

ITU-T Workshop on Bridging the Standardization Gap and Interactive Training Session

(Cyberjaya, Malaysia, 29 June – 1 July 2010)

Business Experience In Implementation of IPTV

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AGM

IPTV Operation & Development

Telekom Malaysia

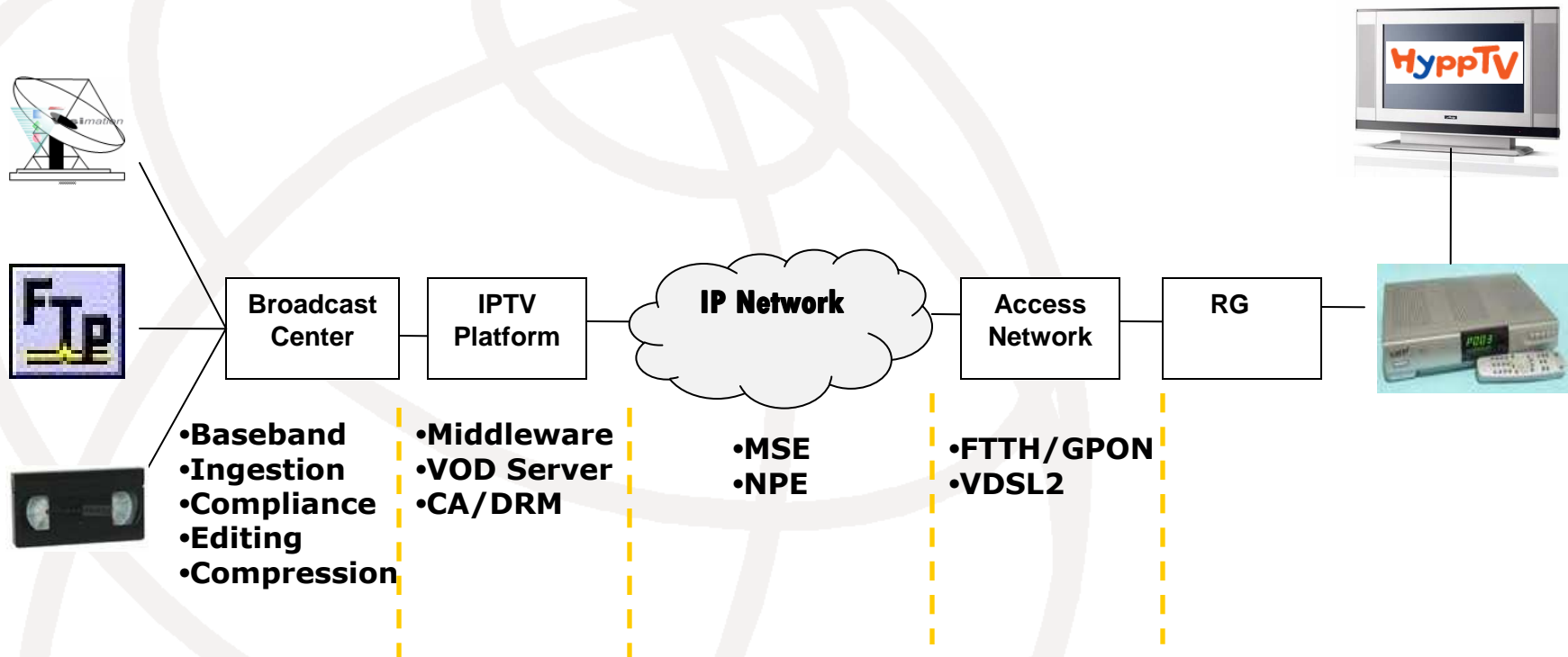
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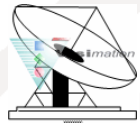
Overview of Telekom Malaysia

- TM is a leading integrated information and communications group, offers a comprehensive range of services in broadband, data and fixed-line.
- TM is evolving into a Next Generation Network service provider enabling the group to enhance its efficiency and productivity while providing enriched products and services.
- Number of Employees: 25K
- Number of Subscribers:
 - POTS - 4 Million
 - BROADBAND - 1.52 Million
- HSBB Home Passed-150K

End-to-end IPTV Network

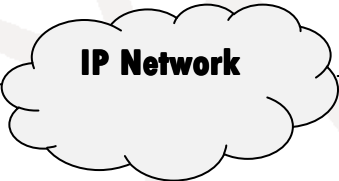


Broadcast Centre



Broadcast Center

IPTV Platform



Access Network

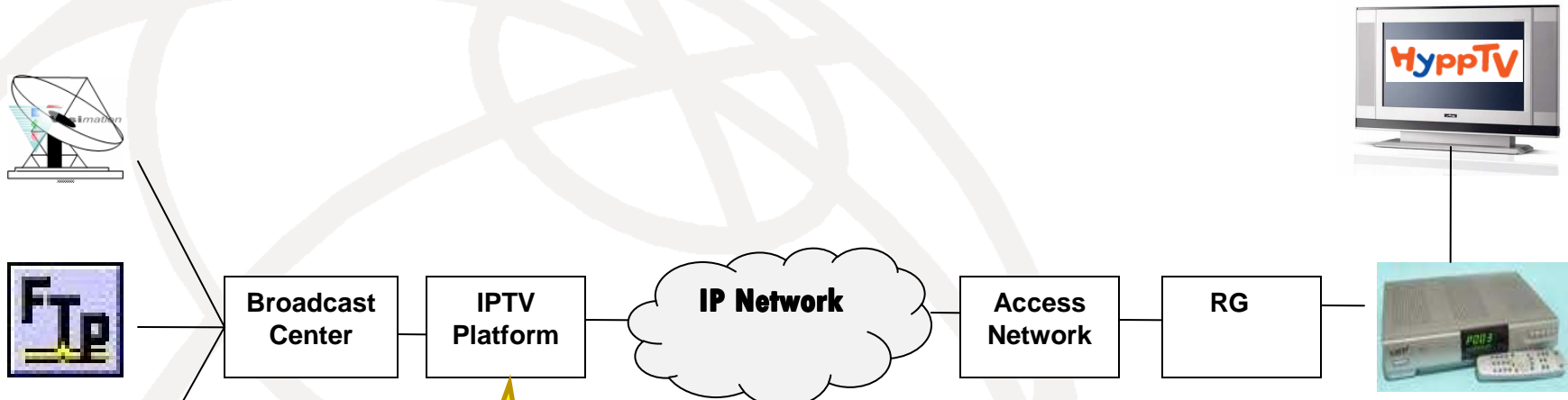
RG



ITU-BT.R 601-5
Component Video
Signal 4:2:2

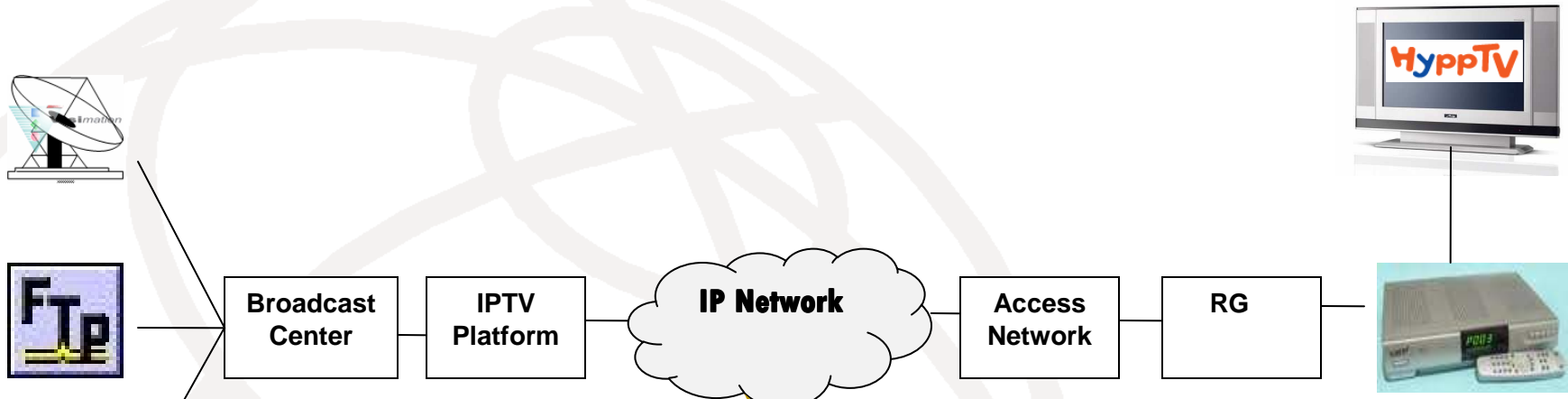
ITU-BT.R 656-4
Composite Digital
Signals (SDI)

IPTV Platform



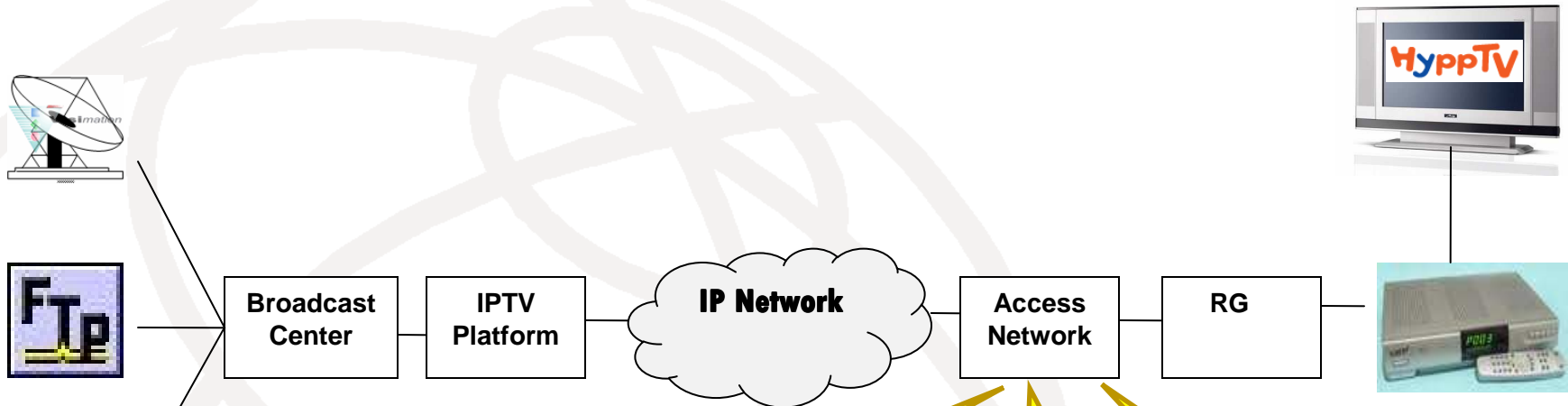
**ITU H.264
(MPEG-4 AVC Part-10)
Video Codec Standard**

IP Core Network



G.8110.1
Architecture of
Transport MPLS (T-
MPLS) layer network

Access Network

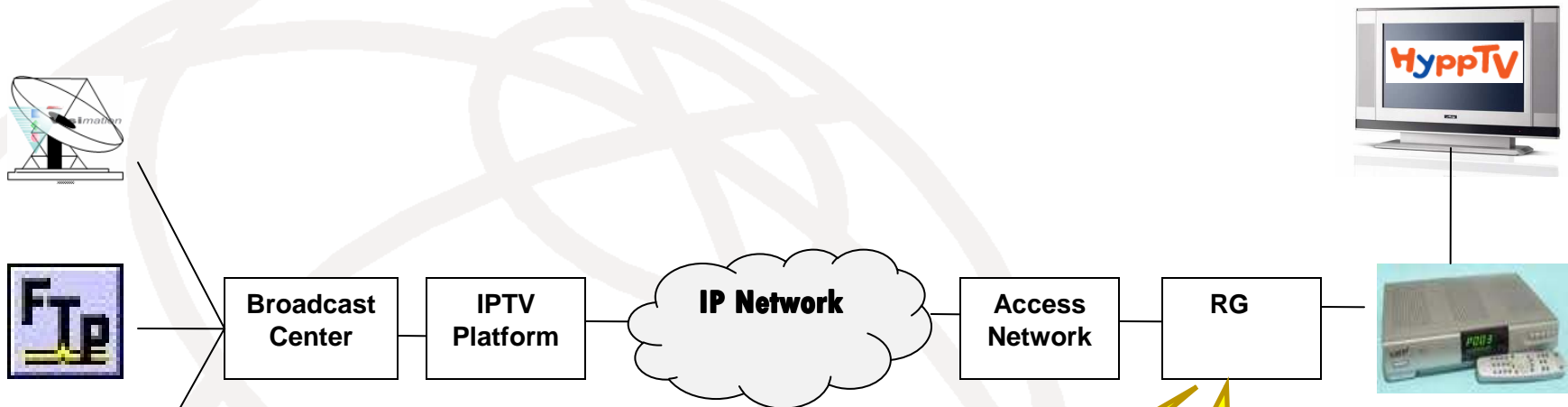


G.993.2
Very high speed digital subscriber line transceivers 2 (VDSL2)

G.984.4
Gigabit-capable passive optical networks (GPON)

G.168
Digital network echo cancellers

Residential Gateway



H.770

Mechanisms for service discovery and selection for IPTV services

H.662.1

Architecture and functional requirements for home networks supporting IPTV services

IPTV QoE

Recommended Minimum Transport Layer Parameters for Satisfactory QoE for MPEG-4 AVC, VC-1 Encoded SDTV Services

Based on ITU-T Rec. G.1080 (Quality of Experience Requirements for IPTV Services)

Transport stream bit rate (Mbit/s)	Latency	Jitter	Maximum duration of a single error	Corresponding Loss Period in IP packets	Loss Distance	Corresponding Average IP Video Stream Packet Loss Rate
1.75	<200 ms	<50 ms	≤ 16 ms	4 IP packets	1 error event per hour	$\leq 6.68E-06$
2.0	<200 ms	<50 ms	≤ 16 ms	5 IP packets	1 error event per hour	$\leq 7.31E-06$
2.5	<200 ms	<50 ms	≤ 16 ms	5 IP packets	1 error event per hour	$\leq 5.85E-06$
3.0	<200 ms	<50 ms	≤ 16 ms	6 IP packets	1 error event per hour	$\leq 5.85E-06$

Recommended Minimum Transport Layer Parameters for Satisfactory QoE for MPEG-4 AVC, VC-1 Encoded HDTV Services

Based on ITU-T Rec. G.1080 (Quality of Experience Requirements for IPTV Services)

Transport stream bit rate (Mbit/s)	Latency	Jitter	Maximum duration of a single error	Corresponding Loss Period in IP packets	Loss Distance	Corresponding Average IP Video Stream Packet Loss Rate
8	<200 ms	<50 ms	≤ 16 ms	14 IP packets	1 error event per 4 hours	$\leq 1.28E-06$
10	<200 ms	<50 ms	≤ 16 ms	17 IP packets	1 error event per 4 hours	$\leq 1.24E-06$
12	<200 ms	<50 ms	≤ 16 ms	20 IP packets	1 error event per 4 hours	$\leq 1.22E-06$

Summary

Why we have Standards;

- Interoperability
- Future expansion
- Ease of maintenance
- Quality of experience
- Safe cost

Thank You

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