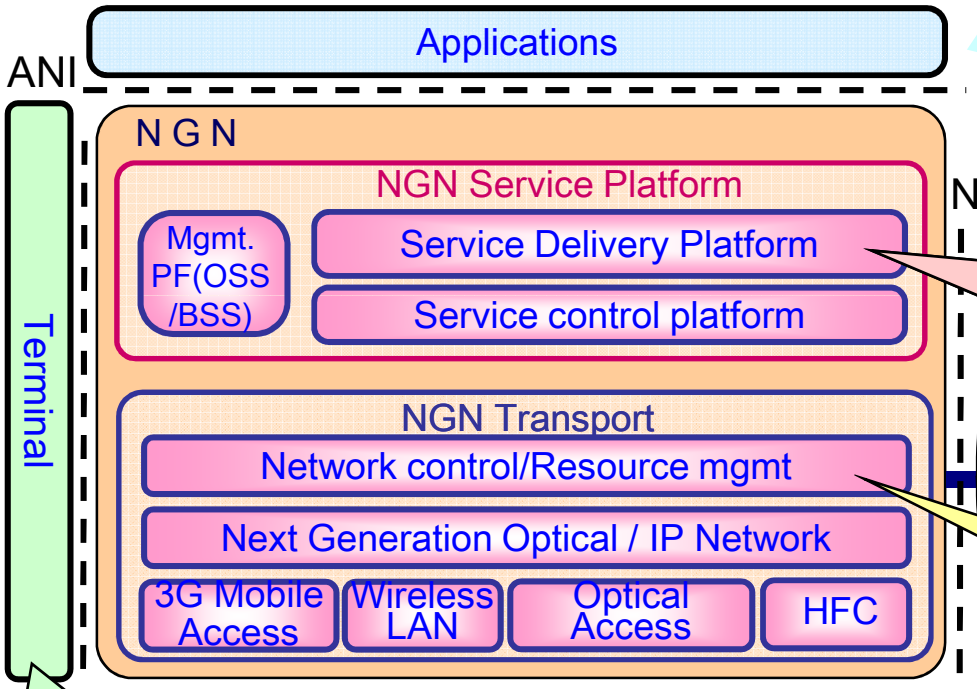
- **Convergence = Choose whichever you want**

	FMC (F = Fixed, M = Mobile)	Broadcasting (B)	FMBC = (F)+(M)+(B)
Contents	(F) Rich, Long-tailed & (M) Personal, TPO-matched	(B) TV quality & reliable	More choices Lower hurdle to deliver contents
Platform	Flexible service offering; (F) Reliable & (M) Presence aware	(B) Advertisement	Orchestration of services Ads to dedicated community
Delivery Network	Bi-directional; (F) Quality & (M) Ubiquitous	(B) Highly scalable & efficient	Flexible choices of quality & cost
Terminals	Easy to feedback; (F) Rich & (M) Portable	(B) Shared terminal & remote control interface	Anywhere, Anytime & Optimal way

Technologies for FMBC Services in NGN

- NGN should be empowered by convergence technologies to provide FMBC services

NGN Key Features:
- Fully IP based
- Separation of Transport and Service
- QoS guaranteed and High security
- Variety of access networks
- Mobility and Ubiquitous service



NGN Architecture

[Flexible Services]
- Service Integration Environment
- Meta data creation with Video processing

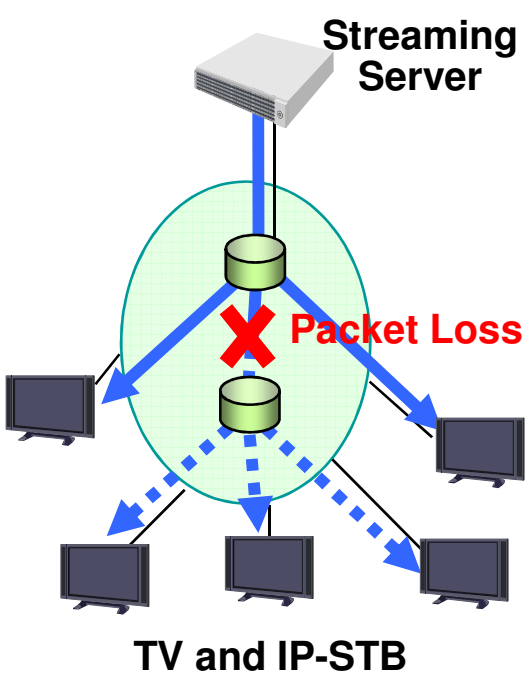
[Media Quality Assureance]
- High-Quality IP Multicast
- Video Quality Metrics

[Flexibly Configurable Terminal]
- Virtually decentralized terminal with Personal Area Network (PAN)

Efficient & Reliable Content Delivery

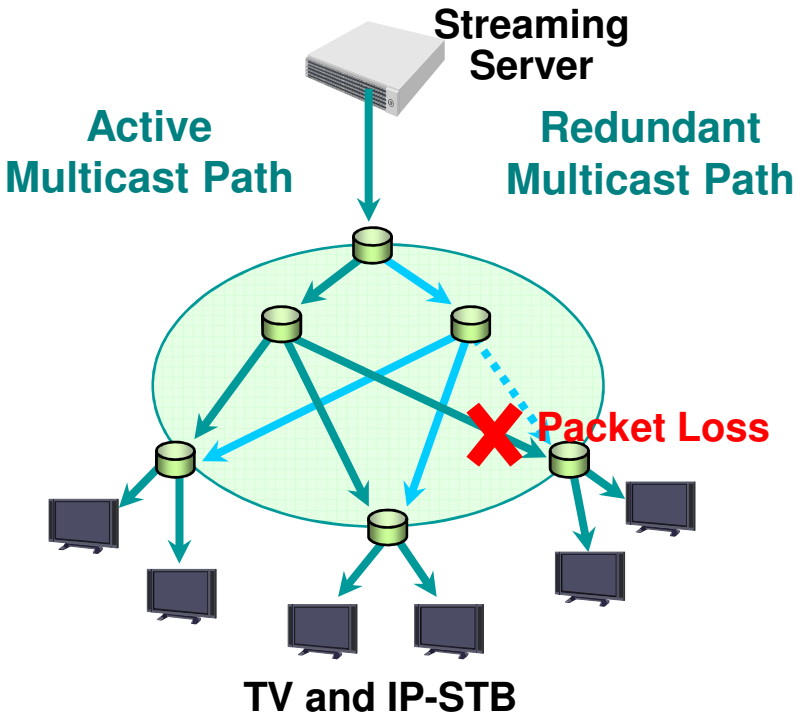
- Improve reliability of IP multicast delivery by duplicating the multicast trees

Single IP Multicast Tree



- **Packet loss can not be allowed in commercial contents delivery**

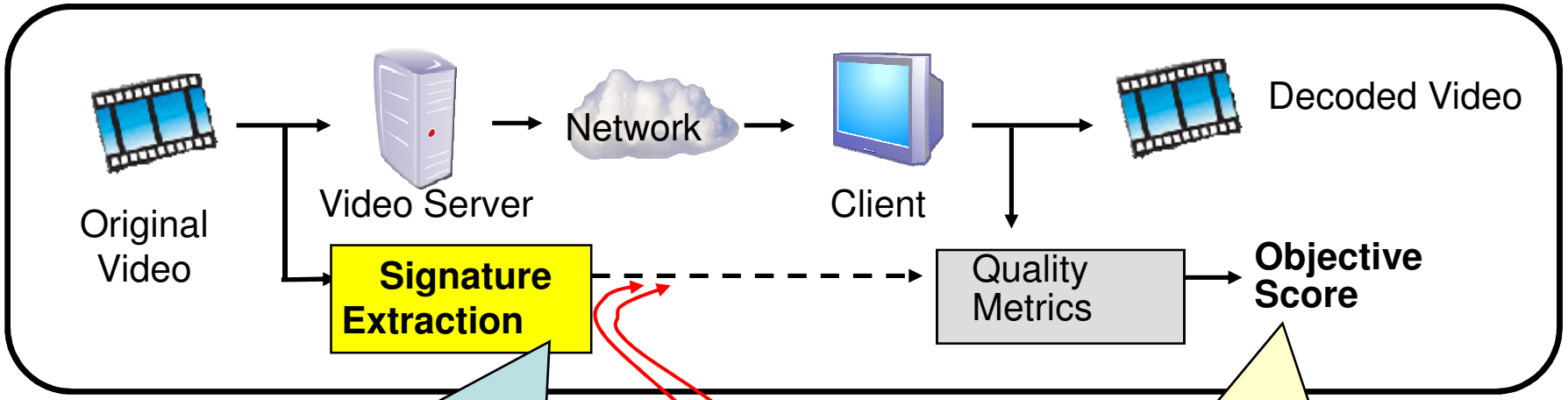
Duplicated IP Multicast Tree



- **Duplicated trees can recover from single packet loss**

Video Quality Metrics

- Inexpensive & accurate quality measurement by reduced pixel referencing



Goal: *Inexpensive & accurate*

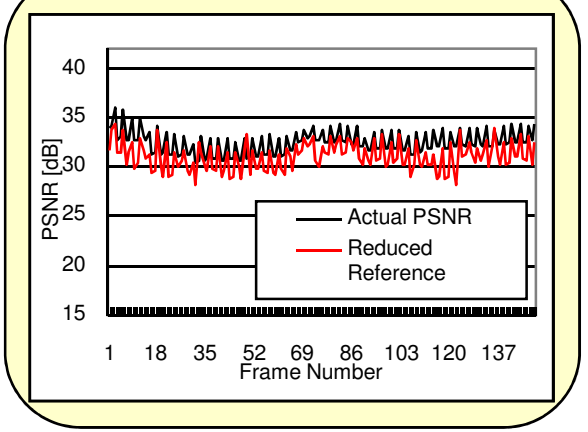
Select pixels whose luminance = 32

64	32	20	16	64	64	32	32	64	20	96	64
16	80	32	48	64	32	16	20	48	20	96	32
16	64	20	20	64	16	20	32	64	20	64	64
64	64	20	32	16	48	96	64	64	32	64	96
32	64	20	16	16	48	64	32	48	64	96	64
20	20	16	48	32	64	96	64	48	64	48	48

Original frame (example)

0	1	0	0	0	0	1	1	0	0	0	0
0	0	1	0	0	1	0	0	0	0	0	1
0	0	0	0	0	0	0	1	0	0	0	0
0	0	0	1	0	0	0	0	0	1	0	0
1	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0

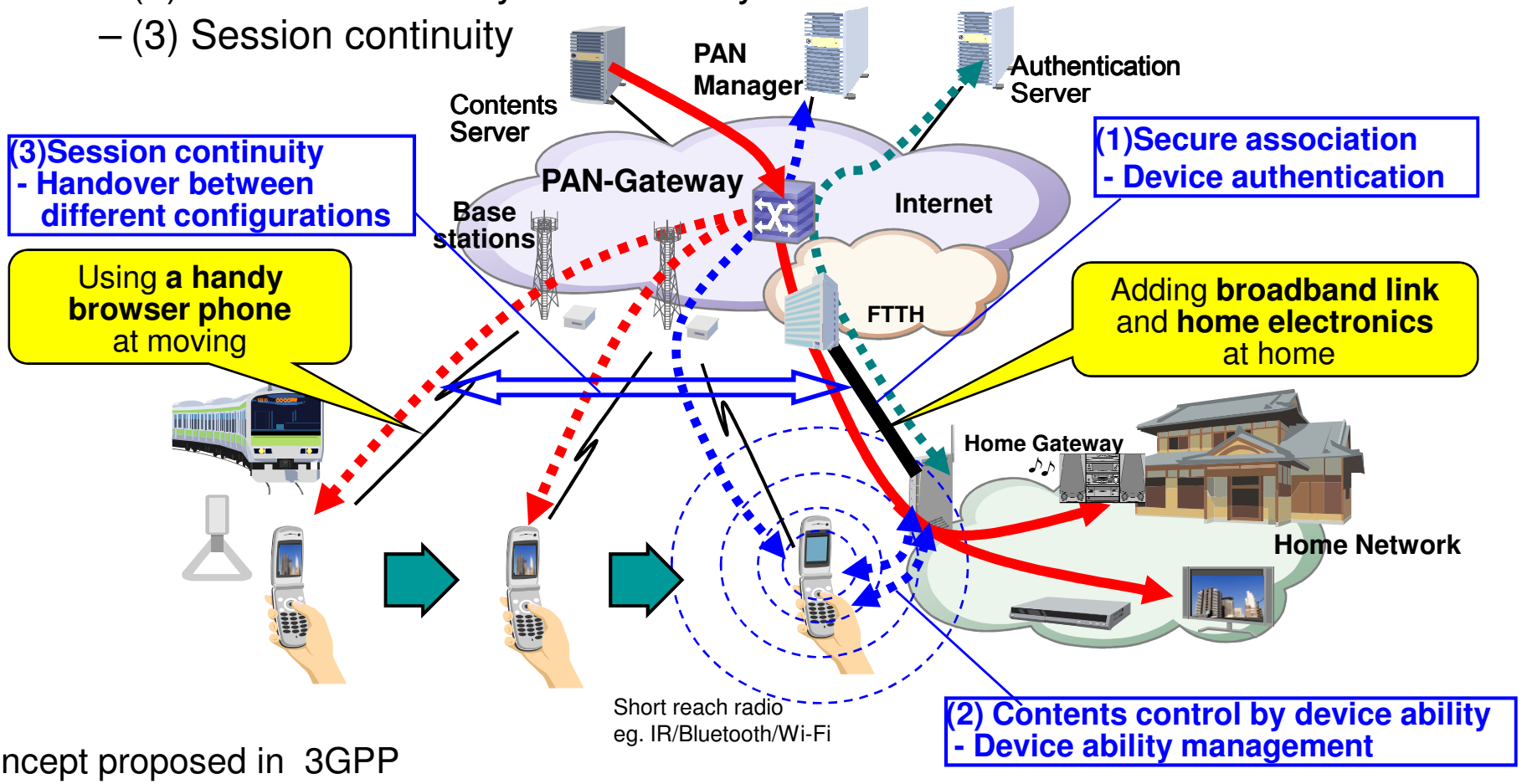
Bitmap of pixels (lum. = 32)



Err = -0.12dB (σ=0.97)

Personal Area Network (PAN)

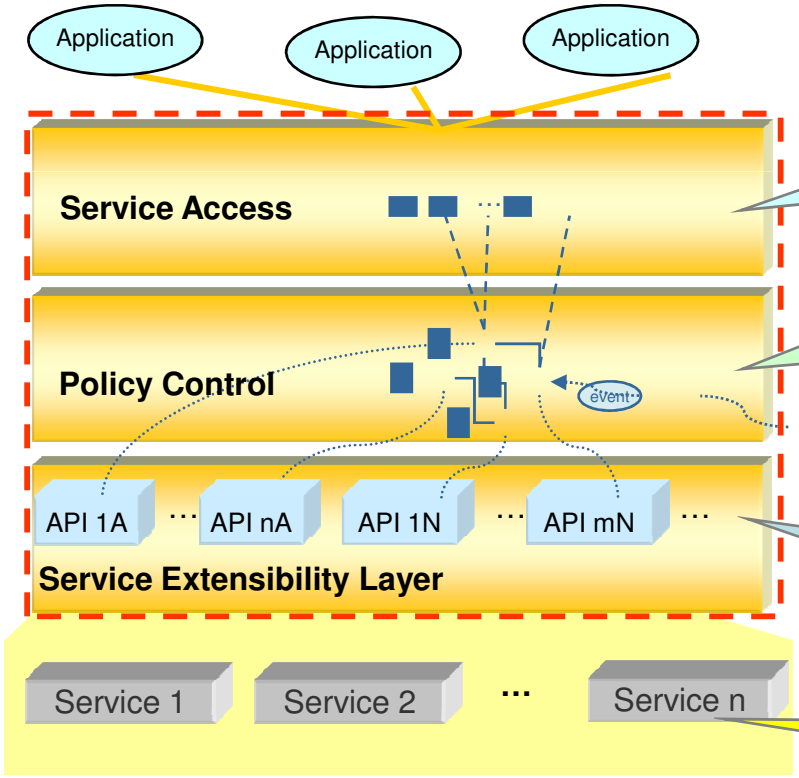
- A feature extension of a terminal by ad-hoc association with surrounding devices in the present place (home, public or visited area)
  - (1) Secure association
  - (2) Content control by device ability
  - (3) Session continuity



Concept proposed in 3GPP

NGN Service integration Environment (SIE)

- Telecommunications services will be delivered and accessed by users
  - (1) Service Orchestration
  - (2) Controlled exposure of resources to application developers



Service Access
High-Level API to expose low-level service platform capabilities
Security and policy handling

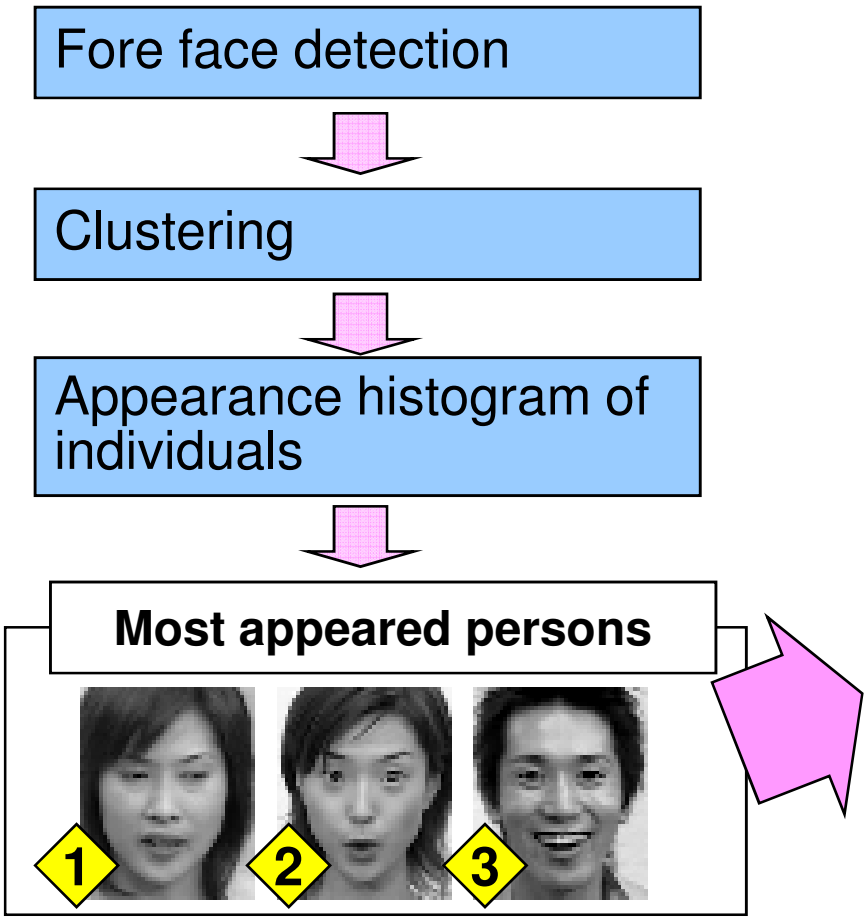
Policy Control
Enables to control services dynamically
Policy-controlled services are more flexible and easier to be adopted to meet changing requirements

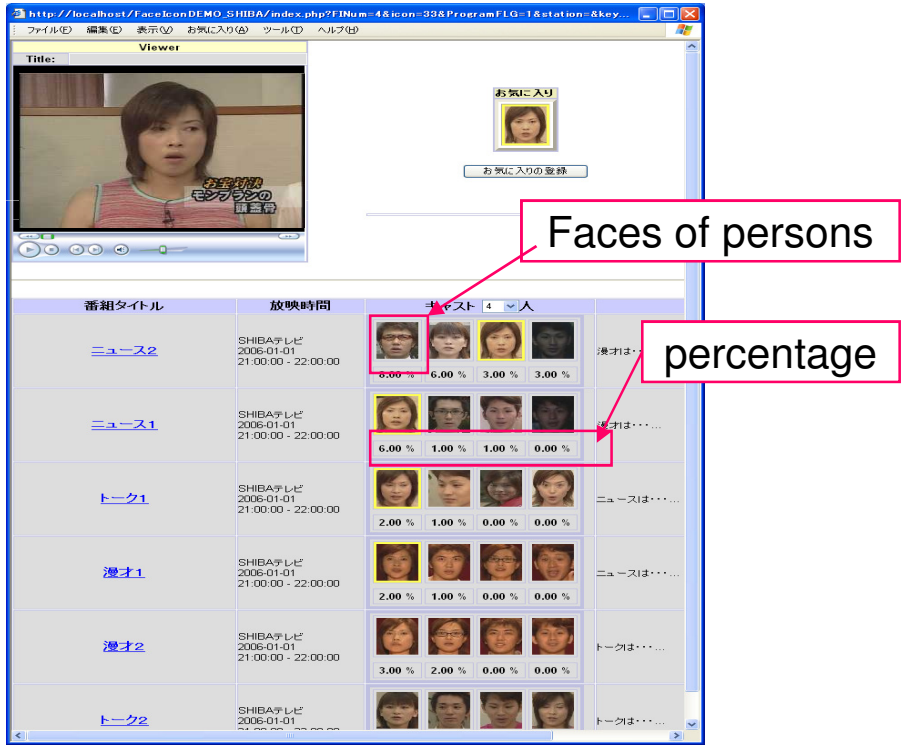
Extensibility-Layer
Connects to underlying service resources
Enables easily to include new services

Service capability integration across providers

Meta data creation with Video processing

- Extracting the outline of a video program
  - Easy to grasp which sort of the program content it is





Conclusion

- Technologies necessary to realize an FMBC service provision are introduced as addition to high quality and security platform on NGN.
- FMBC will become a new, personalized and bi-directional broadcasting media.

Vielen dank!!

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