Central Office Evolution

From Big Iron to Data Center

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Xennial/Oregon Trail Generation

- Born Late 70's/Early 80's
- Remember Land Lines & Pay Phones
- Grew up half Analog, half Digital technology.
- Played Oregon Trail…and died of Dysentery.
- First to do Research papers with a Card Catalog & Online
- The last to experience youth without social media
  - Or online games…or cell phones
- Last to use Cassette Tapes, First to use Scour/Napster
  - Don't forget CD clubs!

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A step back in time…

- While players were dying of Dysentery…
  - The core of your network was:

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Traditional Class 4/5 Environment

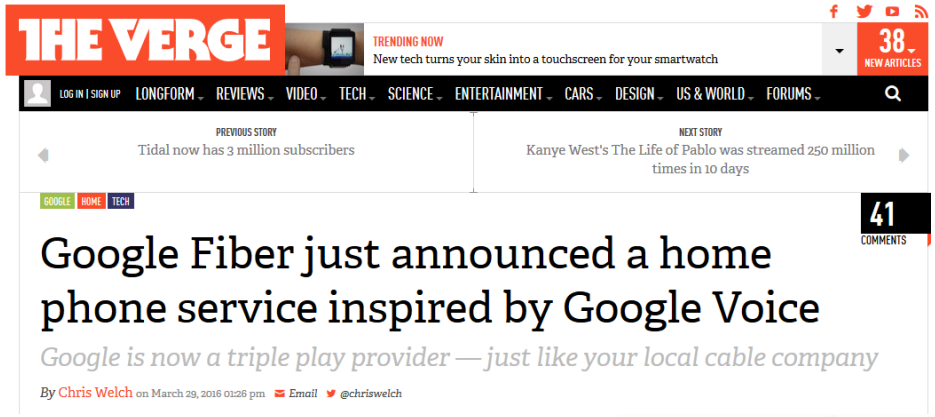
- Capital Expenditures of $1-2M were normal
  - Will anyone buy DSL?
- Change was slow and calculated
- Uptime was high
- Network was Centralized
- Connectivity and Intelligence was concentrated in the Switch
- Lots of floor space was required for “The” Switch
- Every feature was licensed and most individually sold

Brave new VoIP World

- Are expenditures of $500k really necessary?
  - Can we spend this on Fiber Instead?
- Google Announces Fiber in KC and doesn't offer voice!
- Equipment fits in one or two racks
  - All features are included in a few bundles or less
  - Numbering available anywhere, throw-away numbers
- Download an App to provide additional features, Unified Comm's.
- Pace of Change is Fast
- What is the core of the Network?

Enter Google Fiber

- February 10, 2010 – Launched Fiber Internet & TV in KC.
- December 12, 2012 – Announced Fiber was a viable Business Model
- March 29, 2016 – Announced Fiber Phone
- Maybe Voice is still an important product



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Consider the CO Evolution

- Class 5 Switching Capex went from $1-2M to $500k
- Class 5 Switch moved from Core to Application
- Core of the Network is now Transport/Router/Access Pipe
- Device for a network application still takes 50-75% of CO floor space
- FCC Order to facilitate Broadband Only support
- Switching support, Long Distance, Settlements going down or away.
  - Voice lines trending down, Yet Voice is a key Network Application
- Central Office is now a Meet Point & a Data Center

Class 4/5 Solutions for Today

- Shared Switching – with neighboring providers
- Outsource your Switching – to another provider
- Sharing CO Technicians – Outsourcing Operations of your Switching
- Deploy Hosted VoIP & Business Services from a 3rd Party
- Collapse your Voice services into a single switch
  - Sell Voice service to Neighboring providers and customers
- Sell/Fill recovered floor space with servers & new applications

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The Technology Pendulum

- Technology Swings between Centralized to Decentralized Architecture
  - Also Connected vs. Disconnected Architecture
- GR-303/MGCP versus SIP or WebRTC
- Stand Alone Software to Apps & SaaS
- Dedicated devices to Protocol Stacks
- Mainframes to Client/Server
- Client/Server to Cloud Computing
- Cloud Computing to Edge/Fog Computing

The Vital Role of Edge Computing in the Internet of Things

by David Floyer | 20 October 2015 | Analysis, Cloud, Economic Models

Premise - Internet of Things requires Edge and Cloud Computing

There's a new thing called 'fog computing' and no, we're not joking

Julie Bort
May 3, 2016, 8:44 PM 7,714 1

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Cloud, Edge, Fog Computing

- Cloud – Software, Computers, Storage – rented from a Data Center
  - Same Massive Data Centers are shared
- Edge – Decentralization of the Massive Data Centers
  - Brings the data closer to the User/Edge
- Fog – Formerly called Distributed Computing
  - Distributes the Computing, Storage, Control, and Networking anywhere from the Cloud to Things
  - Can Handle the IoT
  - www.openfogconsortium.org

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An Edge/Fog Opportunity

- Providers are Strategically positioned for Edge Data Center Activity
  - Doesn't have to be a Tier 3 or Tier 4 Data Center
- Example:
  - Central Office Re-architected as Data Center (CORD)
  - Project of ON.Lab through ONOS
    - http://onlab.us/
    - http://onosproject.org/
  - AT&T & Verizon are trying this
- Netflix & Google

Challenge:

- Take a quiet stroll through your Central Office
- Challenge:
  - What is this equipment costing me?
  - Is this equipment holding me back, or is it part of my network future?
  - What is my lost opportunity cost?
- Device being paid for may not be sufficient
  - Floor space
  - Power
  - Knowledge Base – Maintenance
  - Lost opportunity cost

Further Challenges:

- Become a Marketing Machine
  - What do your customers want?
  - What do your customers need?
  - What customers can I serve that I don't serve today?
  - What services should I provide that I don't provide today?
- What upgrades must I complete to position for the future?
- What assets do I have, and how can I use them?
- What Partners can I work with?

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Questions?

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