Welcome To
The Inaugural CORD Summit

CORD
Central Office Re-architected as a Datacenter

Exciting Developments

ON.Lab & Linux Foundation launch CORD as an open source project

ONOS & CORD announce new partners: Google, Radisys, Samsung

(Existing partners: AT&T, China Unicom, NTT Comm, SK Telecom, Verizon and Ciena, Cisco, Ericsson*, Fujitsu, Huawei*, Intel, NEC, Nokia)

CORD project announces availability of the first open source distribution

The first CORD Summit

* Only ONOS Partners

Growing Collaborator Community

More in pipeline …

CORD™ (Central Office Re-architected as a Datacenter): A Quick Overview

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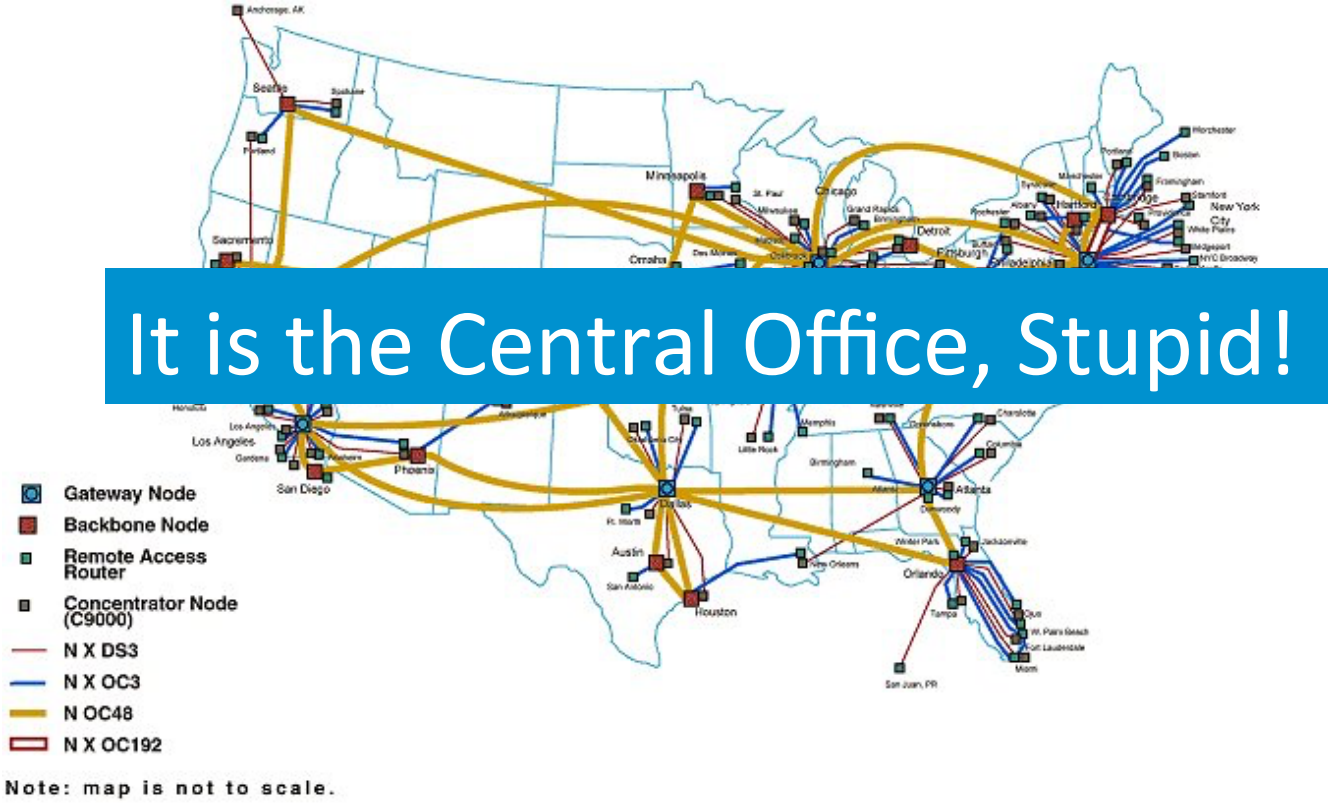
CORD
Central Office Re-architected as a Datacenter

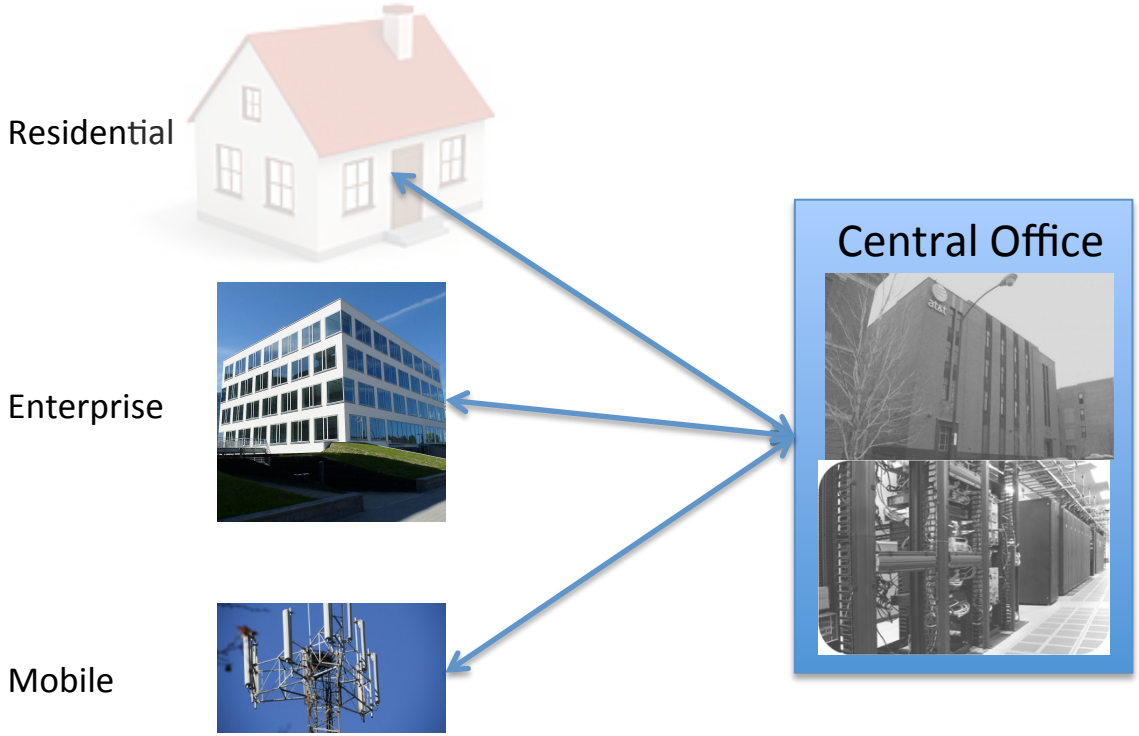
Service Provider Infrastructure



It is the Central Office, Stupid!

Image Source: https://www.telarus.com/uploads/files/795/xlarge/att-network-map.jpg

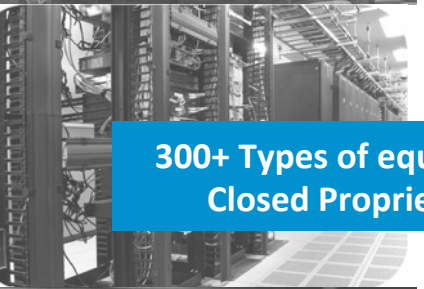
Central Office – The Most Important Infrastructure for Service Providers



- CO is a service provider's "gateway" to its customers
- There are 1000s of COs
- One central office (CO) may support
  - 10K+ residential subscribers
  - 10K+ mobile subscribers
  - 1K+ enterprise customers
- CO represents a great vantage point for a service provider
  - Enable new services to customers

[1]Central Office can be small or large and has different names in different contexts.

What is wrong with a Central Office?



300+ Types of equipment
Closed Proprietary

It is source of high capex and opex.

Its lack of programmability inhibits innovation.

It limits ability to create new services and new revenues.

CORD Mission: Deliver to Service Providers

Economies of a datacenter

Infrastructure built with a few commodity building blocks using open source software and white boxes

Agility of a cloud provider

Software platforms that enable rapid creation of new services

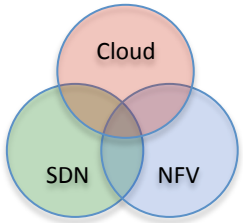
With an open CORD reference implementation

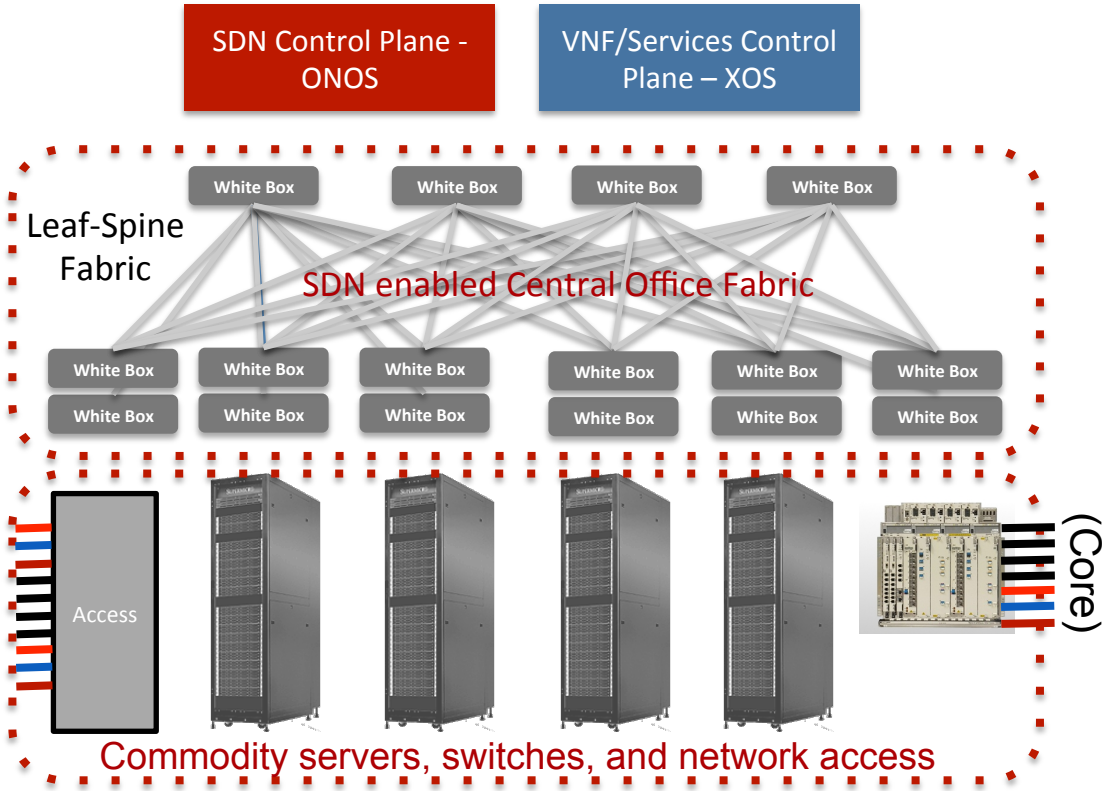
CORD High Level Architecture

Large number of COs

Evolved over 40-50 years

300+ Types of equipment
Huge source of CAPEX/OPEX





Domains of Use: Residential, Mobile, Enterprise

Field Trial

Residential
vOLT, vSG, vRouter, vCDN

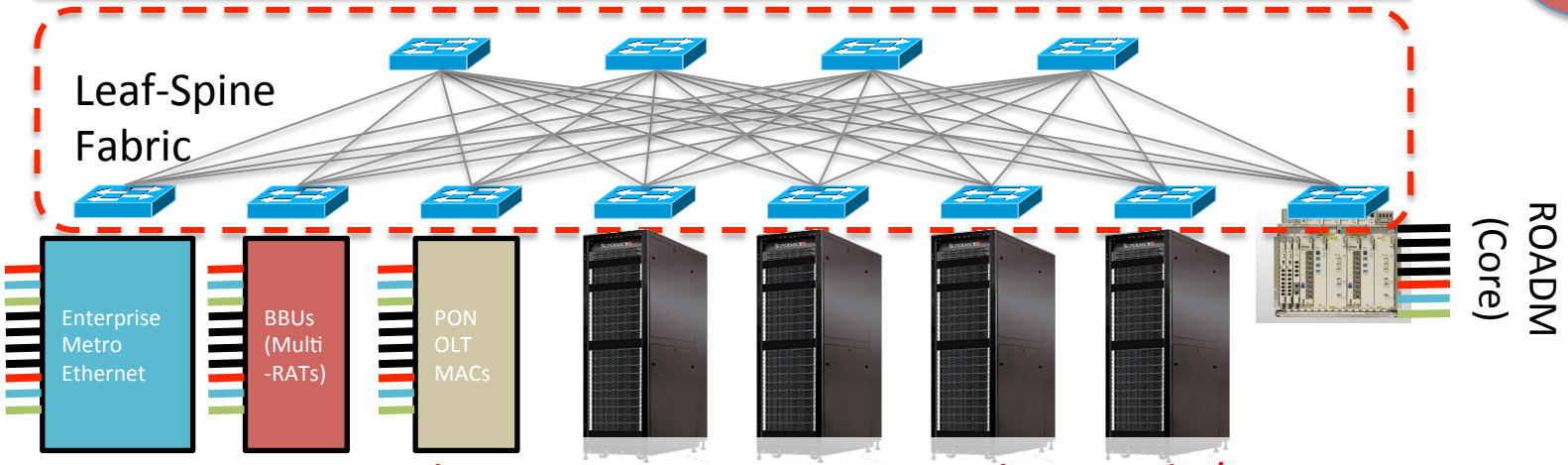
Mobile
Enable 5G w/ Disaggregated/ Virtualized RAN & EPC, Mobile Edge

Enterprise
SDN-WAN with programmability, packet-optical

POC at ONS

POC at ONS

ONOS + Trellis+ XOS + OpenStack/Docker



Commodity Servers, Storage, Switches, and I/O

Service Provider Interest: Across the Globe

Service Provider	Interest
AT&T	CORD + R-CORD + M-CORD
Bell Canada	R-CORD
China Unicom	E-CORD, M-CORD
China Mobile	R-CORD
NTT Comm	E-CORD
NTT East	R-CORD
SK Telecom	M-CORD
Windstream	CORD
Verizon	M-CORD (R-CORD?)

DT, TIM, Orange, Telefonica, EE/BT, Vodafone

ONOS use cases and [R,E,M]CORD

CORD: An Open Reference Implementation

Hardware Blueprint ← **CORD POD** → **Open Source Software**

Bill of Materials
- OCP Servers
- OCP Switches
- Access Devices

Assembly Instructions
- …

Testing Infrastructure
- …

*An open **service delivery platform** that provides cloud economies and agility.*

From FTTH-as-a-Service to Software-as-a-Service.

Core Components
- OpenStack
- ONOS
- XOS
- OCP

Domain Services
- R-CORD: vOLT, vSG, vRouter, …
- E-CORD: vCE, vOAM, vFirewall,
- M-CORD: vBBU, vSGW, vPGW,

Other Services
- Monitoring

Many configurations of CORD possible for different contexts for different operators

Ciena and Radisys to provide "turn-key CORD PODs"

CORD Differentiators and Value Prop

- **Unique and strong partnership**
  - ON.Lab + Providers + Vendors + a growing collaborating community
- **Integrated solutions platform for “service” delivery**
  - A complete platform ready for trials and deployments
- **A common platform for three critical and huge domains of use**
  - Residential, enterprise and mobile
- **Leverages merchant silicon and white boxes**
  - Not only for servers and switches but also for access (GPON, LTE/cellular, …)
- **Built with best in class open source platforms**
  - ONOS, Trellis, XOS, Docker, OpenStack, …

Future of CORD
With Participation of the Community

- **CORD Platform**
  - Strengthen the architecture; add features and functions
  - Enable different pod configurations for different providers and different contexts
  - Get it production ready
- **Domains of Use:** Residential, Mobile and Enterprise
  - Get production ready “access racks” with merchant silicon/white boxes
  - Enable rich set of services: right balance of open source and closed source
- **Community**
  - Nurture a vibrant developer and user community and grow the ecosystem
- **What matters** – bring value to providers with production deployments
  - Move CORD from POCs to Lab Trials to Field Trials to Deployments

CORD Summit: Agenda Highlights

- Keynotes
  - Google, AT&T, China Unicom: Service provider perspective on CORD
  - Linux Foundation: CORD as an open source project
- CORD overview
  - Core platform
  - Domains of use: Residential, Mobile, and Enterprise
- CORD First Open Source Distribution
  - How to use it and build on it
- Breakouts
  - Platform, R-CORD, E-CORD, M-CORD: roadmaps and community input
  - Community: how to participate and contribute

Get the community ready to accelerate development and deployment of CORD

Thank You!

CORD as an Integrated Solutions Platform

Closed Proprietary

1. Disaggregation
2. Softwarization
3. Open Source

High capex/opex
Lack of automation
Lack of customization
Difficult to innovate

OSM Open O

OPNFV

OpenStack OPEN DAYLIGHT onos Open Network Operating System

ONIE, ONL, FBOSS,
OVS, OF-DPA, P4, ..

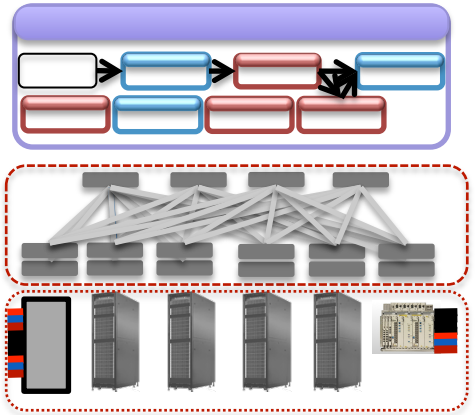
OPEN Compute Project

Difficult to consume disaggregated components

Vendors still selling proprietary solutions with legacy boxes

Integrated Solutions Platform

CORD



With scalability, performance, HA, ease of use & deployment

Capex/opex efficiencies
Automation/customization
Service innovation

CORD as a Solutions Platform for Service Delivery

CORD/XOS uses Everything-as-a-Service Paradigm (similar to Micro-services) that makes it much easier to

- Turn “a function” (cloud or network) into a service
- Create a service with scalability and high availability
- Impose security policies on a collection of trusted/untrusted functions/services
- Manage the life cycle of a service
- Plug a service into another one or into a larger service graph
- Implement the service on various targets: hardware, container, VM, …

It is of great value to providers as they want to create and manage services and good for developers as they want to write code and turn it into services

Unique and Strong Partnership

- ON.Lab
  - Vendor and provider neutral
  - Provides architecture shepherding and core engineering

  Critical for successful open source projects
- Service providers as partners
  - AT&T, China Unicom, **Google**, NTT Comm, SK Telecom, Verizon
  - Combination of OTT and traditional service providers
  - Wired and mobile from key geographies
- Leading vendors
  - Ciena, Cisco, Fujitsu, Intel, NEC, Nokia, **Radisys**, and **Samsung**
  - A few motivated to try new business models: system integrator with Open Source & white boxes

Partnership with Key Industry Organizations