WELCOME

IETF 86
ORLANDO

In a World of Open Standards
Rough Consensus and Running Code
Stands the IETF

Opens March 10, 2013

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Movies ... Television ... Cable ... Internet

Technical Standards Are The Foundation
### London Olympics – TV and Online Viewing

#### TV Networks
- 5,535 hours of coverage
  NBC, MSNBC, CNBC, Bravo, Telemundo
- 219M viewers in US
  - Average >31M viewers per night over 17 days
  - most-watched US TV event in history

#### Online
- Events Streamed Live
  - 57M unique visitors
    - 10M on mobile devices
  - 20M hours of video watched
- Live Video
  - 64M live video streams
  - 13.6M hours
- On Demand
  - 94M streams
  - 6.7M hours

Multi-Platform Availability Increased Viewing
Challenges For The Future
Content Drives Internet Use and Growth

Everyone is a Consumer and Creator of Content
The Scale of Television is Staggering

Today - NetFlix is 54% of US nighttime Internet
- 33M subscribers, over 1B hours / month (38 hours/sub)

Future - mainstream TV over internet?
- 864M (and growing) pay-TV homes … “TV Everywhere”
- Proliferation of SmartTVs, Tablets and Smartphones
- Average US HH views >4 hours/day of linear TV

London Olympics Example (using HDTV @ 8 Mbps)
- Online – 20M hours = 72 PetaBytes
- TV – 33M homes x 4 hours x 17 days = 7.6 ExaBytes
  - 33M homes = 248 Petabps

Advances in speed and compression alone won’t keep up…
Video’s Future Challenge

8k Ultra-HDTV
7680 x 4320
120 fps?
80-200 Mbps

4k Ultra-HDTV
3840 x 2160
60 fps
80-200 Mbps

Full HDTV
1920 x 1080
30 fps
20-40 Mbps

HDTV
1280 x 720
60 fps
2-4 Mbps

Today

QVGA
320 x 240
10-15 fps
500 kbps

VGA/SDTV
640 x 480
30 fps
1-2 Mbps

1920 x 1080
30 fps
20-40 Mbps

1280 x 720
60 fps
2-4 Mbps
Scalability Challenges Compounded

Explosion of Connected Devices:
- PCs, TVs, Phones, Tablets

Entertainment Television:
- “TV Everywhere”

Future Video
- Beyond HD

User Generated Content:
- Everyone a content creator

Explosion of Connected Users: 2B … 7B
IETF/IRTF Initiatives … Scalable, Safe, Secure

Content-Agnostic  
IPv6  
CDNI  
ICN  
DNSSEC  
OAUTH

Content-Appropriate, Content-Aware  
Device Domains … Wireless Display Links  
Best Available Screen … Best Available Connection  
Smart Content Discovery … Distribution  
Best Available Copy … Nearest Available Copy  
Smart Network & Device Resource Management, Routing, Caching  
Trust of Content, Devices, Users, Groups while maintaining privacy

Technical Standards Create The Future
Thank you