WIND RIVER STUDIO

윈드리버의 클라우드 플랫폼은 어떻게 5G O-RAN (O-CLOUD)의 대세가 되었나

***O-CLOUD : O-RAN 아키텍쳐 중 가상화 또는 컨테이너를 지원하는 레이어**

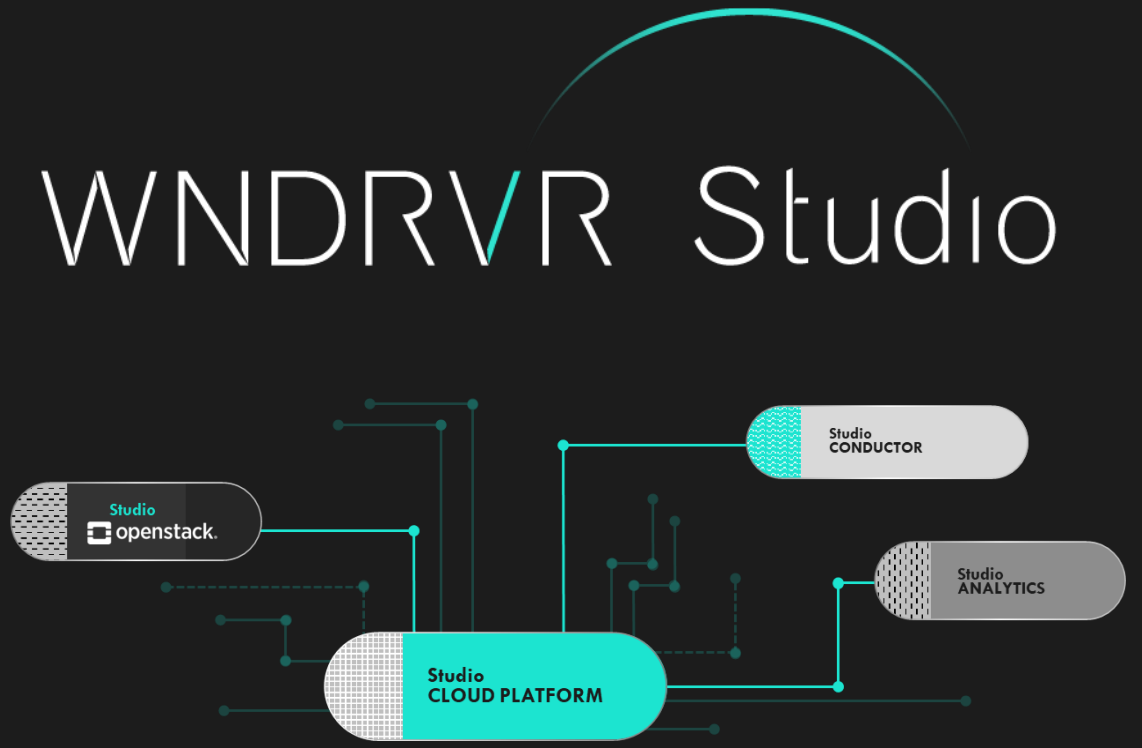
Wind River Korea
기술 담당 한상호 매니저

David.Han@windriver.com

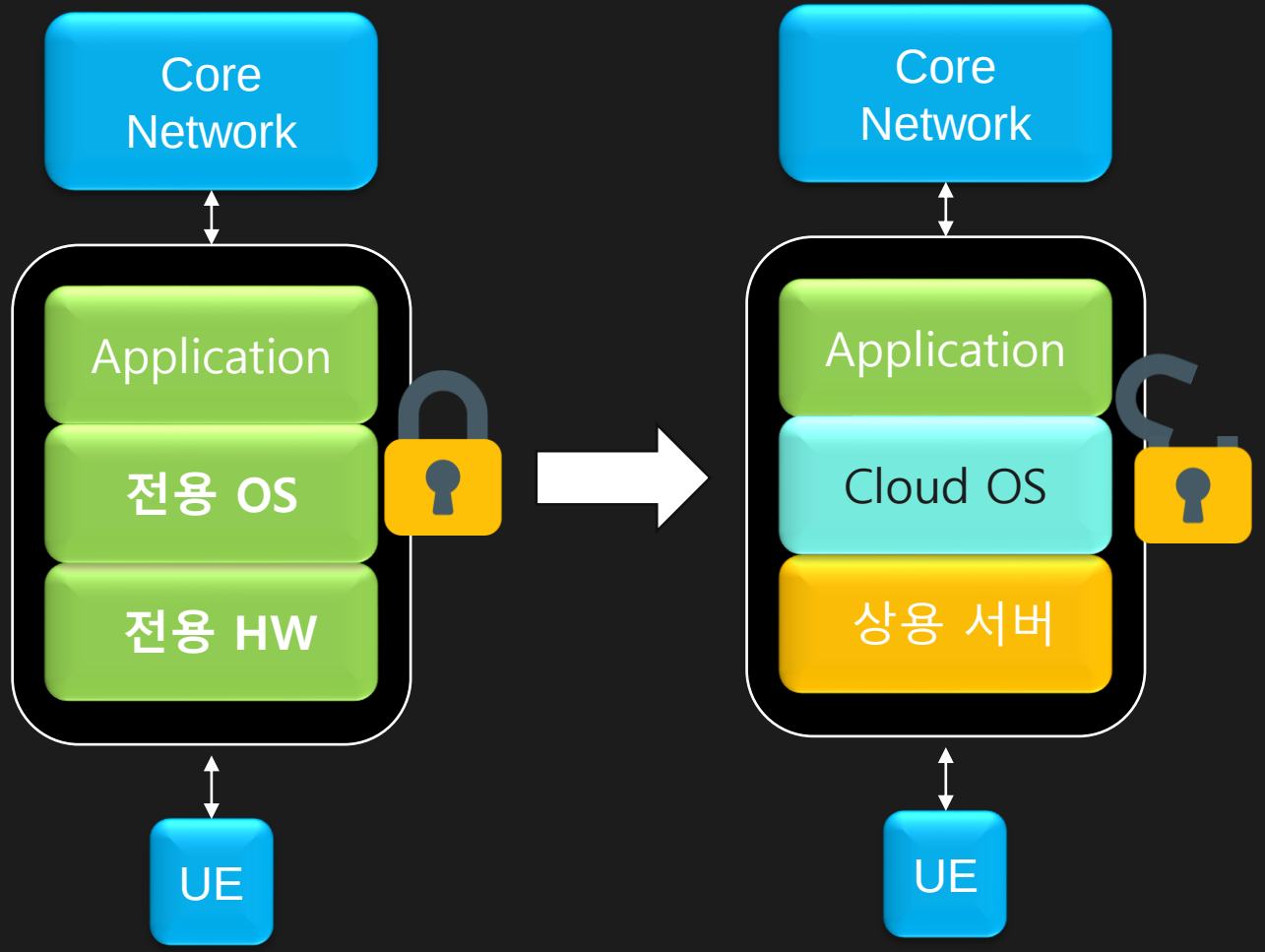
WNDRVR

아젠다

- O-RAN 란?
- WIND RIVER 5G O-CLOUD 성공 사례
- 어떻게 5G O-RAN (O-CLOUD)의 대세가 되었나
- Wind River Cloud Platform
- O-CLOUD 대세가 된 기술적 이유



O-RAN(Open-Radio Access Network) 란?



Traditional RAN

- 전용 H/W와 S/W
- 제조사가 모두 공급
- 새로운 기능 추가의 어려움
- Vendor lock-in

O-RAN ALLIANCE's mission is to re-shape the RAN industry towards more intelligent, open, virtualized and fully interoperable mobile networks.

Open RAN

- H/W와 S/W를 분리
- O-Cloud Layer
- 인터페이스 오픈
- 완벽하게 오픈된 구조
- 쉽게 새로운 App 추가

WIND RIVER 5G O-CLOUD 성공 사례

Verizon Needed a Software-Defined Interoperable Cloud-Native Infrastructure for Its 5G Computing Demands

Wind River created a solution to help virtualize the edge network by moving to a cloud-native, container-based virtualized architecture with standardized interfaces that lead to greater flexibility, faster delivery of services, greater scalability, and improved cost efficiency

» PREVIOUSLY:

- x **Tightly integrated hardware & software (CLOSED)**
- x **Vendor lock-in**
- x **Deployment of new services in months / years**
- x **Inflexible to new use cases**

» WIND RIVER SOLUTION:

- ✓ **Software-defined, runs on standard servers (OPEN)**
- ✓ **Interoperable, cloud-native**
- ✓ **Deployment of new services in hours / days**
- ✓ **Configurable: opportunity for new revenue streams**

5G vRAN: Verizon completed the first end-to-end fully virtualized 5G data session in the world to rapidly respond to customers' varied latency and computing needs by providing the foundation for wide-scale mobile edge computing and network slicing

"Virtualizing the entire network from the core to the edge has been a massive, multi-year redesign effort of our network architecture that simplifies and modernizes our entire network"

Adam Koeppe, SVP of Technology and Planning for Verizon

verizon✓

WIND RIVER 5G O-CLOUD 성공 사례

verizon

2020 ~ 2022 DEPLOYED

vodafone

2021 SELECTED

Tomorrow, Together
KDDI

2021 SELECTED

YOUR CHALLENGE:

The scale, density, and complexity of 5G RAN

5G networks require more RAN nodes than previous generations, presenting new challenges.

Total cost of ownership

With **thousands** or **tens of thousands** of nodes needed, maintenance and power costs rise exponentially

Coverage efficiency

5G operators need to deliver **maximum coverage** with the **fewest possible** hardware resources

Manageability

Operators need **automation and orchestration features** to manage the extensive scale of a distributed cloud deployment

WNDRVR

어떻게 5G O-RAN (O-CLOUD)의 대세가 되었나

Capture your share of the 5G opportunity with our integrated solution

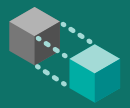
Technology Differentiators

- **Distributed Cloud**
- **Scalable – up to 1000 sub-clouds** per controller.
- Complete solution – Container management with end-to-end automation and analytics
- Zero Touch Provisioning (ZTP)
- Interoperability – Open-source stack, **fully integrated and tested with Samsung, Mavenir,** et. al.
- High Performance Linux Platform – **Lowest latency in the industry at ~7usec and 50% increase in throughput** as compared to the competition

Ease of Operations

- **Live software upgrades**
- Single Pane of Glass
- Professional services for design, deployment, and management of cloud native wireless network

Total Cost of Ownership



- True single edge node, dual node for high availability
- **Single core use – No one else in the industry can do this, up to 50% savings in cost**
- Operational savings
- Container or VM at the edge
- Control and Worker in the same stack

Experience and Credibility

- **The ONLY commercially deployed 5G vRAN solution in the world**
- **Verizon currently running 1000’s of sites** carrying commercial traffic meeting 5 9’s reliability and performance KPIs
- **Only company in the world with 3+ years of Services** - designing, deploying and running commercial cloud native wireless network

WIND RIVER CLOUD PLATFORM

Wind River Cloud Platform은 컨테이너형 워크로드의 배포 및 관리를 위해 필요한 모든 요소들을 완벽하게 구현 및 통합한 클라우드 플랫폼

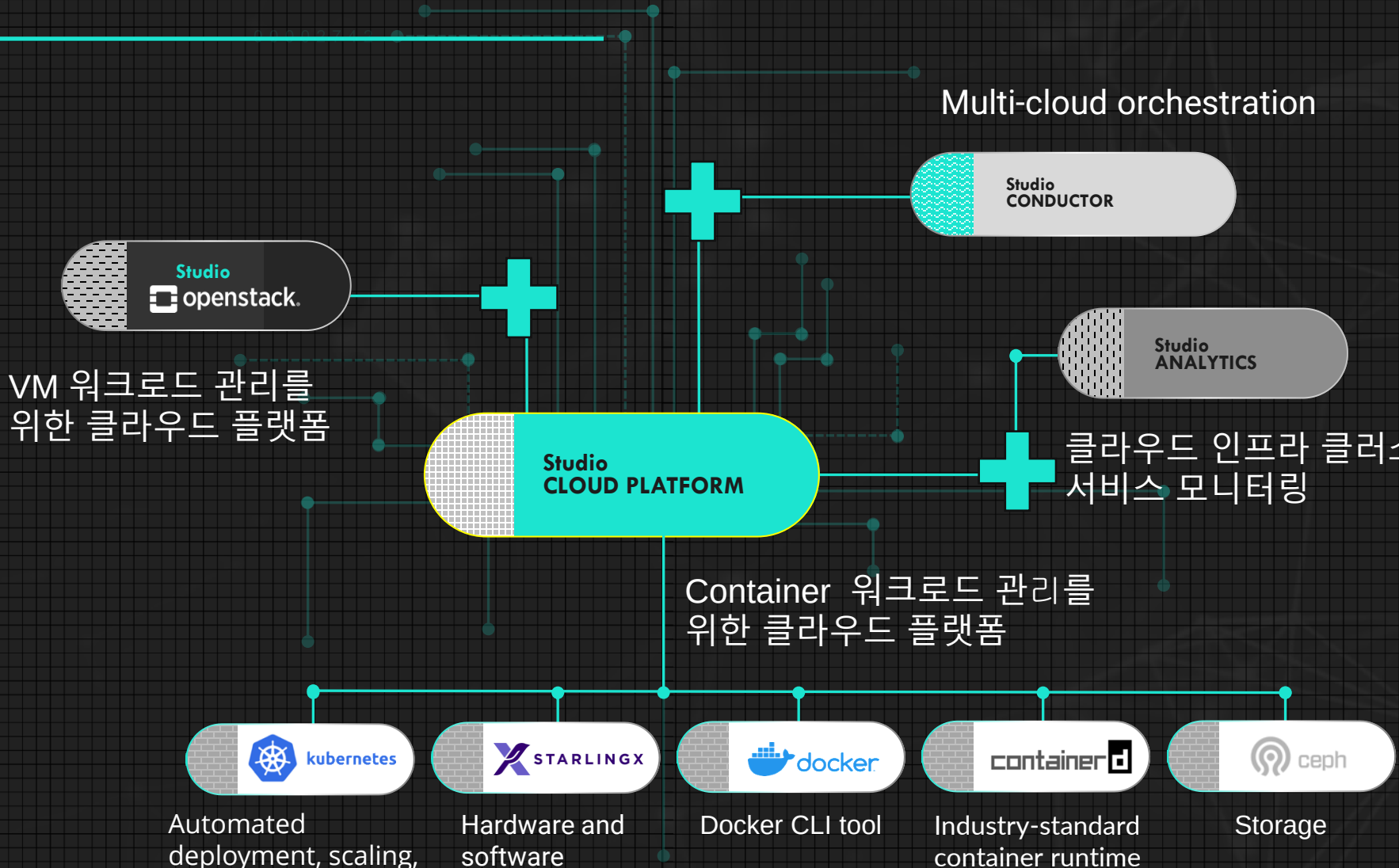
Cloud Platform은 COTS 서버에 Kubernetes 클러스터를 구축 해주는 프라이빗 클라우드 소프트웨어 제품입니다.

다양하게 지원 되는 구성을 통해 데이터 센터에서 네트워크 엣지까지 모든 스케일을 지원 합니다.

- ✓ Fully integrated 된 Cloud Platform
- ✓ Low footprint
- ✓ Ultra Low latency
- ✓ Core (Datacenter) 부터 Edge
- ✓ **쉬운 설치 & 프로비져닝**
- ✓ **분산 클라우드 지원**

WNDRVR

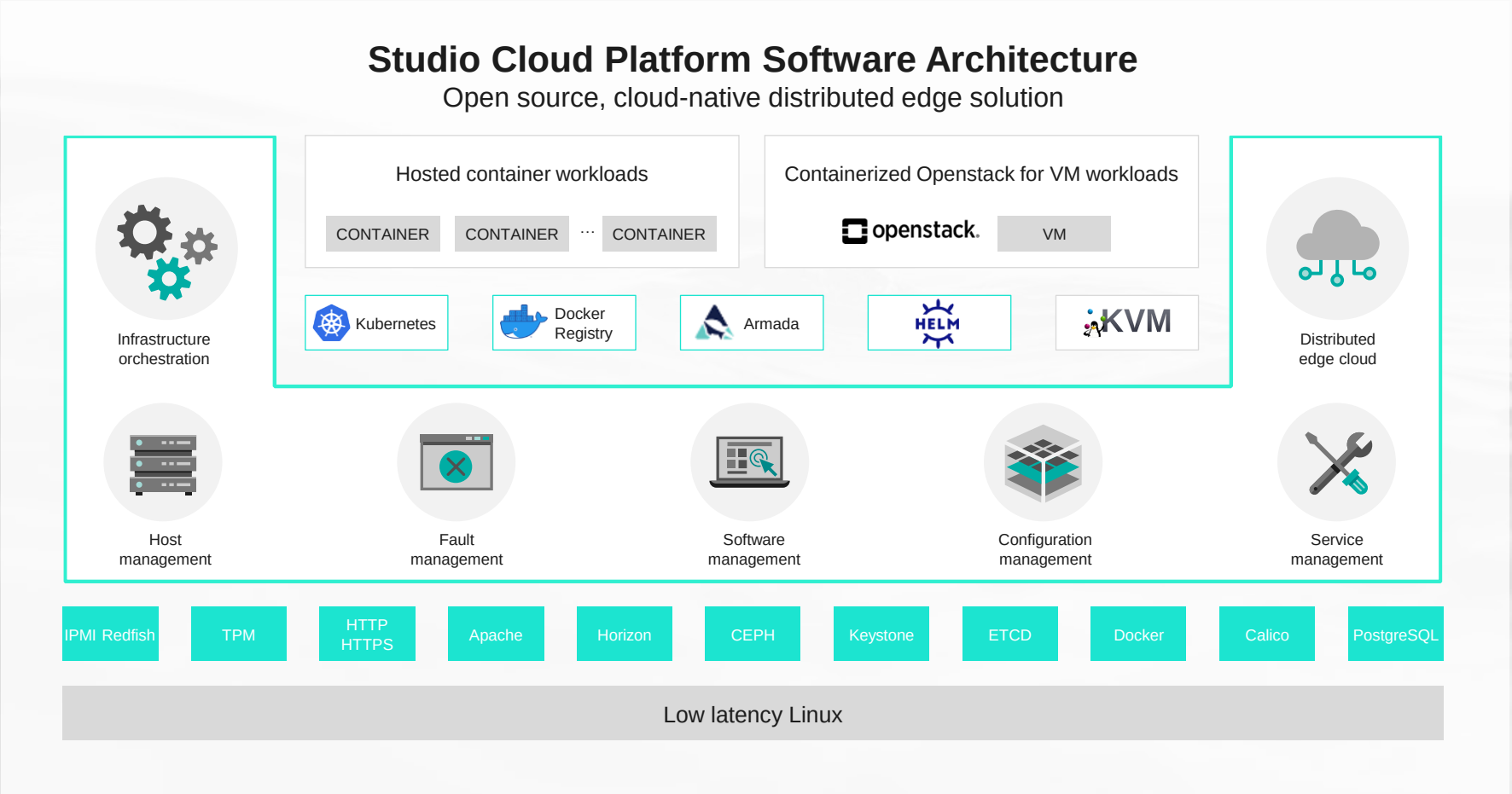
WIND RIVER CLOUD PLATFORM + Addon = Wind River Studio



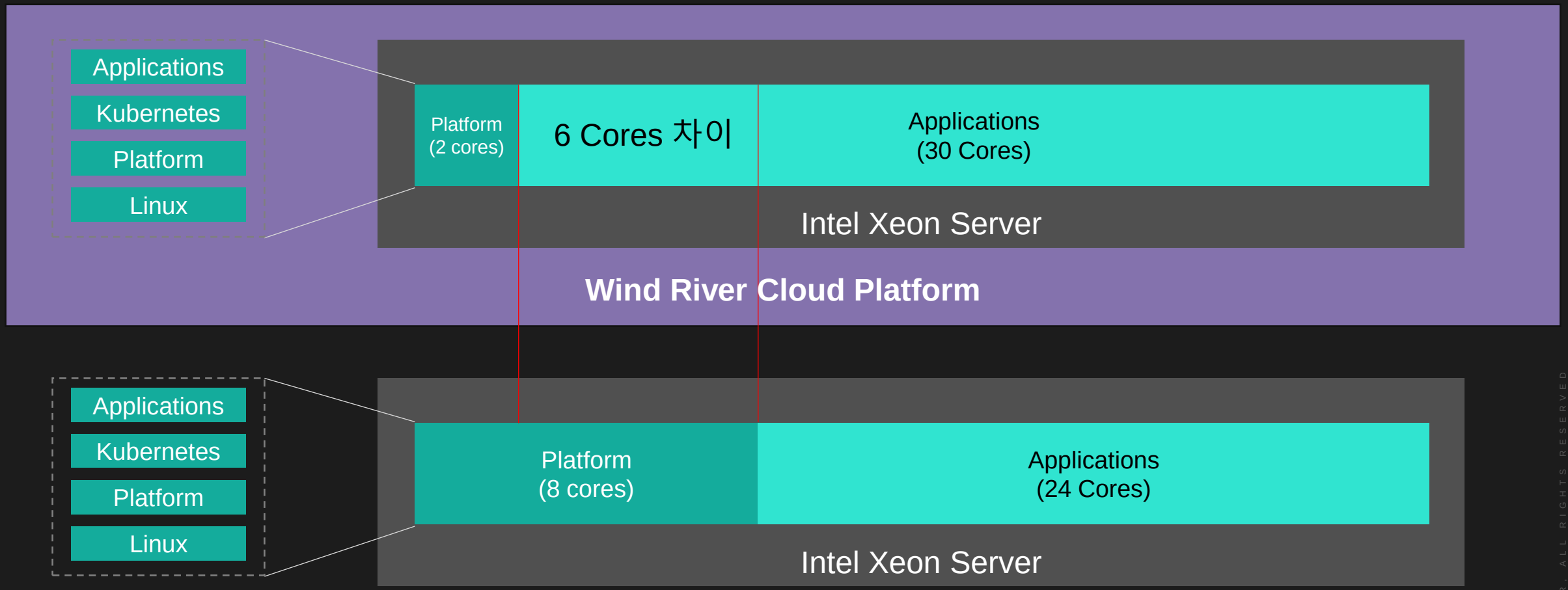
WNDRVR

Wind River Cloud Platform

Cloud Architecture



최소 풋프린트 지원 : Single Node 경우

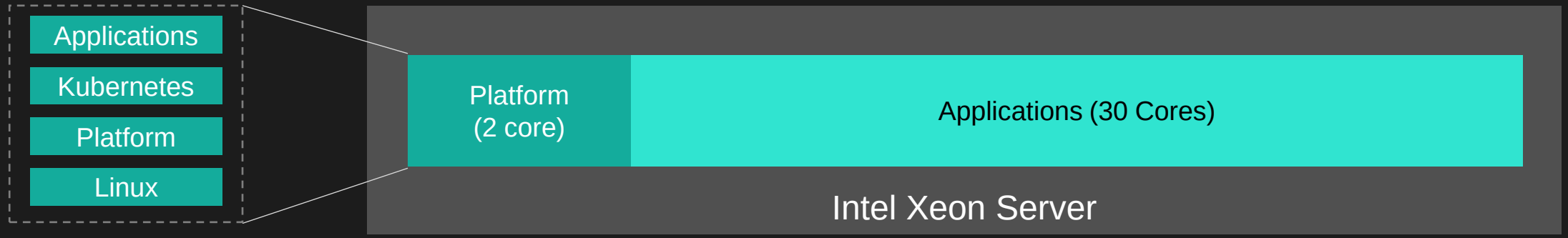


Intel Xeon Gold Cascade Lake

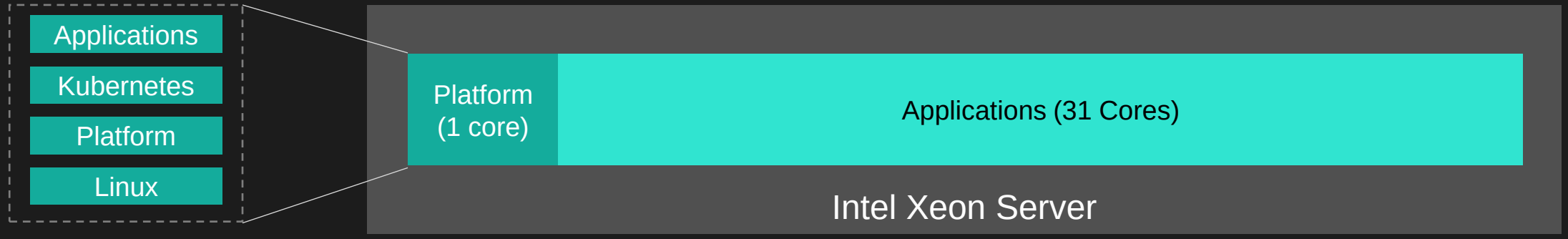
Wind River Cloud Platform은 서버 한대로 K8S Cluster 구성 예

WNDRVR

최소 풋프린트 지원



현재 : Intel Xeon Gold Cascade Lake



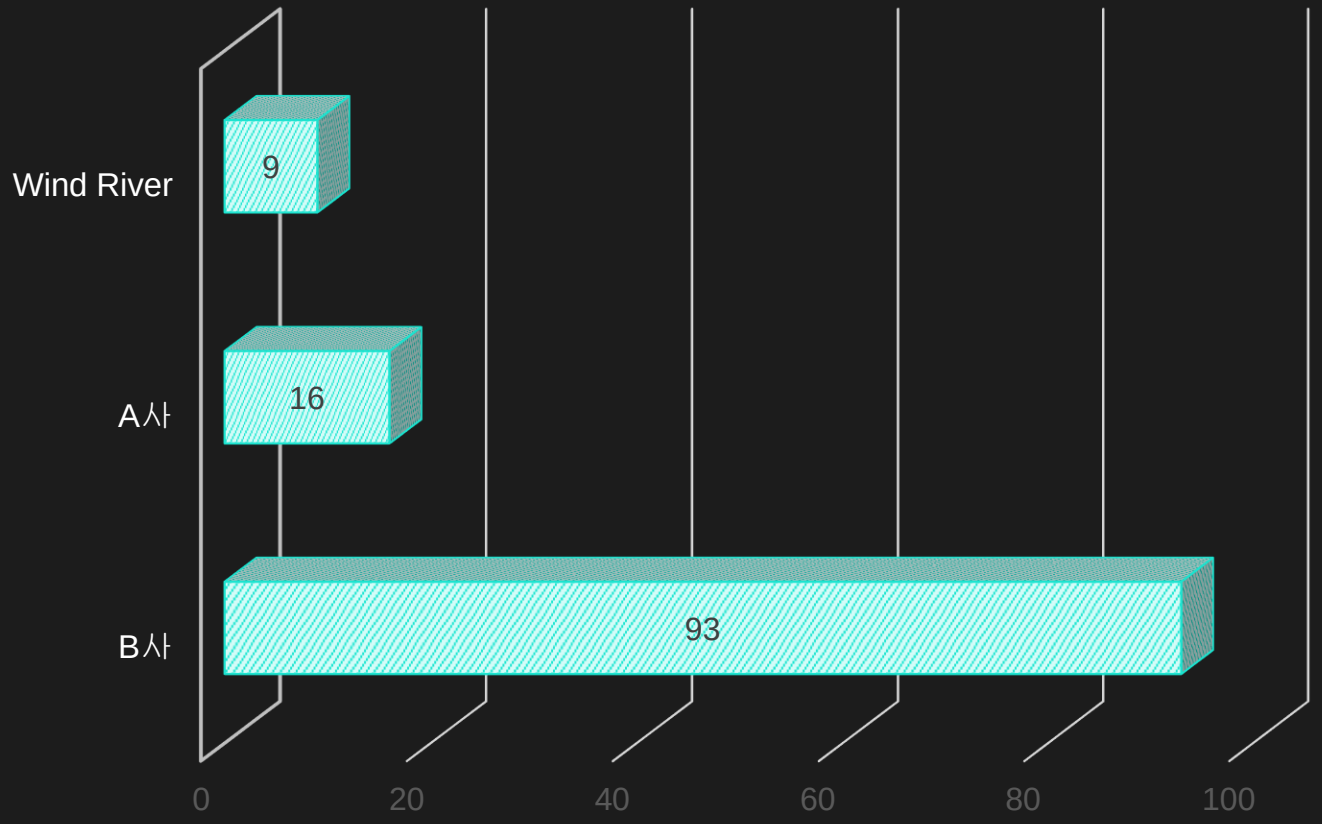
Intel 사파이어 라피즈 : 2022년 양산 예정

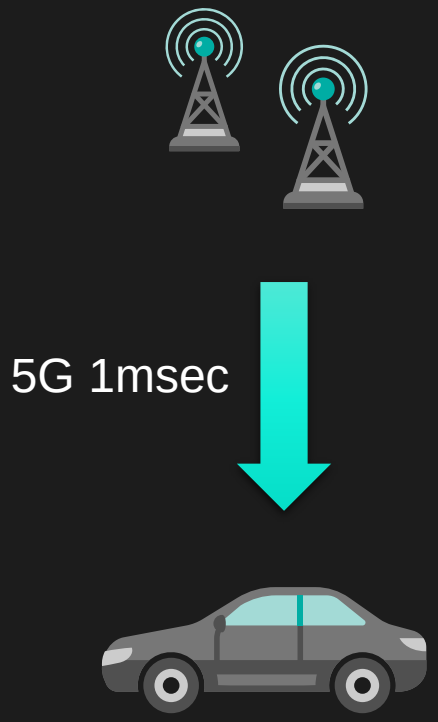
Wind River Cloud Platform은 서버 한대로 K8S Cluster 구성 예

WNDRVR

ULTRA LOW LATENCY

인터럽트 LATENCY (CYCLICTEST)





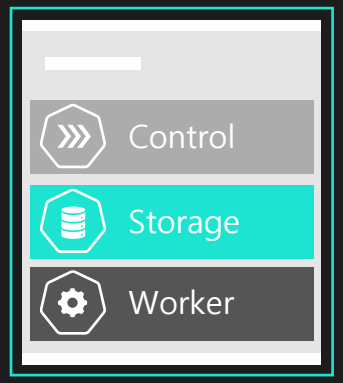
WNDRVR

* Cyclictest https://wiki.linuxfoundation.org/realtime/documentation/howto/tools/cyclictest/start

FOOT PRINT

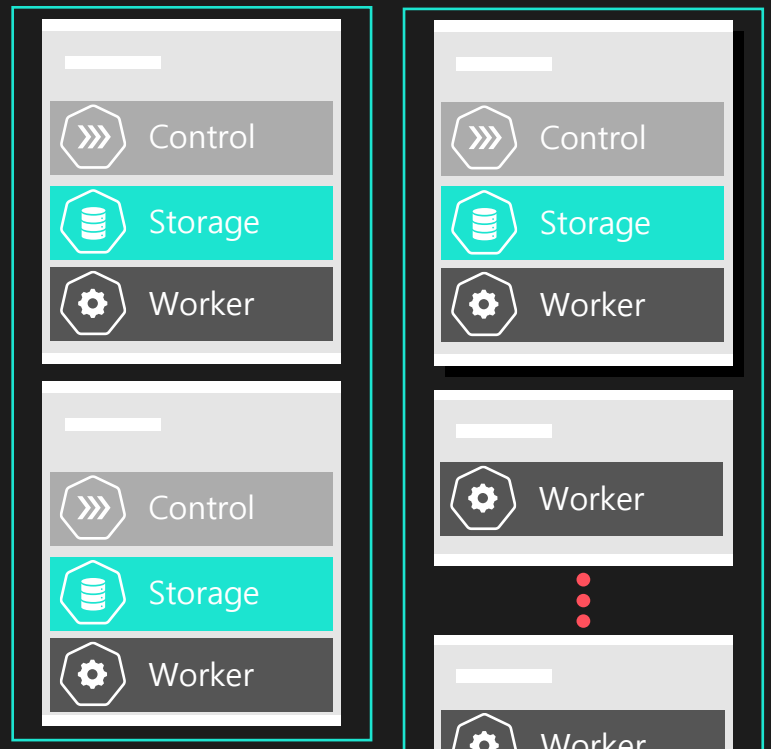
코어부터 엣지까지 모든 스케일 지원

vDU



하나에 서버로 K8S Cluster 구성

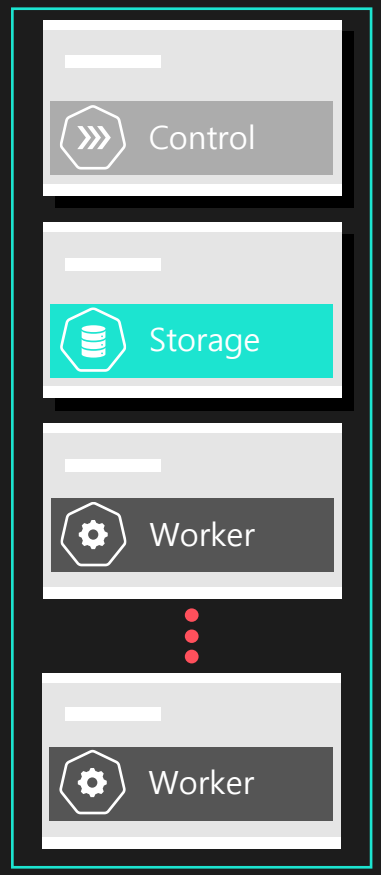
vDU 또는 vCU



HA를 위해 두대에 서버로 K8S Cluster 구성

추가 + 50 Worker 확장

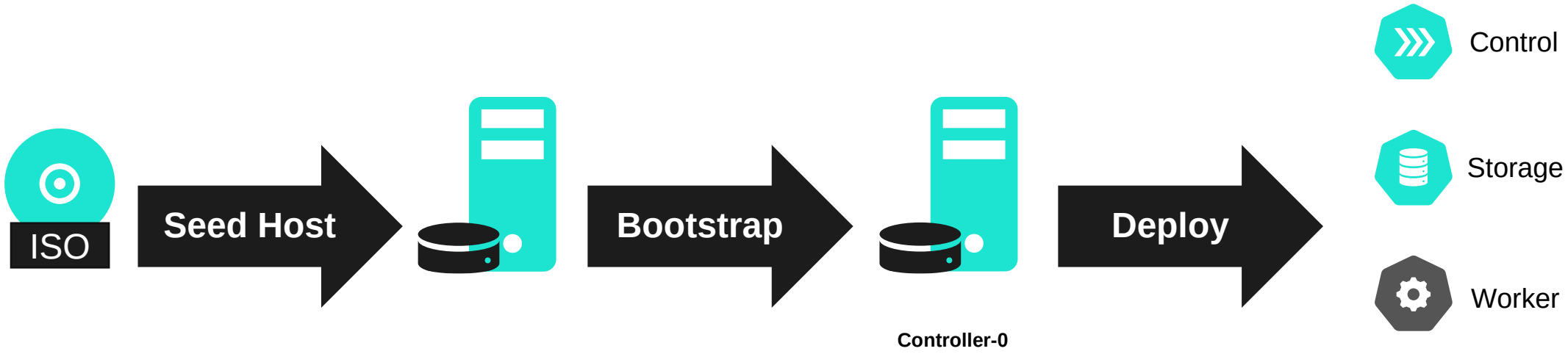
코어 또는 vCU



Controller 2대에 Worker 200 대 까지

WNDRVR

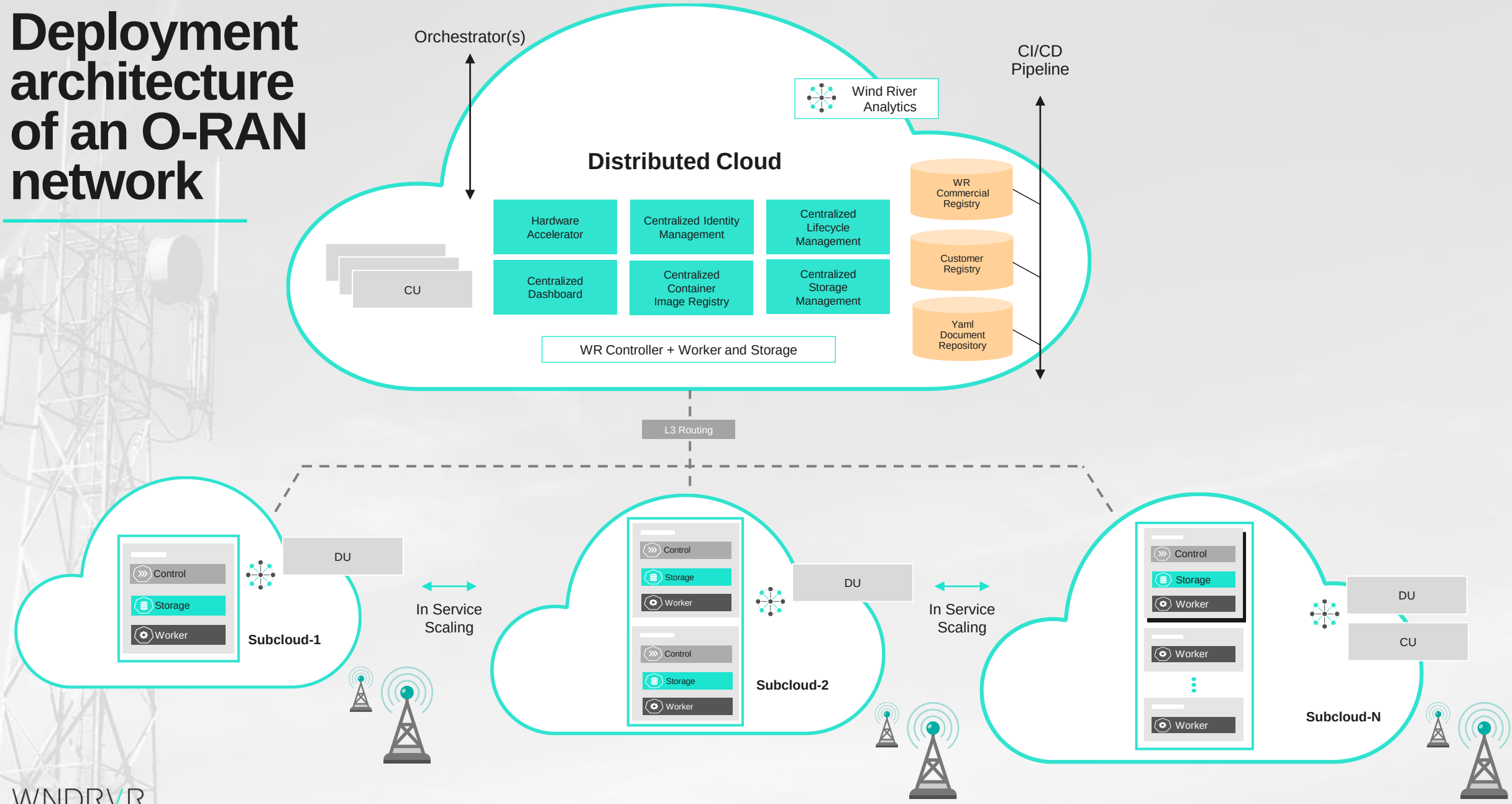
SIMPLIFIED INSTALLATION



ZTP FEATURES

1. ISO customized with parameters required to install
   (boot disk, install type, console, OAM IP address)
2. Bootstrap and Deploy done automatically in on Ansible playbook
3. Can run local or remote (CI/CD stream)

Deployment architecture of an O-RAN network



WNDRVR

>> Partner Example: Enabling Solution Level Offerings

>> 5G Reference Stack. Fully Integrated, Ready for Deployment

verizon

vodafone

KDDI

WNDRVR

>> STUDIO CLOUD PLATFORM AND ANALYTICS

SAMSUNG — WNDRVR —

>> vRAN Container Solution

intel

Hewlett Packard Enterprise

DELL

>> vRAN Applications (VM, Container)