

IEC Type1&2 Report

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Agenda

- › Akraino IEC Blueprints
- › IEC Introduction
- › IEC Reference Stack
- › IEC Type1&2 Deployment Reference Cluster
- › IEC Type1&2 work in R2
- › Insight into IEC
- › Future Work & Challenges

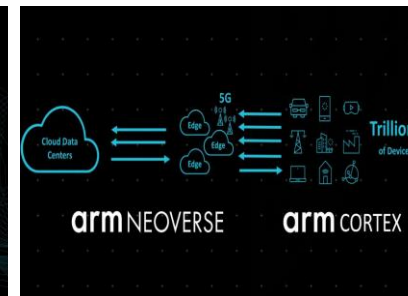
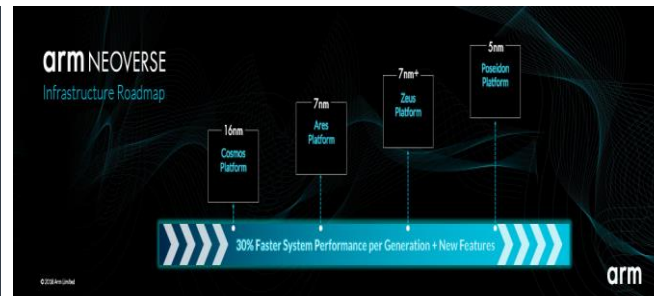
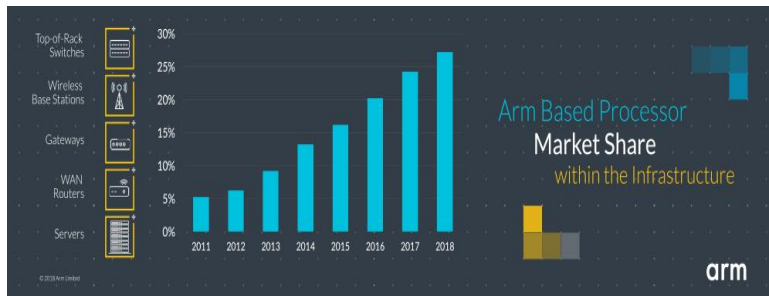
Akraino Blueprints

- 30+ blueprint projects proposed in Akraino
- Arm proposed and is leading Integrated Edge Cloud (IEC) as PTL
 - [IEC Type 1: small deployment](#)
 - [IEC Type 2: medium deployment](#)
- Arm is also discussing feature projects with partners in Akraino

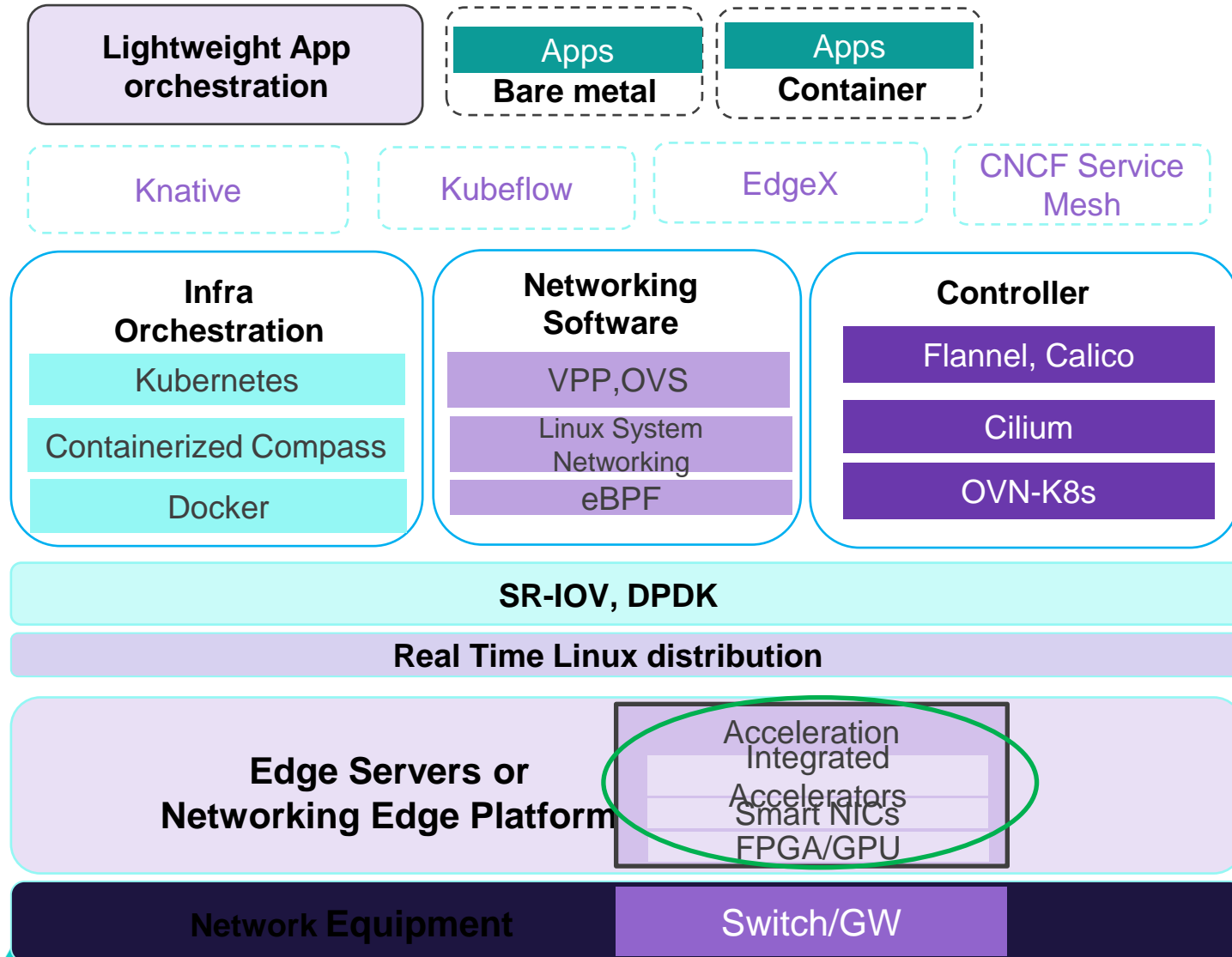
Blueprint Family	Blueprint Species Name	Submitter
Integrated Edge Cloud	IEC Type 1: small deployment	Arm
	IEC Type 2: medium deployment	Arm
	IEC Type 4: AR/VR oriented Edge Stack	Tencent, Arm Juniper, Inwinstack, Mobiledgex, Organge
	IEC Type 3: Android cloud native applications on Arm servers in edge	China Mobile, Byte Dance, Arm
	IEC Type 5: SmartNIC	Byte Dance, Mellanox, Broadcom, China Mobile, Arm, Phytium

IEC Introduction

- › IEC (Integrated Edge Cloud) is a platform that enables new functionalities and business models on the network edge. It targets telco applications and medium deployment of Edge Cloud. In this release it is based on Kubernetes and Calico and installation is automated with the foundation building and the focus on SEBA use-case.
- › Edge use case to address
 - › Telco/enterprise Edge cloud – for example, MEC or branch office data center...
 - › Telco/enterprise remote edge locations – edge platform with limited resources, for example, SD-WAN, IoT gateway...

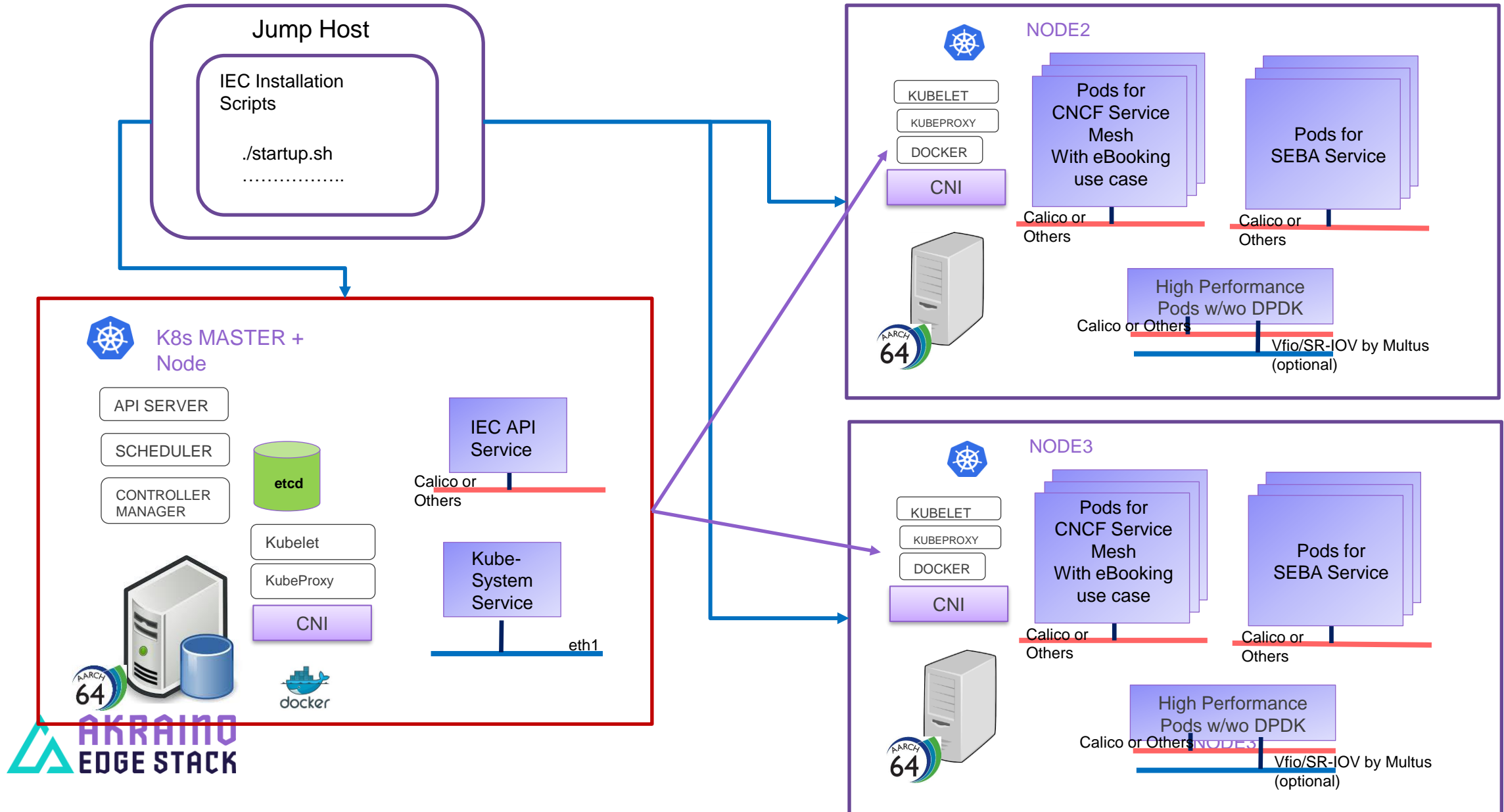


IEC Reference Stack



- Heterogeneous Architecture
 - › VM, container, bare metal
 - › Servers and customized Edge platforms
 - › Virtualized NFs and Physical NFs
 - › Accelerator interface
- Resource constraints
 - › Kubernetes
 - › SDN Controller for K8s
- HW Accelerations
 - › Integrated accelerators
 - › PCIe/CCIX attached accelerator (Smart NICs...)

IEC Type1&2 Deployment Reference Cluster



IEC Type 1

Features

- › Platform works on aarch64 architecture, typically arm64 SoC with low power consumption;
- › It supports both single node deployment and a 3-node deployment
- › Deployment is can be automated from a jumpserver <https://jenkins.akraino.org/view/iec/>
- › The SEBA on arm use-case is enabled and integrated with the IEC Type1 platform(Smallest SEBA itw?)
- › The installation scripts which deploys Kubernetes cluster, Calico CNI, Helm/Tiller and related verifying Kubernetes applications/services with 1 master and 2 slave nodes. The scripts can be run from the jumpserver, or with manual installation from the servers on which it run. The installation methods is introduced in [IEC Blueprints Installation Overview](#).
- › Currently IEC uses project [Calico](#) as the main container networking solution which provides high performance, rich network policy, widely supported from Linux system and easy installation. In the future, Contiv/VPP or OVN-Kubernetes can be used as a high performance substitute since those 2 solutions can support DPDK enabled high speed interface access.

IEC Type 2

Features

- Platform works both on x86_64 and aarch64 architectures
- It supports both single node deployment and a 3-node deployment
- Deployment is automated in CI with <https://jenkins.akraino.org/view/iec/>
- The SEBA (on arm) use-case is integrated with the IEC platform
- The IEC supported hardware are edge servers mainly based on arm64, such as Marvell ThunderX series, Ampere Arm64 servers; the desired network connections are above 10Gbit/s which may satisfy most current IEC applications requirement.
- The installation scripts which deploys Kubernetes cluster, Calico CNI, Helm/Tiller and related verifying Kubernetes applications/services with 1 master and 2 slave nodes. The scripts can be run from the jumpserver, or with manual installation from the servers on which it run. The installation methods is introduced in [IEC Blueprints Installation Overview](#).
- Currently IEC uses project [Calico](#) as the main container networking solution which provides high performance, rich network policy, widely supported from Linux system and easy installation. In the future, Contiv/VPP and OVN-Kubernetes may be used as a high performance substitute since those 2 solutions can support DPDK enabled high speed interface access.
- IEC support [Akraio CI/CD](#) requests: IEC Daily jobs (scheduled to run recurrently) deploy IEC using one of the agreed installers; run testing suites; collect logs and publish them.



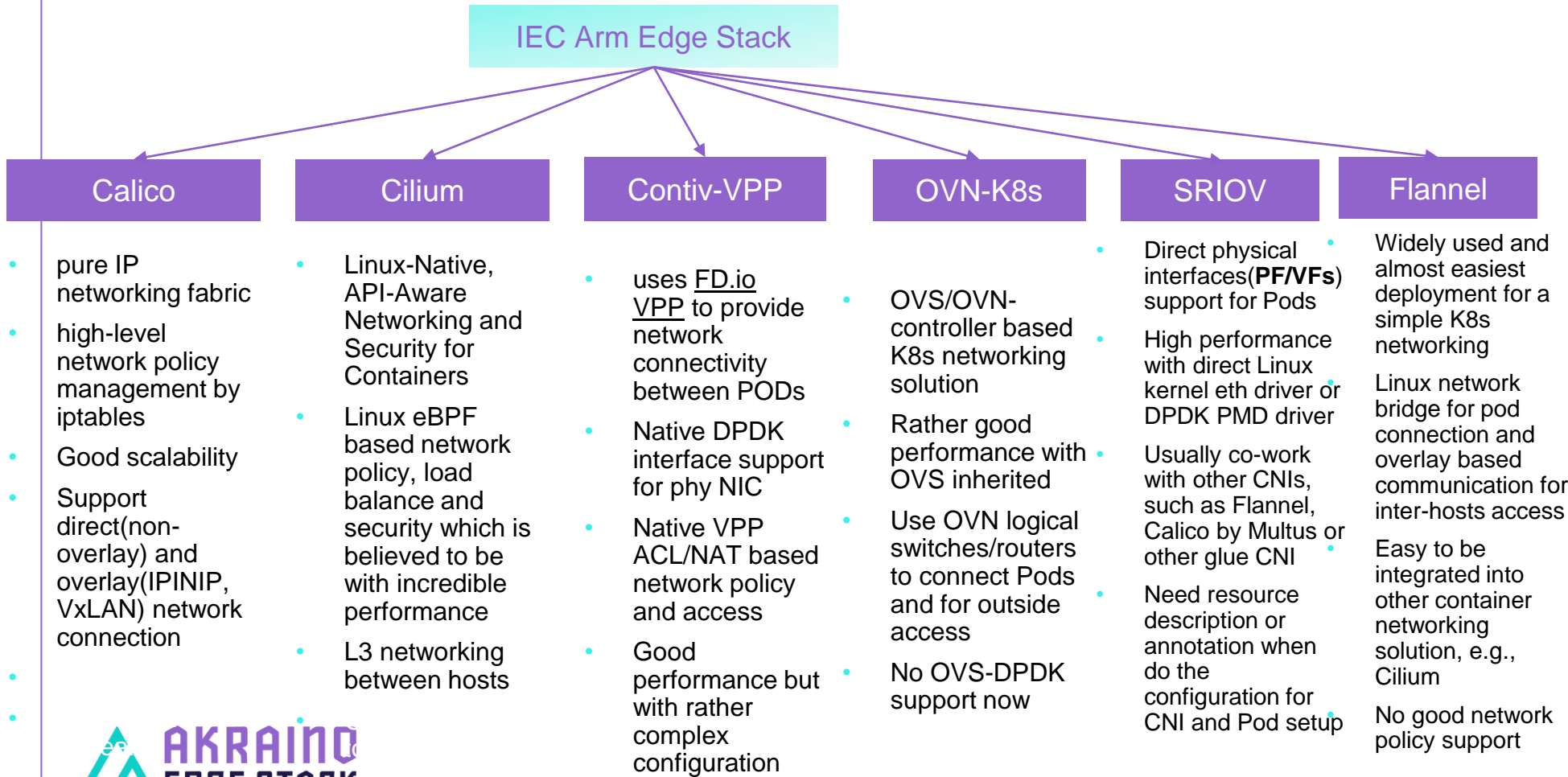
[Ampere eMAG 64bit Arm Server](#)



[Marvell Thunderx2 arm server](#)

High Performance CNIs available for Arm Edge Stack

Things now available in Akraino IEC Arm edge stack as a ref:



[Code Review](#) / [iec.git](#) / [tree](#)

[summary](#) | [shortlog](#) | [log](#) | [commit](#) | [commitdiff](#) | [review](#) | [tree history](#) | [HEAD](#) | [snapshot](#)

fix issue that deploy cilium on latest image

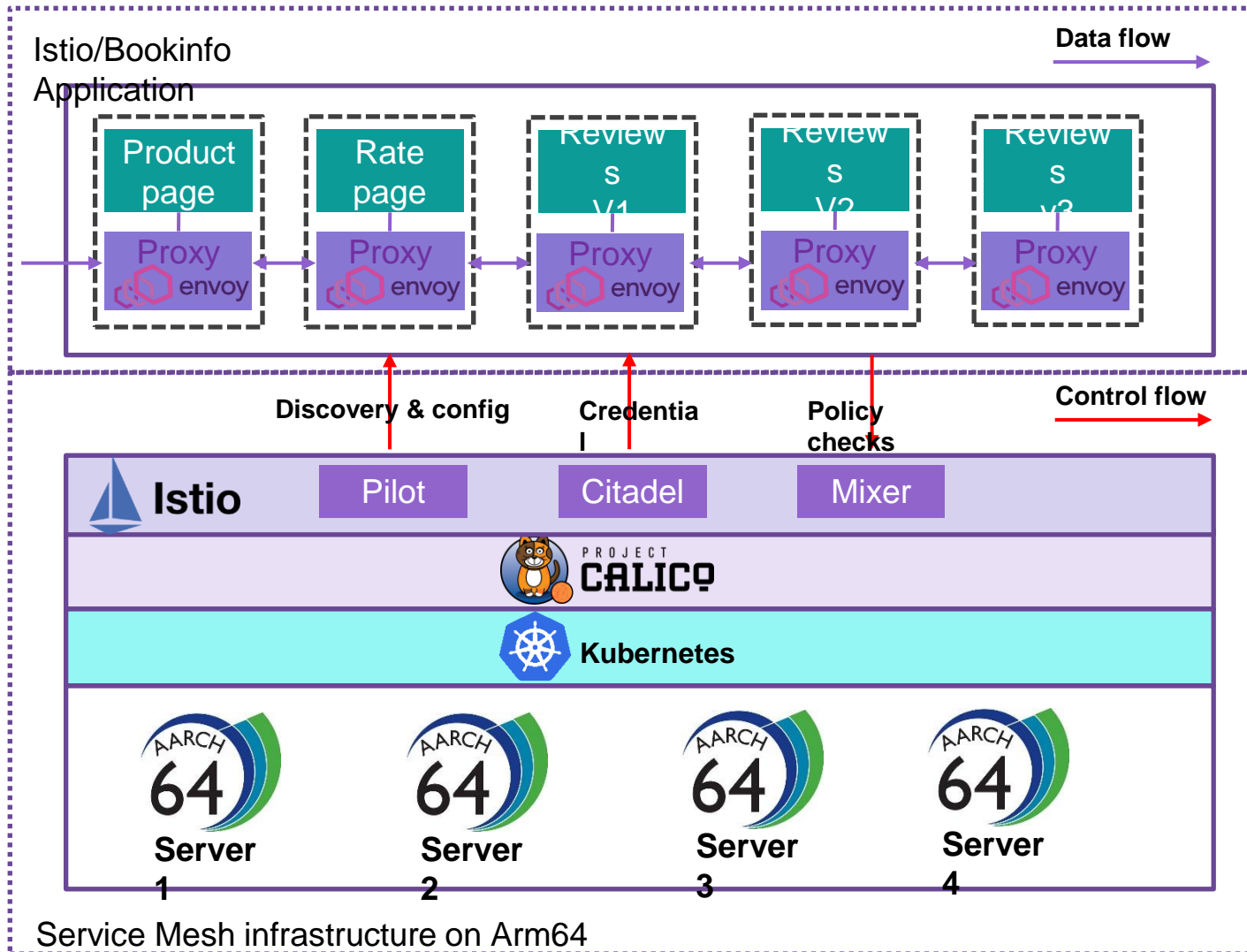
[\[iec.git\]](#) / [src](#) / [foundation](#) / [scripts](#) / [cni](#) /

```
drwxr-xr-x  --
drwxr-xr-x  - calico      tree | history
drwxr-xr-x  - cilium      tree | history
drwxr-xr-x  - contivpp    tree | history
drwxr-xr-x  - dann        tree | history
drwxr-xr-x  - flannel    tree | history
drwxr-xr-x  - multus     tree | history
drwxr-xr-x  - ovn-kubernetes tree | history
```

Repo:
<https://gerrit.akraino.org/r/admin/repos/iec>



Istio – A Robust Service Mesh – on Arm64



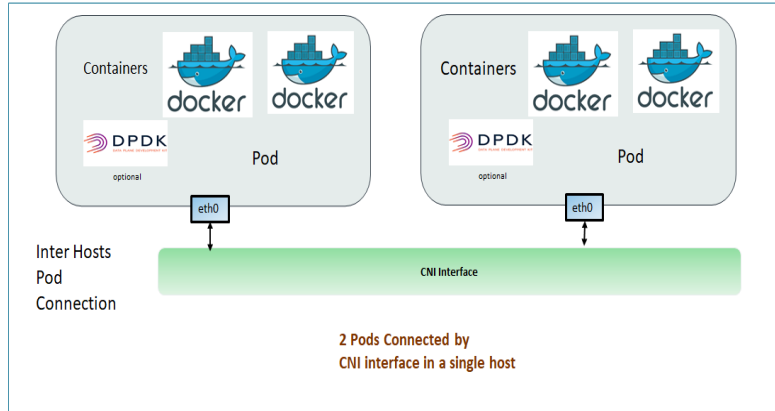
- **Istio** An open platform to connect, manage, and secure microservices
- **Calico** Simple, scalable and secure Container Network Interface
- **Envoy** High-performance edge/middle/service proxy

Integrated into IEC:

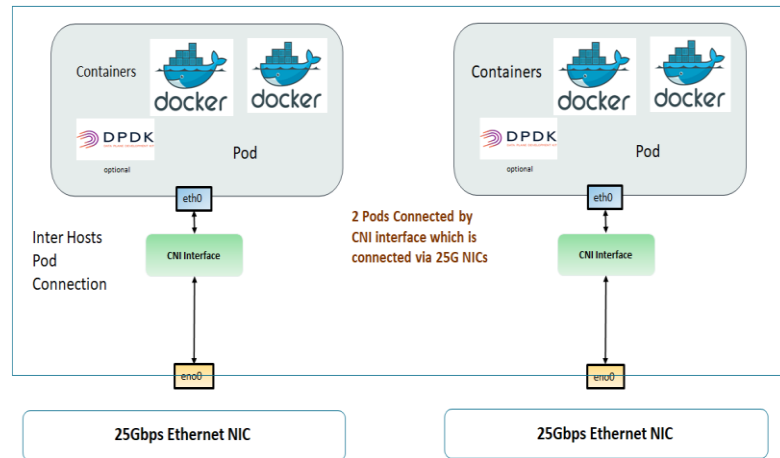
https://gerrit.akraino.org/r/gitweb?p=iec.git;a=tree;f=src/foundation/service_mesh;h=2e7a4f541a191decfa5ce8136091224bac710b23;hb=HEAD

Benchmarking metrics, environment and tools

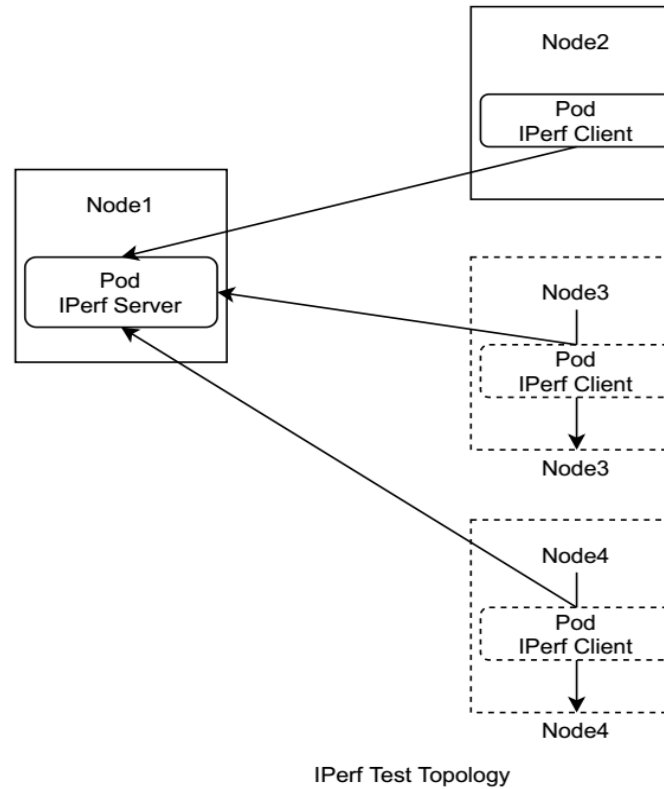
Performance Evaluation Network Connection- Intra Host



Performance Evaluation Network Connection- Inter Hosts



IPerf(v2)



IPerf Test Topology

Test Command:

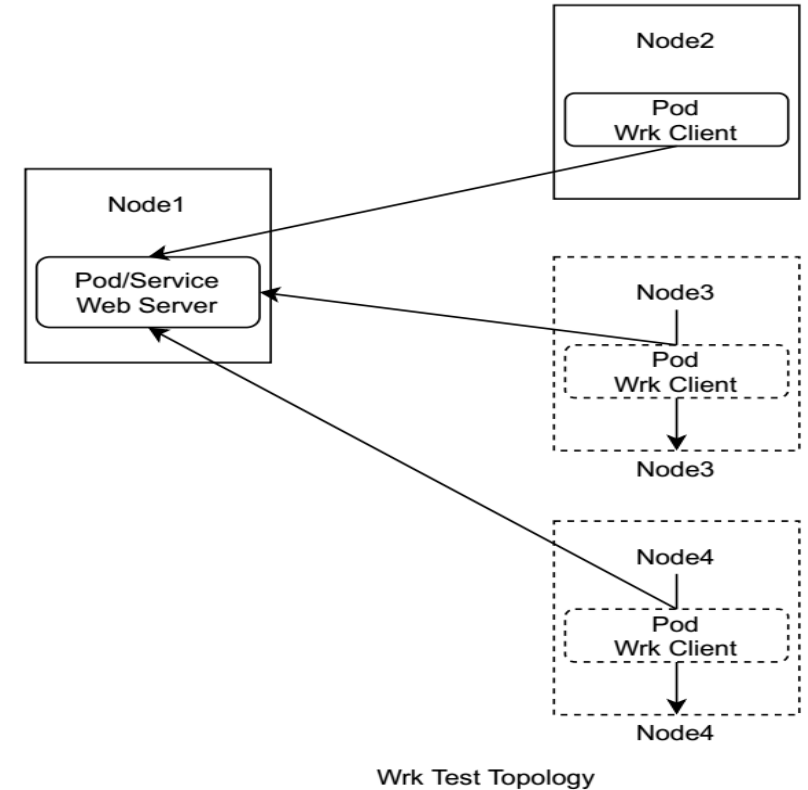
Client:

```
iperf -c ${SERVER_IP} -t ${time} -i 1 -w 100K -P 4
```

Server:

```
iperf -s
```

Wrk



Wrk Test Topology

Test command:

```
wrk -t12 -c1000 -d30s http://$IP/files/$file
```

For More Information, Please
Visit www.akraino.org

谢谢!
Thank You!

