

**SCTE CABLE-TEC**  
**EXPO'13**  
OCTOBER 21-24 / ATLANTA, GA

**WAYS THAT THE USER INTERFACE AND VIDEO –  
LIVE AND ON-DEMAND - CAN BENEFIT FROM  
A MORE CLOUD BASED ARCHITECTURE**

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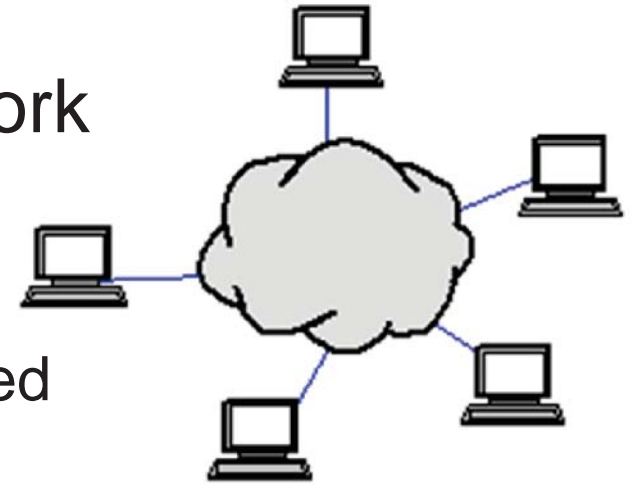
# Agenda

- ▶ A Short History of the “Cloud”
- ▶ Cloud Hype and Cloudwashing
- ▶ What does Cloud mean with respect to Cable
- ▶ User Interfaces, HTML5 and the Cloud
- ▶ OTT, Video Encoding/Transcoding & the Cloud
- ▶ Latency
- ▶ Cloud Sense and Nonsense



# One Version of Cloud History

- ▶ “Cloud” originally defined a network
  - Simple or Complex
  - Telephone, Internet, Computers...
  - Often shorthand for “you have no need to know - trust us that it works”



- ▶ “Cloud” today means many things
  - SaaS, PaaS, IaaS....
  - CDN?



# Cloud Today Means?



et/mwo/loski



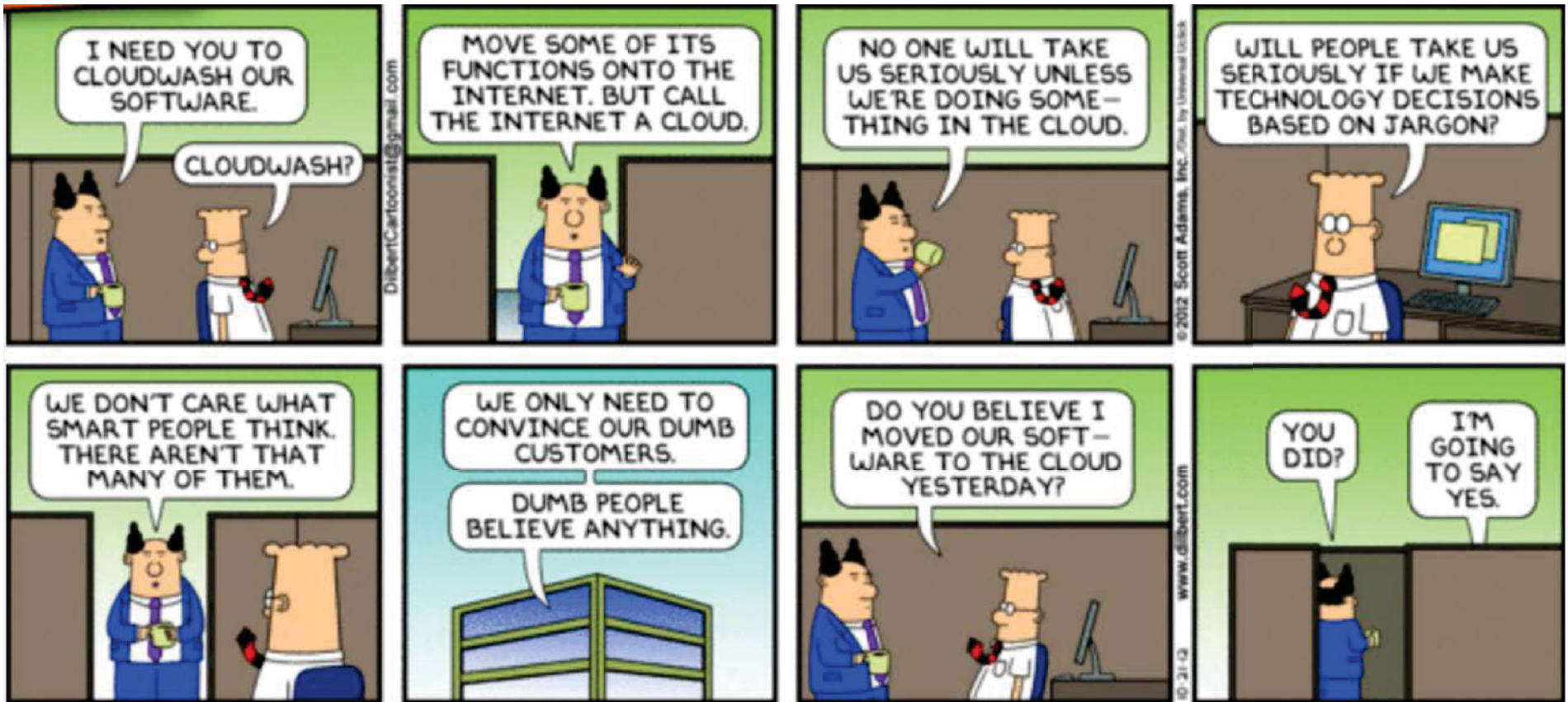
# Or “Cloud” Today Means:

- ▶ Software as a Service – SaaS
- ▶ Infrastructure as a Service - IaaS
- ▶ Platform as a Service - PaaS
- ▶ Client Server Applications?
- ▶ HTML5 UI's?
- ▶ OTT?
- ▶ CDN's?





# Cloud Hype and Cloudwashing



# Cloud Hype and Cloudwashing

- ▶ **Cloudwashing:** *Marketing* to redefine an application as “Cloud” based
  - Any client / server app or internet connected device can be “repositioned”
- ▶ **Larry Ellison, Sept. 2008** “ ...we've redefined Cloud Computing to include everything that we already do... I don't understand what we would do differently ... other than change the wording of some of our ads.” Oracle CEO
- ▶ **Just because something can be Cloud based, doesn't mean it should be!**





# Back to Cable and the Cloud....





# Why the Cloud Must be Considered

- ▶ Capital Expenditure reduction
- ▶ Lower cost compute resources
  - Follow Average vs. Peak metrics
  - In-house vs. Outsourced vs. Hybrid?
- ▶ Security, Reliability
  - Dedicated Servers vs. Private Cloud vs. Public Cloud?
- ▶ Less STB's, More OTT?
- ▶ Lower powered STB or enhanced legacy STB using remote UI?



# Cloud Friendly Services

- ▶ OTT related services
- ▶ Video asset preparation – Encoding, ABR, DRM
- ▶ CDN? (Not really a cloud?)
- ▶ UI's – Web Servers for HTML5 UI's and apps...
- ▶ Recommendations



# Cloud & the UI – Some Basics

- ▶ Web server for an HTML5 based UI could be located in the “cloud” (not should be)
- ▶ Optimal solution different for OTT vs. STB
  - Several sources of data and HTML elements?
    - Guide data, expanded guide data / graphics, nPVR data, advertisements, *recommendations...*
    - Some data appropriate for true cloud sourcing (recommendations, advertisements, weather, traffic?)
- ▶ Should the STB EPG web server be in the head-end or a cloud?
  - It may even best reside within the STB itself!



# OTT and the Cloud

- ▶ Encoding and Transcoding *could* be in the Cloud
  - Widely used for VOD assets
  - Live *possible* but much more challenging and costly
- ▶ Live depends more on QoS, Resolution & Scale
  - Practical for smaller scale events with best effort QoS
  - Challenging for major HDTV live events
- ▶ CDN's are not exactly Cloud based
  - Share some positive attributes like pay as you go
  - Some specialized CDN could be considered more Cloud based





# Thin Client STB UI and Cloud

- ▶ Thin Client UI can be rendered via HTML5, RVU, CVP2, or as part of MPEG stream
- ▶ HTML5, RVU, CVP2: Server for the Thin Client is typically the home gateway
  - Some display elements could come from a distant server (possibly a “Cloud”)
- ▶ Example: Server is typically in the head-end but *could* be cloud based.



# Cloud Latency

- ▶ Cloud based Cable services still via HFC Plant
  - Same DOCSIS roundtrip/ one-way delay
  - Same Propagation, FEC, Buffering math and issues
  - QoS priority (like DSG) to mitigate congestion?
- ▶ Additional latency to/from Cloud server?
  - Coast to coast propagation time < 30mS
  - Queuing delays if bad QoS
  - ABR negotiation for video an issue
- ▶ Latency need not be an issue for non-video apps





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# Conclusions

- ▶ “Cloud” has many meanings and lots of hype
  - HTML5  $\neq$  “Cloud”
- ▶ “Cloud” advantages relate more to:
  - Compute-intensive, low-throughput applications
  - “Spiky” high peak to average usage
  - Virtualizeable processes
- ▶ OTT good potential fit
- ▶ As much a business decision as a technology one







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