Transition from TDM to All-IP Network

TFI Conference 2014

Presented by:
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January 22, 2014

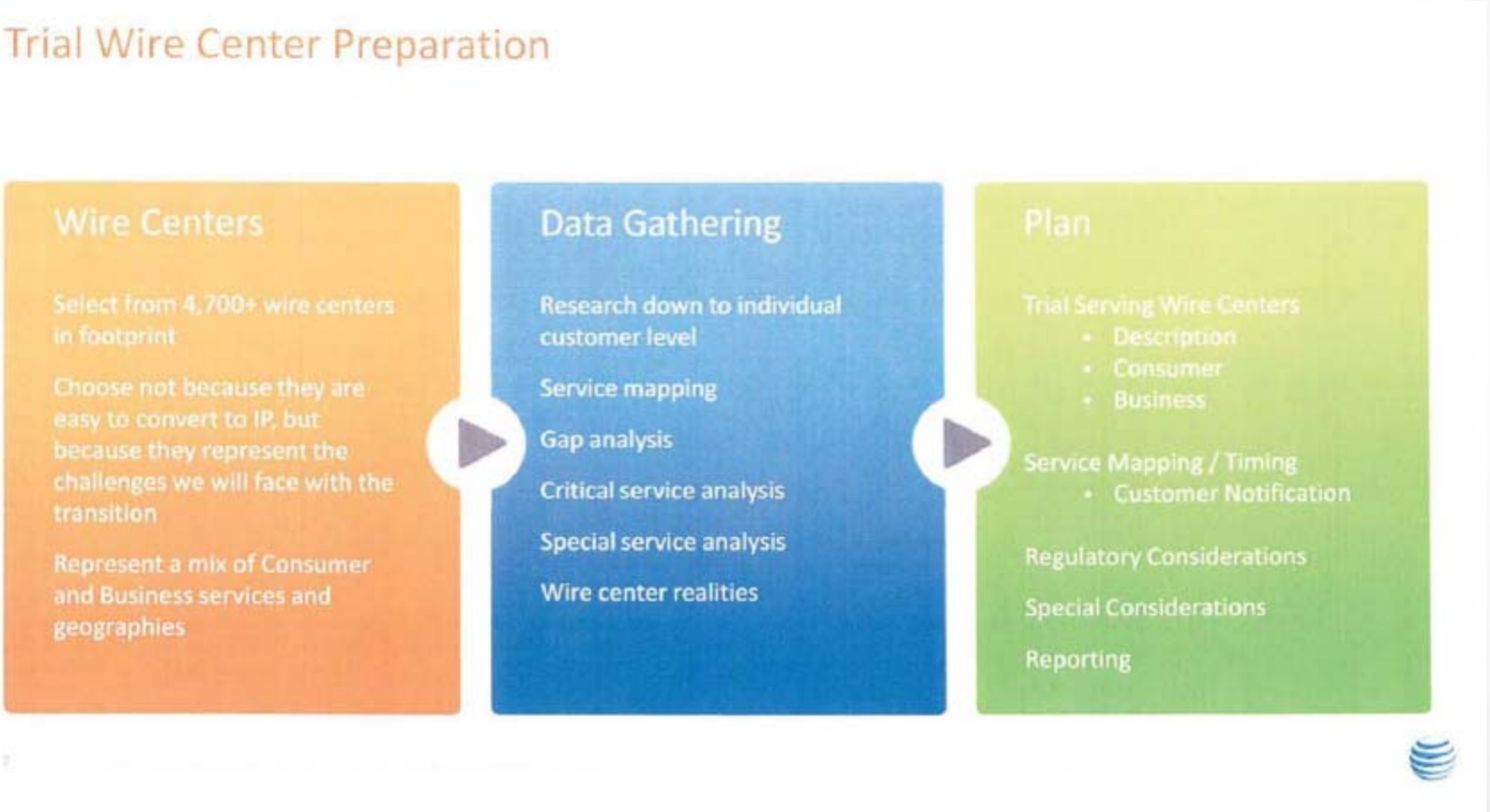
5/10/2013 FCC Public Notice

- Proposed real world trials that will be "helpful to the Commission"
- Goal – "gather a factual record to determine what policies are appropriate to promote investment and innovation while protecting consumers, promoting competition, and ensuring that emerging all-IP networks remain resilient."
- To look at impact of IP transition areas like next-generation 911, transitioning consumers from wireline to wireless services, interconnection of VoIP traffic
- Want details of how trials would work

AT&T Proposal

- 12/19/2013 Meeting with FCC Technology Transition Task Force
- AT&T proposed:
  - Begin testing its TDM-to-IP transition
  - Identify the steps it will take to transition from TDM to IP-based facilities and services
  - Set timeline to make changes throughout its network
  - Service-based experiments; extensive review of the services to be impacted by the transition
    - Mix of residential and business services
    - Experiments will provide reporting to keep the FCC informed

AT&T Proposal



What are the Issues?

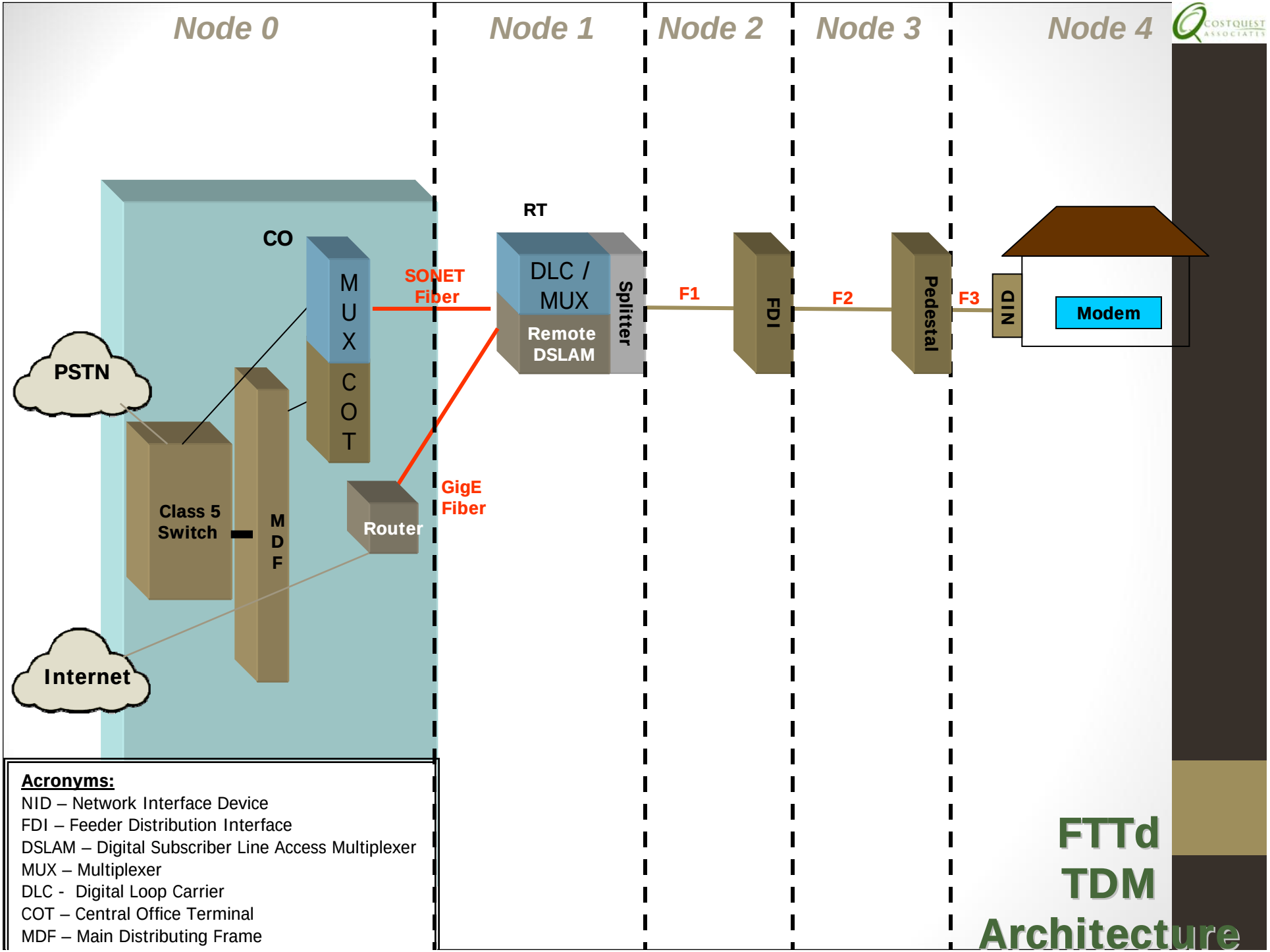
- Provider/Carrier of Last Resort
  - Do IP-based services meet the definition of POLR services in each state?
    - In AT&T states, only KY, LA and SC have POLR requirements
      - LA – only ½ of AT&T wire centers have POLR rqmnts
      - SC – POLR only for existing grandfathered standalone 1FR customers
- E911 issues
- Special Access issues
- Interconnection issues
- Wireless vs Wireline issues (e.g., Fire Island after Sandy)

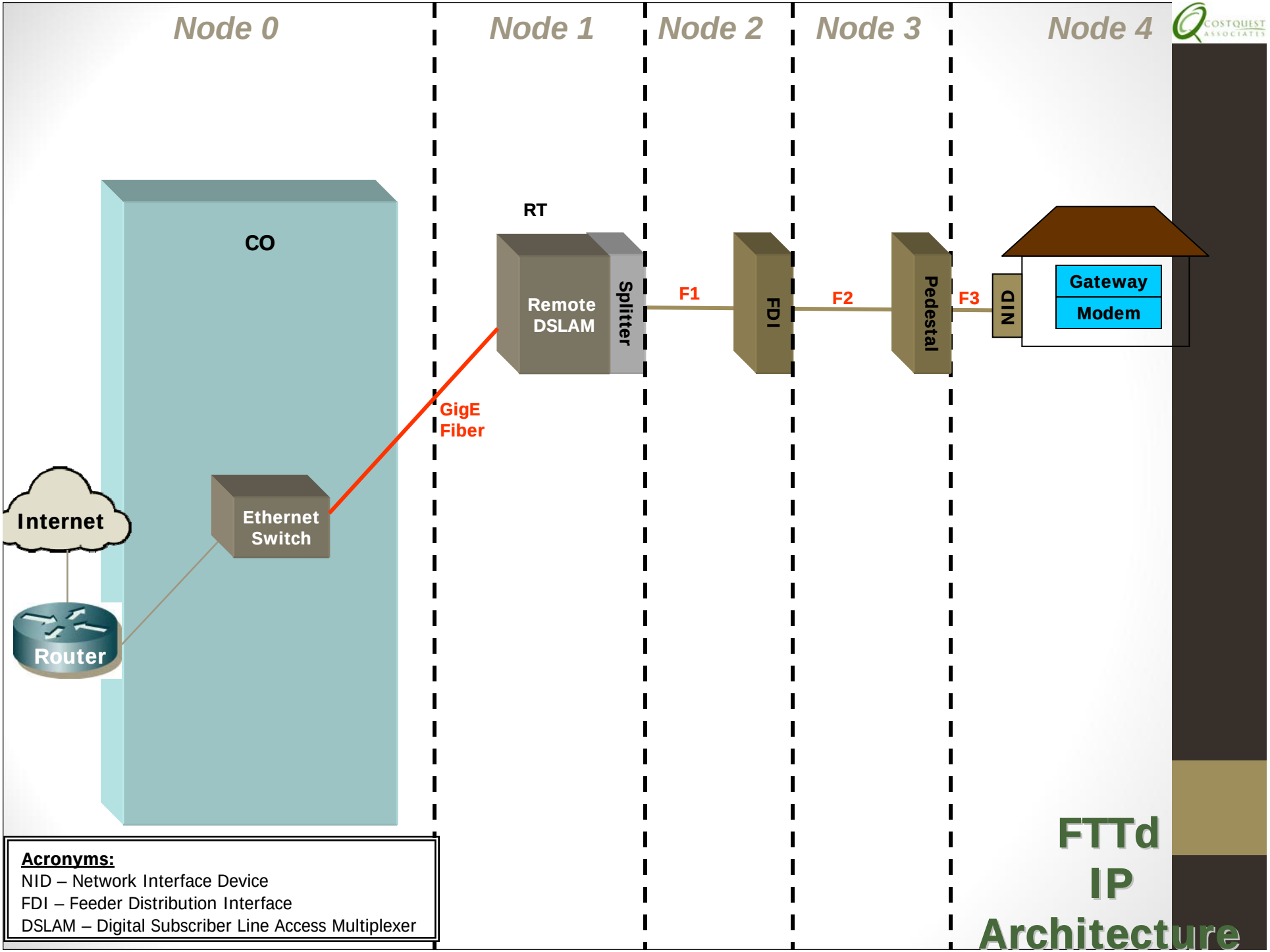
Why is the transition important?

- Current Network –
  - Voice and other TDM-based services – provided via DLC systems, SONET systems, circuit switches
  - Broadband and Video – provided via IP-based DSLAMs, ethernet switches, broadband routers
- All-IP Based Network –
  - All traffic is provided over the same facilities/equipment
  - Voice is treated as a form of data

Why is the transition important? (cont'd)

- Significant future CAPEX and OPEX savings
  - DLC systems no longer needed
  - SONET systems no longer needed
  - Circuit switch(es) in each wire center vs Consolidated IMS switch functionality handling huge sections of the country
  - Savings in Land and Building costs, power costs
  - Savings from billing system simplification
    - Currently more than 50,000 AT&T "services" – Google in KC, 3
  - Savings in personnel cost to maintain two networks


Node 0
Node 1
Node 2
Node 3
Node 4
CO
MUX
COT
SONET Fiber
RT
DLC / MUX
Remote DSLAM
Splitter
F1
FDI
F2
Pedestal
F3
NID
Modem
PSTN
Class 5 Switch
MDF
Router
GigE Fiber
Internet
Acronyms:
NID – Network Interface Device
FDI – Feeder Distribution Interface
DSLAM – Digital Subscriber Line Access Multiplexer
MUX – Multiplexer
DLC - Digital Loop Carrier
COT – Central Office Terminal
MDF – Main Distributing Frame
FTTd
TDM
Architecture


Node 0
Node 1
Node 2
Node 3
Node 4
CO
RT
Remote DSLAM
Splitter
F1
FDI
F2
Pedestal
F3
NID
Gateway
Modem
GigE Fiber
Internet
Ethernet Switch
Router
Acronyms:
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FDI – Feeder Distribution Interface
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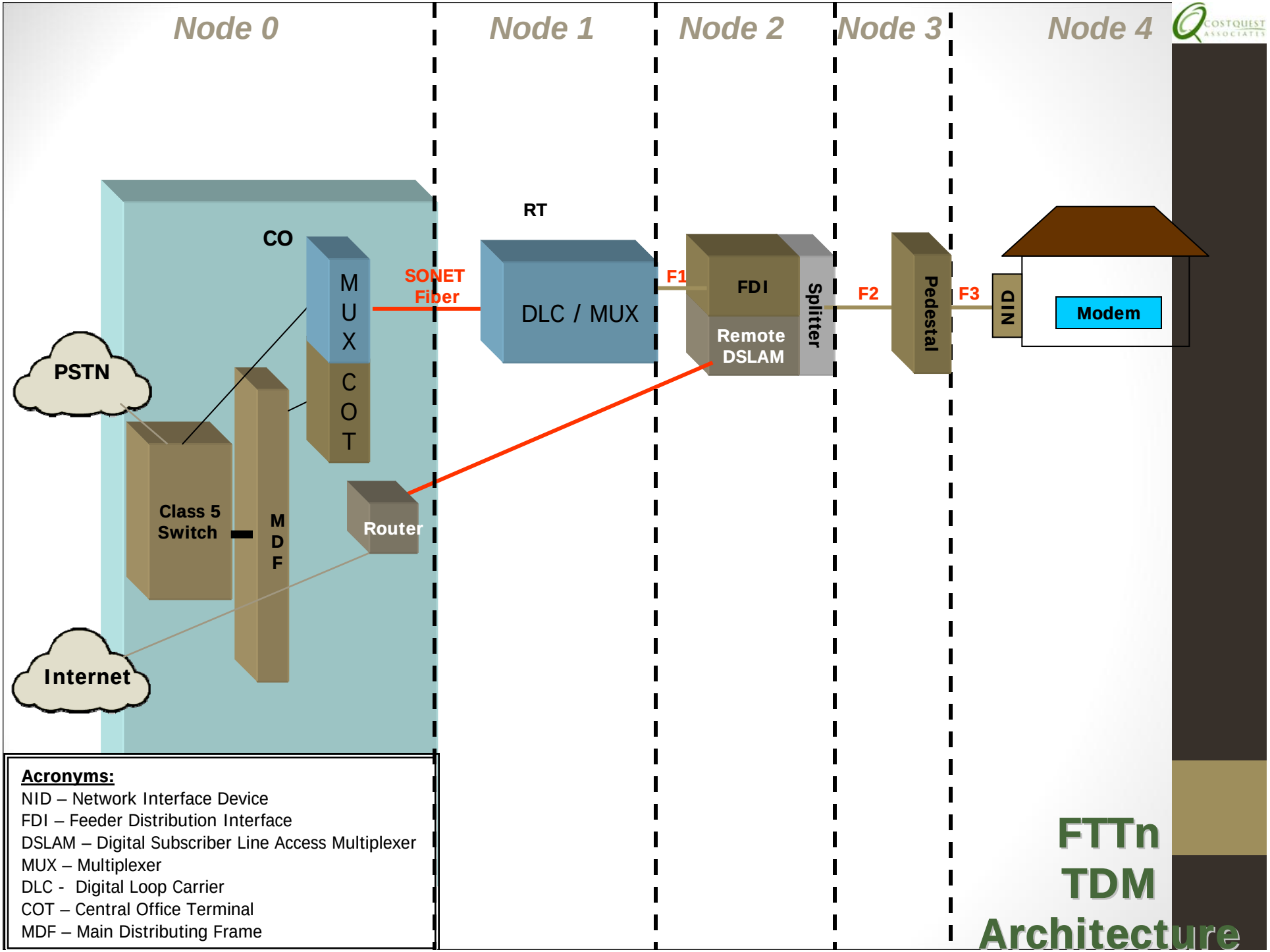
FTTd IP Architecture


Node 0
Node 1
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Node 3
Node 4
CO
MUX
COT
SONET Fiber
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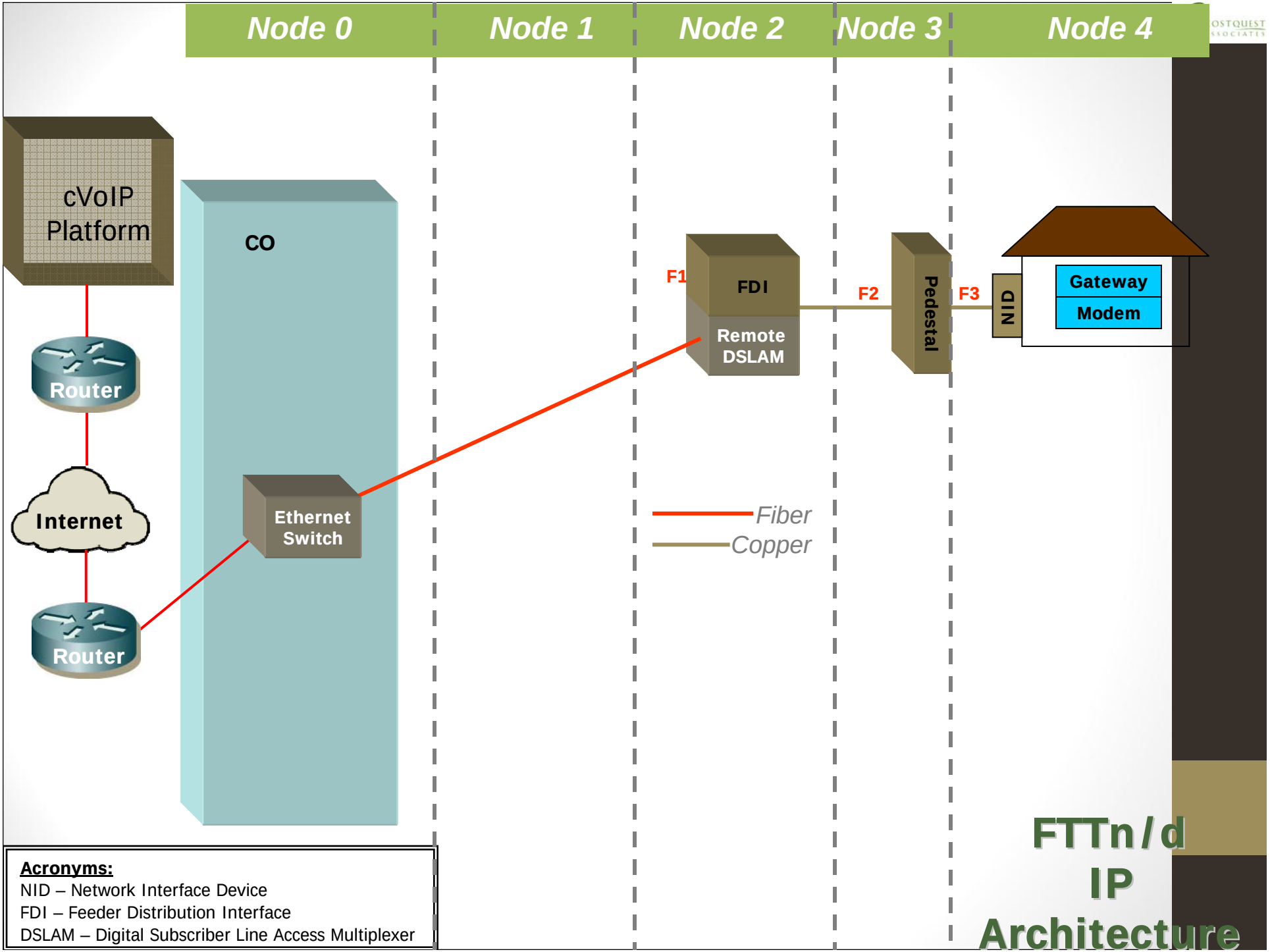
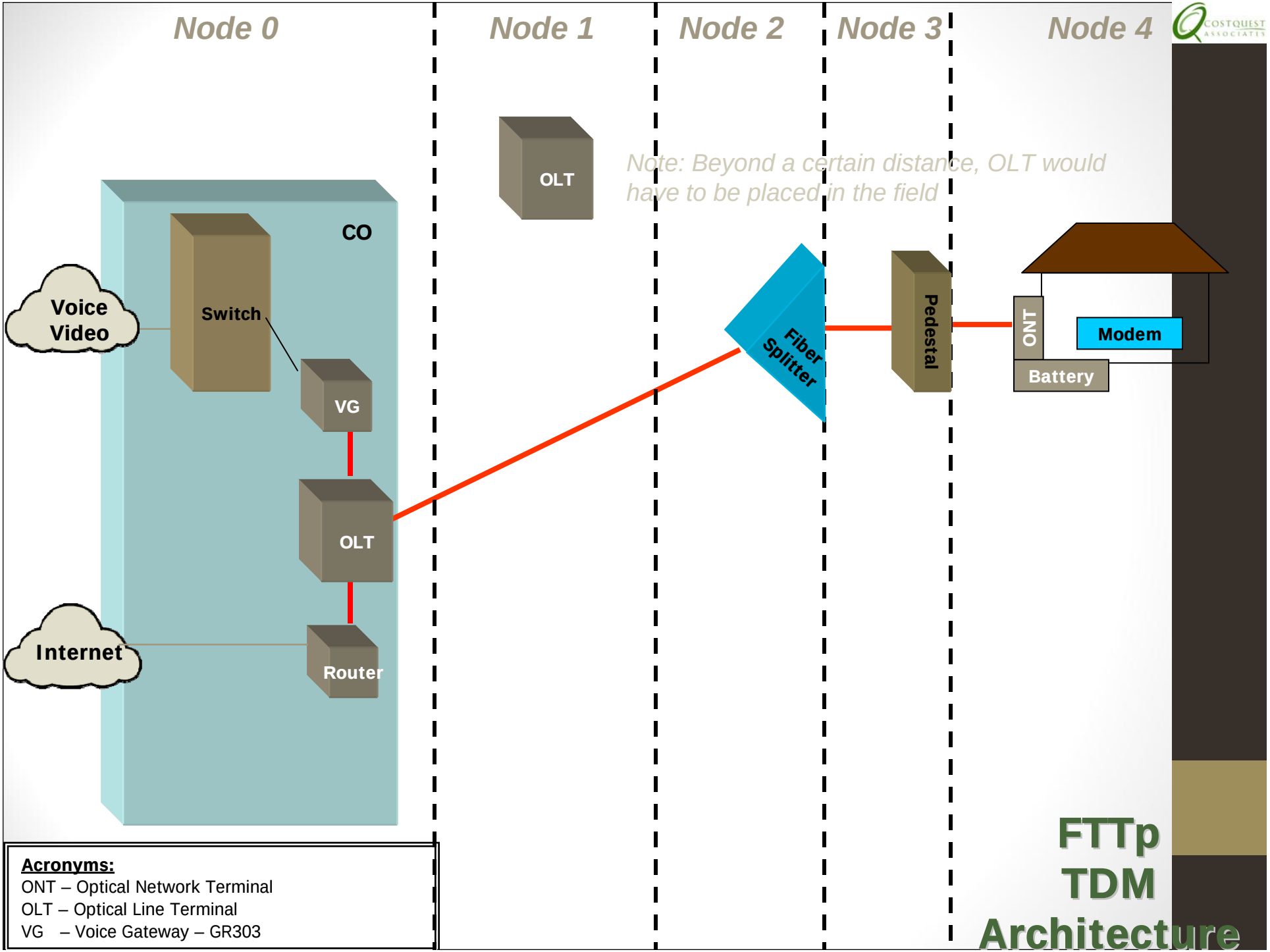
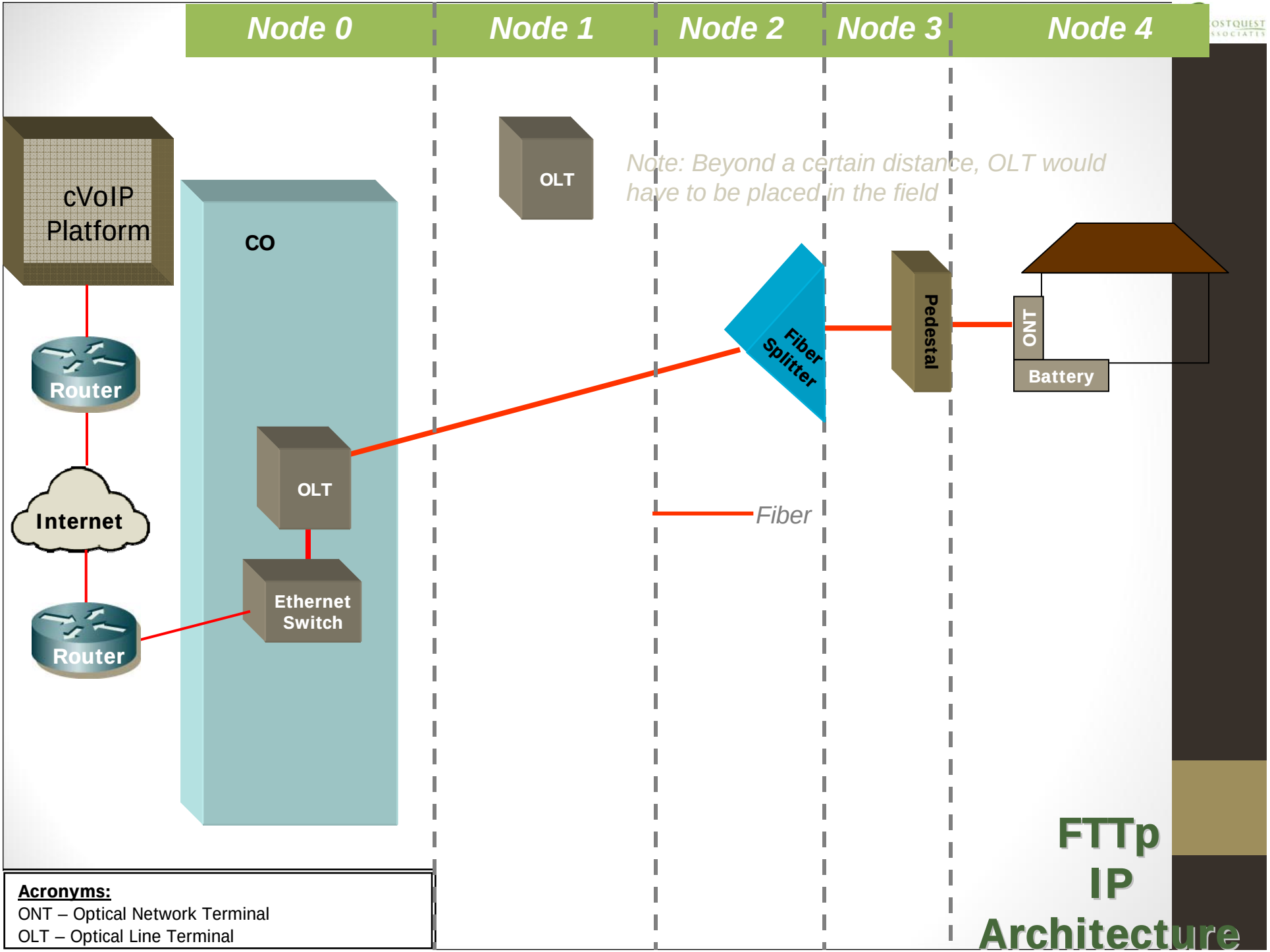
FTTn TDM Architecture


Node 0
Node 1
Node 2
Node 3
Node 4
cVoIP Platform
CO
Router
Internet
Router
Ethernet Switch
F1
FDI
Remote DSLAM
F2
Pedestal
F3
NID
Gateway
Modem
Fiber
Copper
Acronyms:
NID – Network Interface Device
FDI – Feeder Distribution Interface
DSLAM – Digital Subscriber Line Access Multiplexer
FTTn/d IP Architecture


Node 0
Node 1
Node 2
Node 3
Node 4
OLT
Note: Beyond a certain distance, OLT would have to be placed in the field
CO
Voice
Video
Switch
VG
OLT
Internet
Router
Fiber Splitter
Pedestal
ONT
Modem
Battery
Acronyms:
ONT – Optical Network Terminal
OLT – Optical Line Terminal
VG – Voice Gateway – GR303
FTTp
TDM
Architecture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Note: Beyond a certain distance, OLT would have to be placed in the field
Router
Internet
Router
OLT
Ethernet Switch
Fiber Splitter
Pedestal
ONT
Battery
Fiber
Acronyms:
ONT – Optical Network Terminal
OLT – Optical Line Terminal
FTTp IP Architecture

Impact on Property Taxes

- RCN Value should be based on what someone would build today
- No one would build a new network that is a combination of TDM and IP
- RCN based on all-IP is significantly less than an RCN based on a combination of TDM and IP technologies
- Result – existing networks have more obsolescence than ever before

The Cost of Running the Legacy Network and the Outlook for Shutting it Down.

TFI Conference 2014

Presented by:
Charlie Burkhardt, Senior Consultant – CostQuest Associates

January 22, 2014

Focus of AT&T and Verizon

- Wireless
- U-verse & FIOS
- Migrating customers off copper network to U-verse or FOIS
- Moving customers to wireless and shutting down the copper network

Focus of CenturyLink and Frontier

- CenturyLink talks about video services and putting fiber in Omaha and Las Vegas
- Frontier talks about growth in broadband and video and continues to lose customers on it copper network
- Frontier has an agreement with AT&T to purchase their local exchange property in Connecticut

How things of changed for the telephone companies since 1996

- The telephone companies had 100% of the access lines when the 1996 Telecommunication Act passed
  - Their networks were utilized at 75% to 85% with anticipated growth and facilities for maintenance and churn
- Forecast at the time when competition started some were forecasting the telephone companies utilization would level off at around 30% to 35%
- Today, portions of AT&T and Verizon Legacy Copper Networks have utilizations under 30%

Things that are impacting the copper network both positive and negative

- On the positive side, copper plant operates in the case of storms for voice and 911 – unless the lines go down
- On the negative side:
  - Copper networks have limited capabilities for broadband with DSL
  - While Copper can provide video, fiber has to be run close the homes
  - Copper networks are more expensive to operate
    - The FTTH Council estimates that fiber to the premise having an average 20.4 % operating cost savings verses legacy copper network
      - The FTTH Council study shows a range from 16% to 37% savings using fiber to the house
    - Other reports show savings above 60%

Development in Copper Technology

- Can copper be saved?
  - In the labs, new Standard G.Fast with speeds up to 1G for copper wire
    - Earliest Commercial Service will be 2015
    - Works only at short distances, currently 820 feet
  - Issues exist -- cross talk across copper wire bundles and FM radio interference

Examples of the continued decline in use of the copper network

- AT&T in Kansas at the end of 2013 will serve 98% of the population with wireless service that includes voice and internet
  - 38% of Kansas homes no longer have landline services.
- Verizon CFO Fran Shammo indicated less than 1 million consumers left on the copper network in the FIOS footprint at the end of 2013
  - The plan is to move 300,000 customers over to the FIOS network a year with everyone in the FIOS footprint off the copper in 2 ½ years
- Verizon is moving people off the copper network to wireless in Mid Pennsylvania
- Seattle Times reported in July 2013 that 70% of residential customers in AT&T's 22 state area have gone to wireless or internet based voice service
  - Point made - POTS technology is obsolete
- The Federal Center of Disease Control and Prevention indicated in second half of 2012 that 4 out of 10 homes used only wireless phones
- AT&T, in testimony in from of the Energy & commerce Committee of the House of Representatives, state that in their Florida and Michigan wireline footprint only about 15% of homes are still connected to the POTS network

Future of the Copper Network

- AT&T and Verizon Plan to move to an IP Network between 2018 and 2020 and Migrate Customers off the TDM/POTS Network
- Verizon plans to offer Voice Link in rural areas at the same price as voice over copper network
  - Broadband and other services on 4G will be at higher prices
- AT&T plans to move rural customers over to wireless

Regulatory Issues

- What happens when the 100 year legacy copper TDM network safety net gets replaced with IP Networks?
- What happens to Universal Service?
- What happens to the Carrier of Last Resort Regulation?
- How do the regulators guarantee that everyone including the rural areas have access to phone and internet service and at what level of service?

Final Solution to Legacy Copper/TDM Network

- Should AT&T, Verizon and other telcos be allowed to move customers off legacy copper/TDM networks to IP, fiber, wireless or other providers such as cable , satellite or other fixed wireless providers
- Should telcos be required to sell their legacy copper exchanges to other parties that want to operate those networks
  - Alternatively, could rural telephone coops be set up to operate the legacy copper networks
- Questions:
  - When should legacy copper networks be shut down?
  - Is there a time when so few customers are left and the cost so high that a legacy copper network should be abandoned?