The New Intelligent Edge

Akraino Edge Stack Project Overview

John Craig, Lead Member of Technical Staff, AT&T
Travis Broughton, Community Manager, Intel
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AKRAINO EDGE STACK

Emerging Technologies in IOT and Networks

are demanding lower latency and accelerated processing at the edge

NFV Edge Infrastructure	Wireless (vRAN,vEPC)	Wireline (PON)	uCPE (SD-WAN)	IP Enterprise Services
Autonomous Devices	Drones	Autonomous Vehicles	Industry Robots	Medical
Immersive Experiences	Virtual Reality	Augmented Reality	360 Video	Wearable Cognitive Assistance
IoT & Analytics	Industrial Sensors	Home Devices	Retail	Healthcare
On-Demand NFV	Hardware Acceleration	A.I.	Microservices	5G

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New Edge Requires End-to-End Automation & Interworking

Services Cloud Services Residential Services Enterprise Services IOT Services AI Services

Software & Automation

Cloud Automation

Network Automation

IOT Automation

Infrastructure

Enterprise
Software Defined Data Centers (SDDC)

Data Centers

Carrier Network

Cloud Network

Service Providers
MSO/CableCo

Public/Hybrid
Cloud Service Providers
Cloud Hosting
Private Cloud Providers
Web Service Providers

The New Edge Requirements for Akraino Project

Edge Challenges

Large Scale
>1000 Locations

Need Simple Operations
Zero-touch provisioning
Zero-touch operations
Zero-touch lifecycle

Low Cost
Start-up, Build, Run

Multiple Edge Use Cases
Faster innovation but with right integration

Akraino Edge Stack is the first open source collaborative community project exclusively focused on integrated distributed cloud edge platform.

Solution

AKRAINO EDGE STACK

Akraino Edge Stack integrates multiple open sources to supply holistic Edge Platform, Edge Application, and Developer APIs ecosystem.

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What is Akraino?

Everything About Edge – Akraino is Edge Project

Deliverable

Development of Edge Applications

+

Development of Edge Middleware & API

+

Fully Integrated Open Edge Stack

Scope

- Develop Edge Middleware, SDKs, applications and create an app/VNF ecosystem

- Develop Edge API Develop framework for interoperability with 3rd party Edge providers & hybrid cloud models

- Create & Integrate Edge stack to address Edge use cases (Blueprints)
- Edge Stack Life Cycle - CI/CD & Tooling
- Upstream collaboration

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LF Announcement March 2018

- First Open Source Project at Edge gathers momentum, complements other standards & consortiums
- Edge now an integral part of Open Source Software Ecosystem

The Linux Foundation Announces Expanded Industry Commitment to Akraino Edge Stack

ALTIOSTAR
AT&T
北京赛西认证有限责任公司 CESI CERTIFICATION CO.,LTD.
docker
中国移动通信 CHINA MOBILE
中国电信 CHINA TELECOM
China unicom中国联通
九州云 Cloud
H3C
HUAWEI
科大讯飞 iFLYTEK
intel
Tencent 腾讯
WIND
ZTE

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Akraino Edge Stack – Key Principles

Design

- **Finite set of configurations** – reduce complexity
- **Cloud native applications** – design application to be optimized from the beginning
- **Simplified security** – secure platform and services while not being a burden
- **Autonomous, turn-key solution for service enablement** – enable rapid introduction
- **Platform, VNF and application assessment and gating** – assess whether the application is fit to run at the edge (e.g.., latency sensitiveness, code quality)

Build

- **Low startup cost** – space, power, capital but scalable and evolvable
- **Low latency placement and processing** – support the edge drivers
- **Plug and play modular architecture** – building blocks using multiple cloud management technologies

Operate

- **Zero touch provisioning, operations and lifecycle** – reduce OpEx
- **Automated maturity measurement** – operations, designs and services
- **Software abstraction based homogeneity** – hide any hardware differences via software
- **Common platform and service orchestration** – ONAP

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Akraino is Complementary
Akraino Interfaces With Adjacent Projects

LF NETWORKING

ONAP
OPEN NETWORK AUTOMATION PLATFORM

AKRAINO EDGE STACK

Zero Touch Edge Cloud
Automation

kubernetes

Container Orchestration
Multi-cloud portability

EDGE X FOUNDRY™

IIOT Framework at Edge

ceph

openstack.

Open Source Software for
Creating Private and Public
Clouds

Acumos AI

AI Framework Across Projects
Networking
Analytics/Automation

DANOS airship StarlingX

Disaggregated Networking
Whitebox Operating Systems

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Akraino Benefits
Enables New Business Ecosystem & Cost Savings

Users (Enterprises)	New Services	Open Source-Based		
Application Developers	New Edge Applications	Global Open Source Collaboration		
Public Cloud Provider	New Cloud Services	More Footprint	ROI – New Offerings to Existing Customer Base	
Suppliers	Infrastructure (H/W)	Support as a Service	Extended Portfolio	
Telco Operator	Edge Processing – Reduced Backhaul Traffic	NFV Infrastructure (5G, Etc.)	Edge Services (Public Edge Cloud, API, Analytics)	Edge Real Estate

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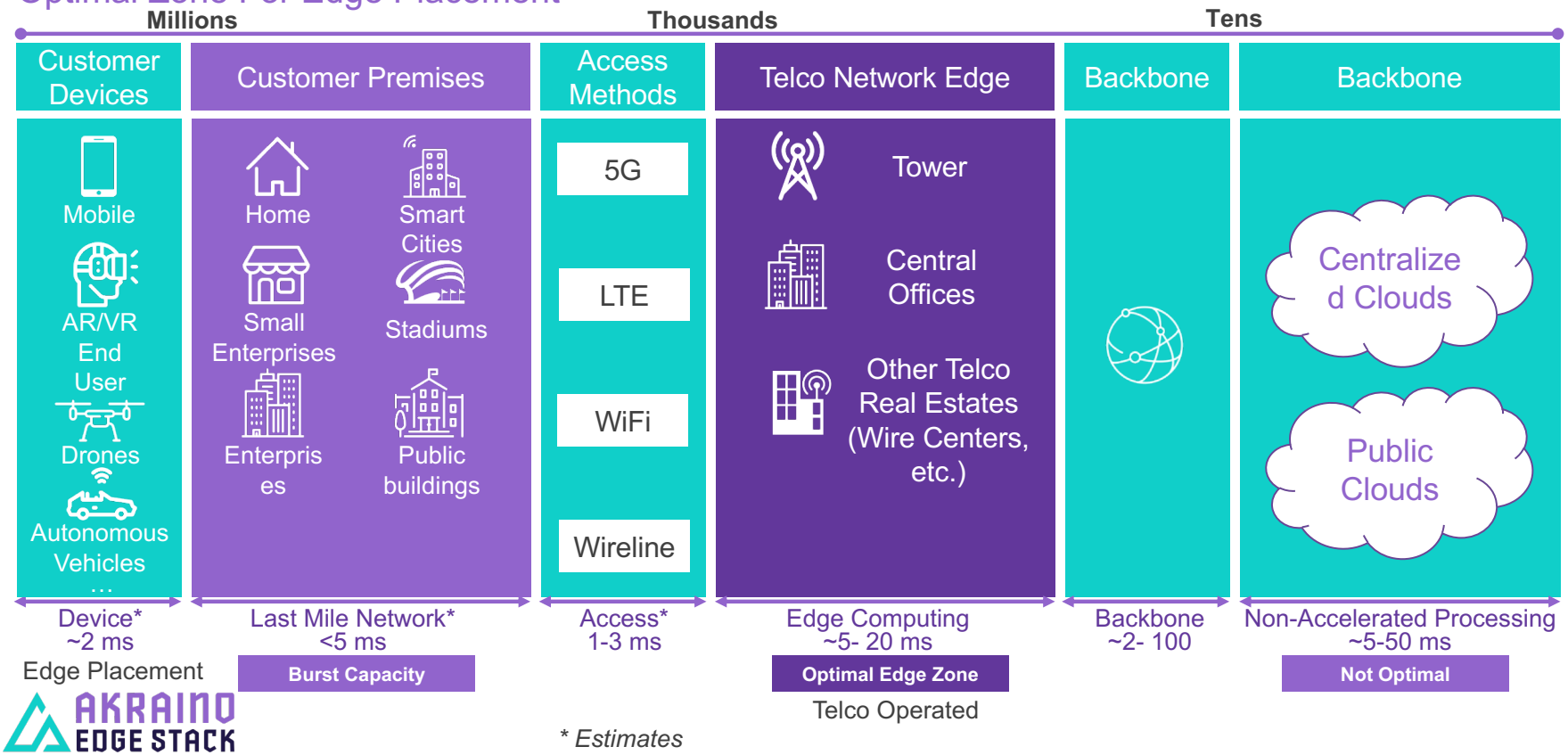
Edge

Optimal Zone For Edge Placement



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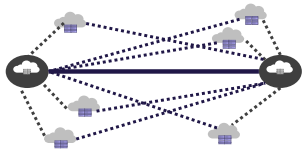
* *Estimates*

Source: AT&T

Akraino Blueprints & release



Reference Architecture
For Edge Use cases

Blueprints

Declarative Configuration

CI/CD, Integration, & Testing

POD

"A" Hardware & Software

Declarative Configuration

CI/CD, Integration, & Testing

POD

"N" Hardware & Software

Blueprints1 ..... Blueprints n

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Akraino Release

TSC will provide acceptance criteria for release

Blueprints – Approved and tested declarative configuration based on use cases, set of Hardware & Software, Point of delivery (POD).

Reference Architecture – Defines Akraino building blocks

Declarative Configuration – Hides lower layer complexity to user

CI/CD, Integration & Testing Tools – Drive product quality

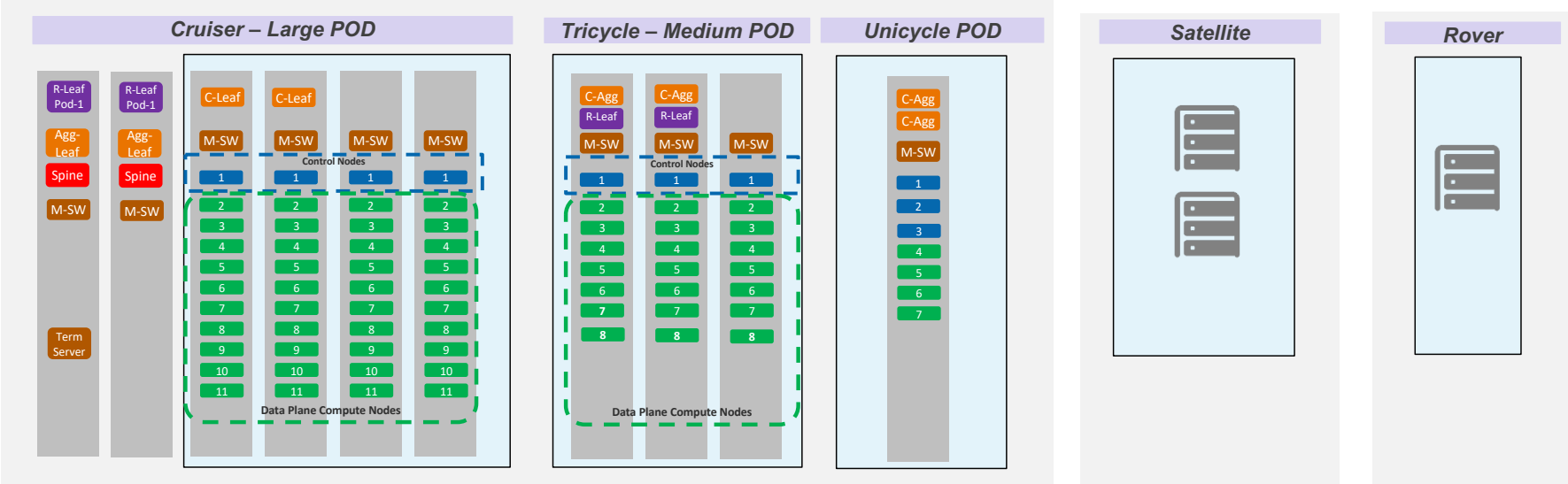
Akraino release – End Product

Source: AT&T

Edge Point of Delivery (POD)

Hosted @ Telco or Provider (e.g., Network Cloud)

Customer's Premises



	Cruiser – Large POD	Tricycle – Medium POD	Unicycle POD	Satellite	Rover
Characteristics	- 6 Racks POD - Containerized Control plane (OpenStack, Ceph, etc.,) - K8 based resiliency	- 3 Racks POD - Containerized Control plane - K8 based resiliency	- 1 Rack POD - Containerized Control plane - K8 based resiliency - Possible - Data plane/Control Plane mixed	- Remote Edge – 1 or 2 servers - Containerized Control plane - No K8 based resiliency - Data plane/Control Plane mixed	- Remote @ customer or public buildings - DANOS based - White boxes
Use Cases (e.g.,)	- 5G Core - 5G access	- IP Services - 5G Access	-IoT, - Wireline (PON), Store - Remote Edge(Analytics, etc.)	- Over the top edge applications	- Over the top edge applications. - SD-WAN

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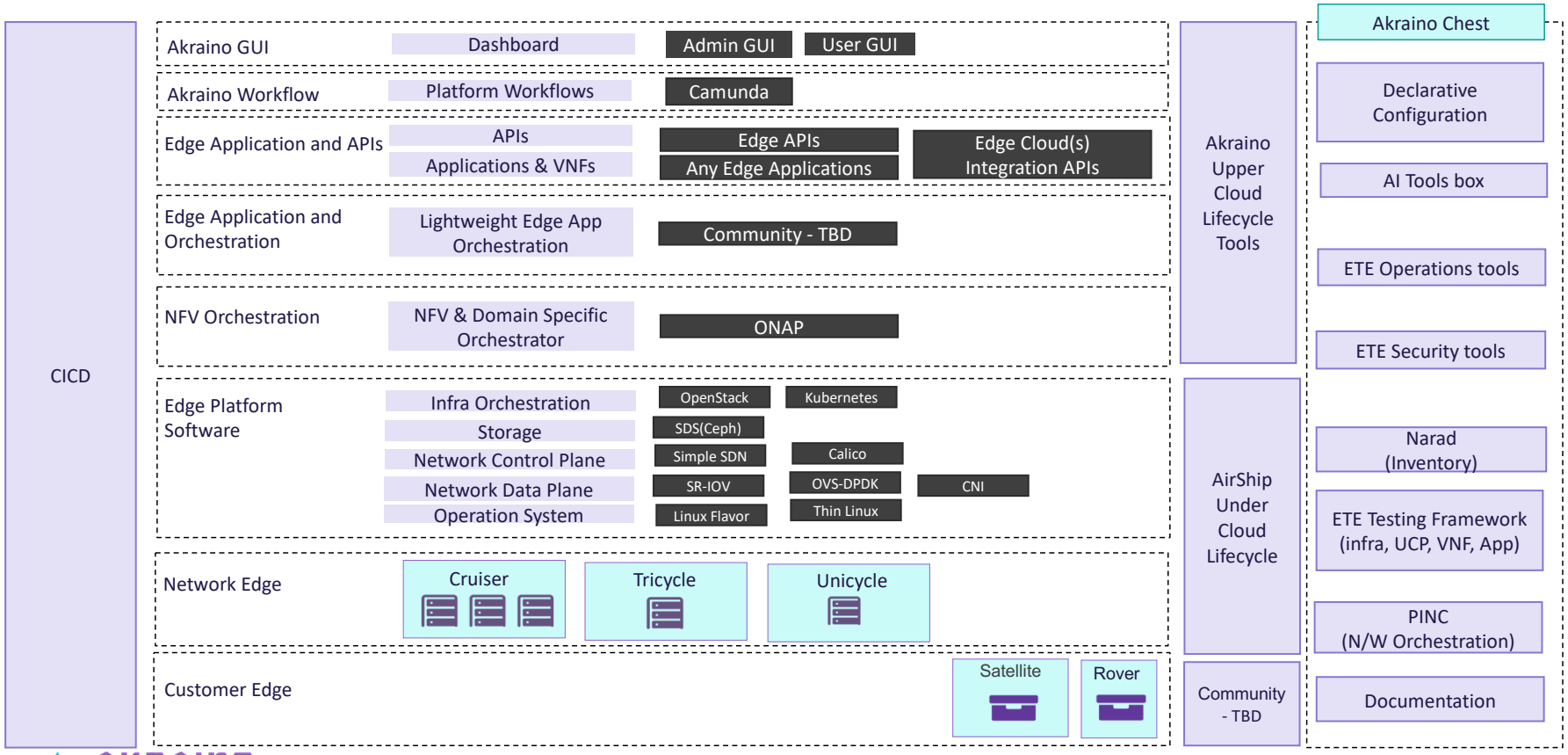
Source: AT&T

Akraino Building Blocks - Proposed



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Source: AT&T

Akraino – AT&T contributions to kick start the community

Demonstration of working Blueprint

- Real world Edge Architecture and Knowledge
- Blueprint based on Kubernetes, OpenStack, Airship, Workflow, GUI etc.,
- Integration of Platform Life cycle tools – Airship
- VNF Orchestration based on ONAP Orchestration
- Sample Edge Applications
- CI/CD& Testing documentation
- Future – Narad, PINC, DANOS Integration

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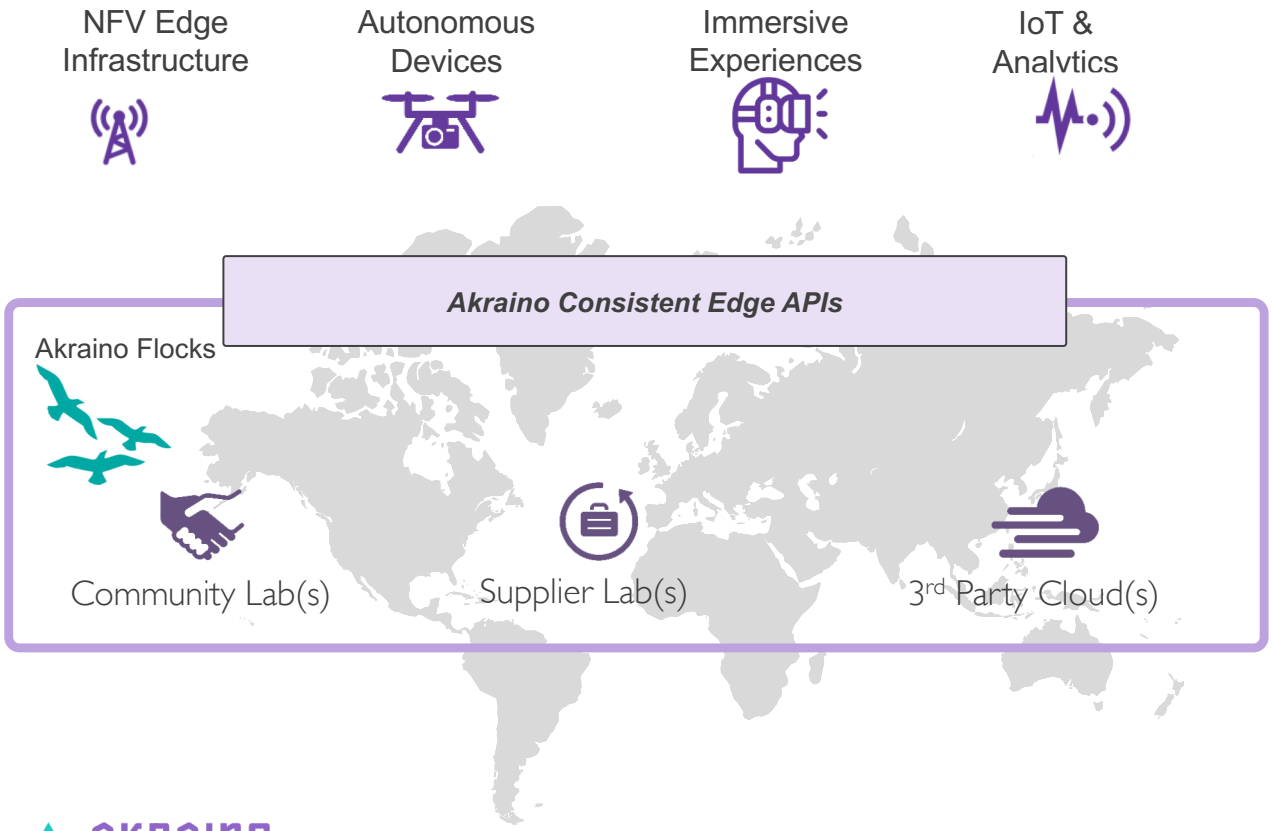
Source: AT&T

Akraino Community Labs (Unison)



Akraino Community to drive interoperable Edge APIs

Applications Area – Experiment Edge application

Community CI/CD – Share Results

Certification – Demonstrate Interoperability

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For More Information, Please
Visit www.akraino.org

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