CORD Roadmap

– Release Management –

CORD
Central Office Re-architected as a Datacenter

#OpenCORD

Reference Implementation

When is the reference implementation released?

- Four-month cadence: January / May / September
- Mid-cycle support branches (e.g., 3.0.1)
- Mid-cycle services branches (e.g., 4.1)

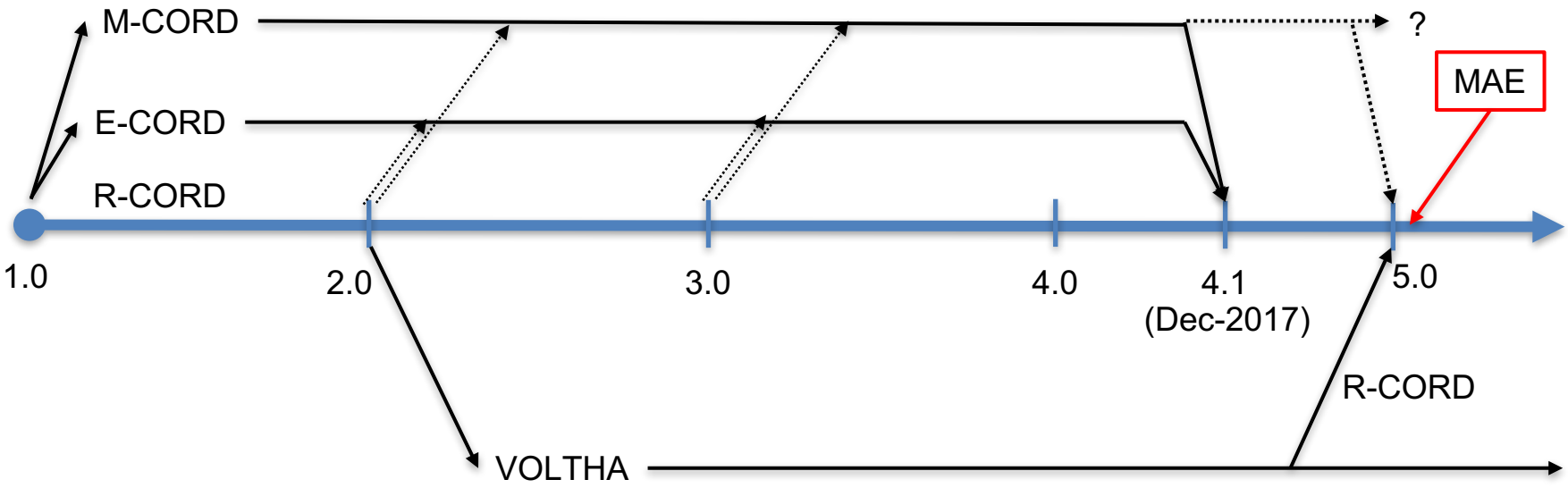
What's officially included in each release?

- Platform: XOS, Build System, ONOS (Fabric, VTN), OpenStack
- Set of Service Profiles: R-CORD (only solution included through 4.0)

Moving towards a "CORD Distribution" Model

- 5.0 will be the 5th release of the distribution
- Components will be versioned independently

Short-Term Release Plan



Priorities Going Forward

CORD 4.0 stabilized service developer interfaces

Next → Build out CORD's service portfolio

- Upgrade all current R/E/M-CORD services to the 4.0 API
- Integrate latest access peripherals – VOLTHA and xRAN
- Expand service portfolio to include micro-services – Kubernetes
- On-Board other VNFs into CORD – ONAP
- Streamline service on-boarding based on experience

Priorities Going Forward

CORD 4.0 refactored build system to improve developer workflow

Next → Exploit flexibility to improve operator workflow

- Automate the build-and-install process for physical PODs, including discovery and configuration of the POD switching fabric
- Make it easy to specify (and change) service profiles independent from configuring the underlying platform
- Improve lifecycle management capabilities to include in-service-software-upgrade of the CORD control plane
- Demonstrate how CORD can leverage available infrastructure rather than require that a POD be build on top of bare metal

Near-Term Drivers (Deliverables)

Multi-Access Edge Cloud

- R/E/M-CORD Services running on the same platform
- Includes VOLTHA and xRAN access peripherals

Managed White-Box OLT

- Includes VOLTHA
- Light-and-Right R-CORD (Kubernetes-based)
- Includes OSAM (Open Source Access Manager)

Integrate CORD and ONAP

- Use Case 1: OSAM
- Use Case 2: E-CORD / MSO
- Use Case 3: A-CORD / DCAE

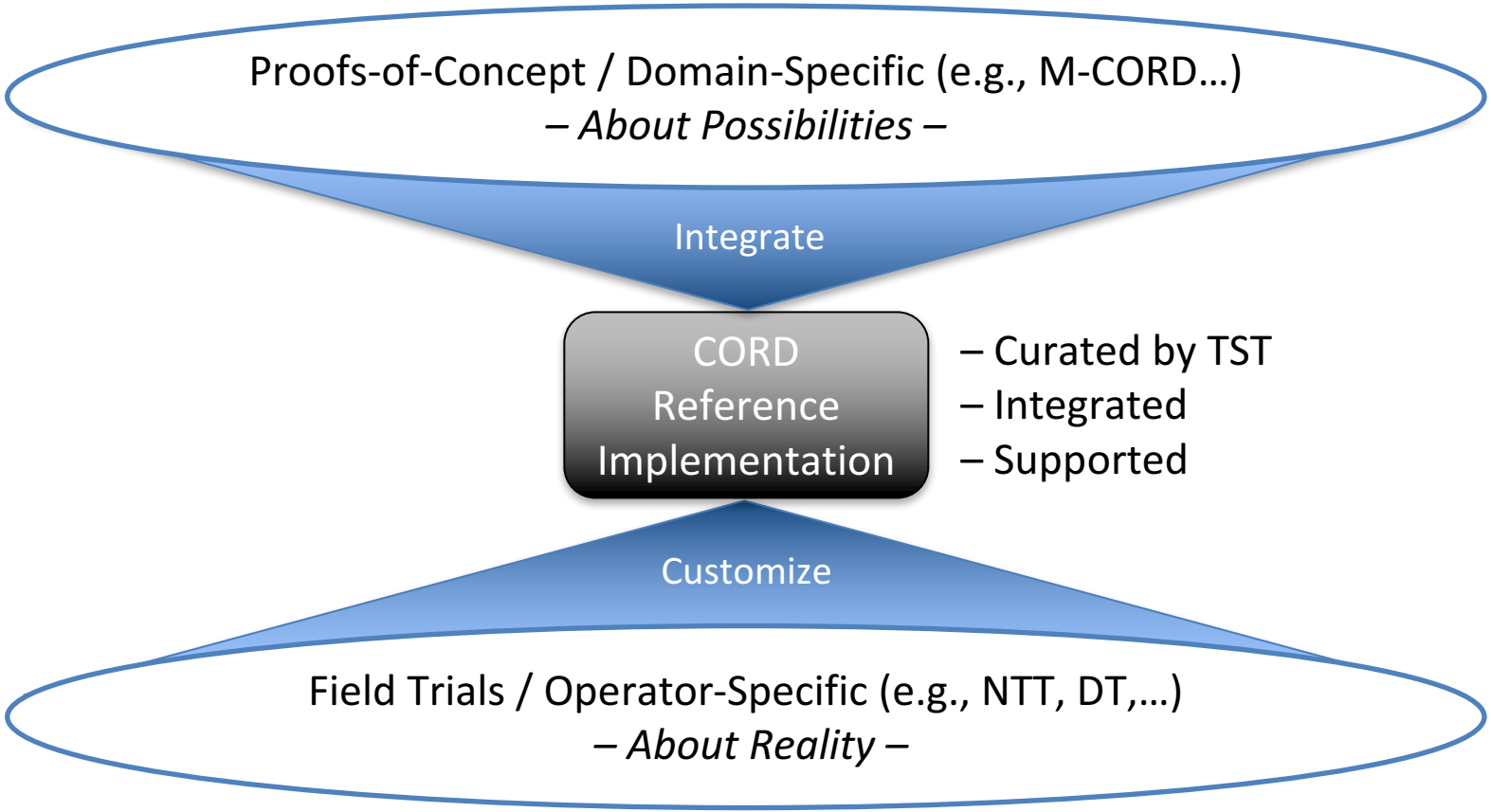
From PoC to Trial

Proofs-of-Concept

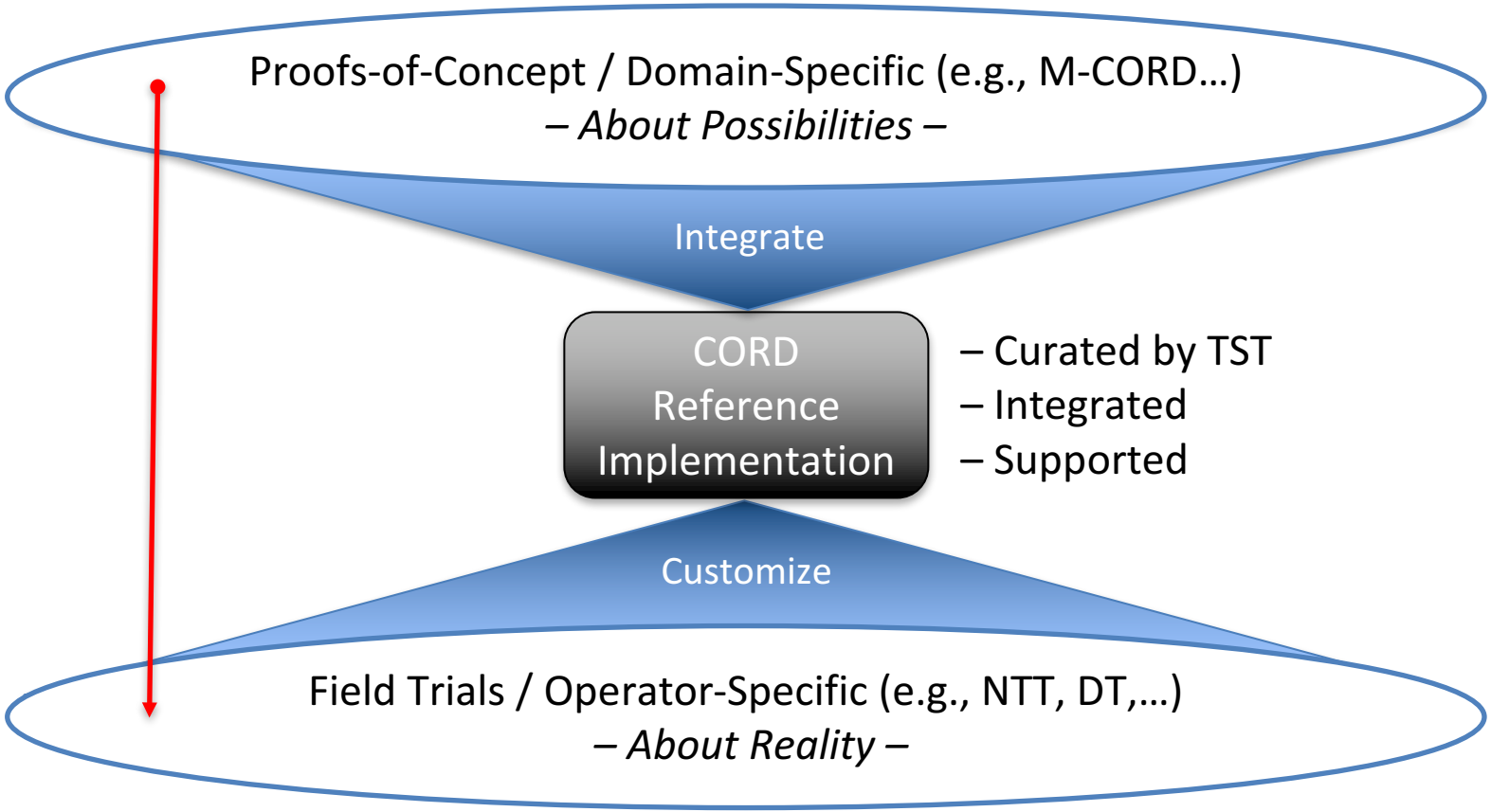
?

Field Trials

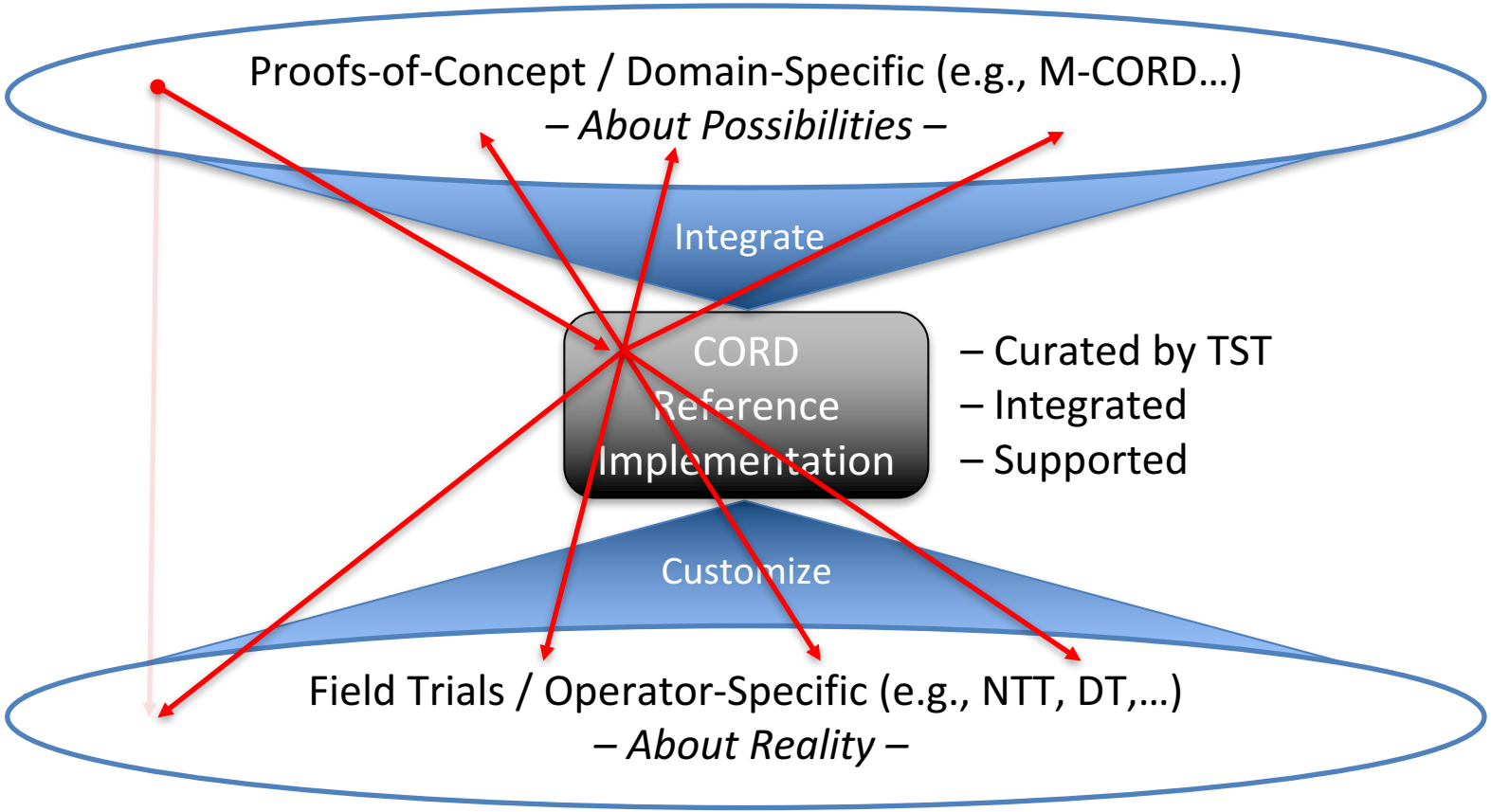
From PoC to Trial



From PoC to Trial



From PoC to Trial



Build System Roadmap

Improved Development Workflow

- Easier debugging → ElasticStack & structured logging
- Easier to develop use cases → Decouple profiles from platform

Improved Operator Workflow

- Fast, foolproof install process
  - Install all containers from Docker Hub onto K8S
  - Install a generic CORD system, use dynamic service onboarding
- Modular, flexible CORD
  - Use existing infrastructure (e.g., OpenStack, provisioned nodes)
  - Exchange pieces of the system (e.g., K8S for OpenStack)
- Discover and configure the fabric
  - PoC script to bootstrap the fabric at install time (QA)
  - Fabric configuration based on XOS models
- Support DB migration

Container Orchestration Roadmap

Deploy CORD platform components using k8s

- OpenStack
- XOS
- ONOS/ONOS Apps

Support Container-based VNFs using k8s

- Common overlay network between OpenStack VMs and Docker Containers
- Hybrid VM-Container service platform

Demonstrate Light-and-Right CORD configuration

- Run a configuration with k8s but no OpenStack

XOS Roadmap

Improved Support for Developers

- Static Checker for services and manifests
- Simple Synchronizer template, with most code auto-generated
- Unit test framework for new Model Policies & Sync Steps
- Dynamic service on-boarding
- Improved Synchronizer performance
- Improved performance from XOS core API
- Auto-generated test coverage to include end-to-end tests

XOS Roadmap

Improved Support for Deployment Engineers

- Better contextual tracing and debugging support
- Better upgrade support, including automatic DB migration
- Dynamic service on-boarding
- Model Policy framework that is free of race conditions
- Enforce Interface models between Service Instances
- Cleaner visualization of the service graph
    - Hide platform level service
    - Filter by subscriber
    - Display synchronization status

Trellis Roadmap

Dual-homing (released 1.11.1) fixes for known issues

Pseudo-wire support

Initial QoS support (supporting network slicing)

IPv6 additional features

- DHCPv6 relay additional features (contributed by Nokia)
- IPv6 Multicast (contributed by Nokia)
- V6 Router Advertisement app (contributed by Infosys)

Support for New ASICs & Bare-metal switches

- Broadcom Qumran (QMX)
- Cavium Xpliant
- Quanta switches (QCT LY8)
- Barefoot Tofino using P4 (not in 1.12 release)

QA Roadmap

Expand test coverage to include M-CORD and E-CORD

Extend automated tests to more fully exercise the platform

- Functional regression tests – Black box tests to make sure base components have not regressed
- End to end CI/CD tests – To make sure a system can be built from scratch, deployed, and can pass a baseline of tests for both control and for traffic.
- Performance tests – So can track performance over time
  - Build out performance automation framework
  - Populate framework with a few baseline performance tests

R-CORD Roadmap

Integrate VOLTHA into R-CORD

Continue to improve white-box EdgeCore OLT adapter functionality in VOLTHA

Explore offloading of some VNFs into hardware

- Fast-path where traffic remains in the hardware, only go out to VNF services when you need them
- Leverage P4-compatible hardware that is now available
- E.g. QoS done in switches rather than vSG

Work towards multi-access edge: combined deployments of R-CORD and M-CORD

E-CORD Roadmap

Services, Services, Services

- E.g., firewall, WAN accelerator, encryption, ...
- Open and closed source versions

ONAP Integration

- Replace Global XOS with ONAP

Multi-Access CORD

- {R,E,M}-CORD service chains co-existing in the same pod

Device Integration

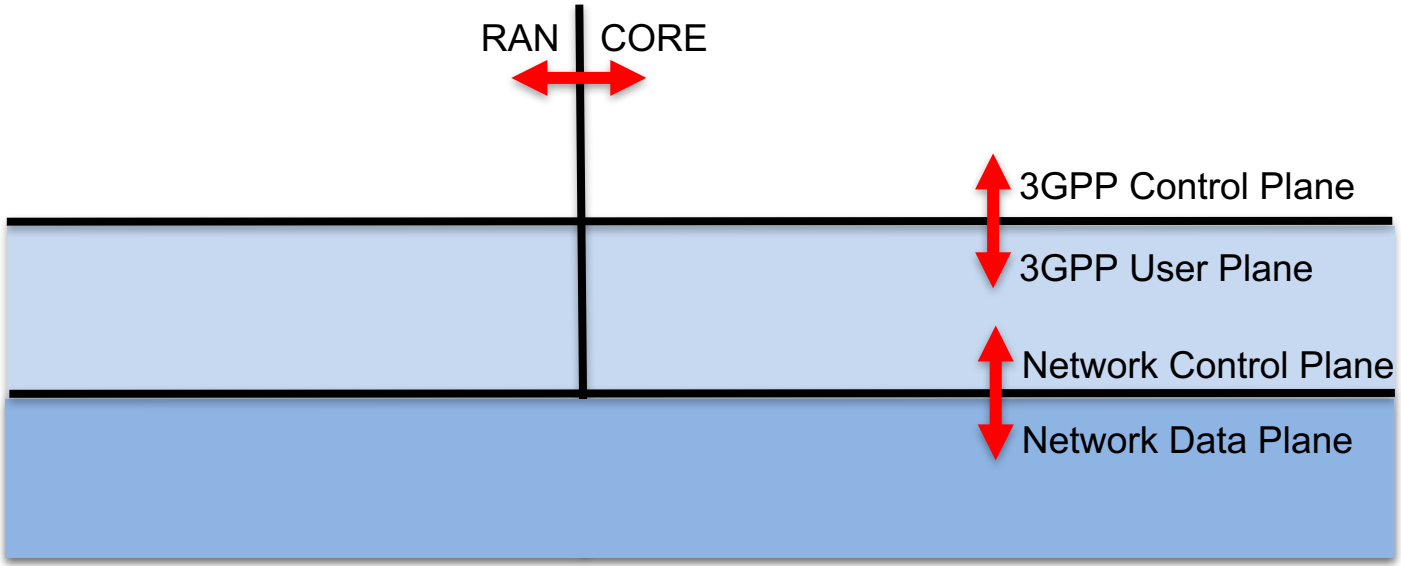
- CPE
- Ethernet Edge

M-CORD Roadmap

Integrate xRAN enhancements into the CORD Platform

Expand open source availability of NGIC

Continued SDN'ization and Disaggregation of 3GPP



A-CORD Roadmap

Upgrade all current A-CORD services to the CORD 4.1 release

Integrate P4 INT enabled Trellis to A-CORD

Integrate A-CORD and ONAP DCAE including VNF onboarding alignments

Move from unstructured to structured telemetry data combining data models from OpenConfig, VES and ETSI

Create an hierarchical multi-collector architecture with dynamic collector and probe instantiations

Create a programmable SD Collector architecture along with SD-Collector development guidelines and SD Collector SDKs.

Create vProbe development guidelines and vProbe SDKs