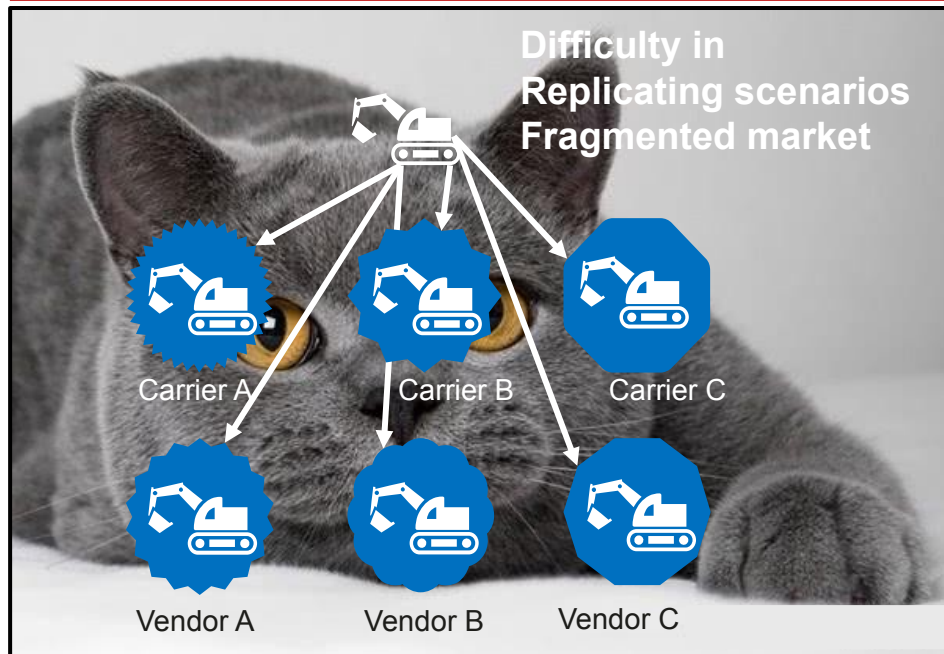# EdgeGallery
Building OpenSource 5G MEC Eco-System

- Gaurav Agrawal

Industry Application Ecosystems with Unified Market and Shared Applications

Small-scale Application Ecosystems of Vendors and Carriers

Difficulty in Replicating scenarios Fragmented market

Carrier A Carrier B Carrier C

Vendor A Vendor B Vendor C
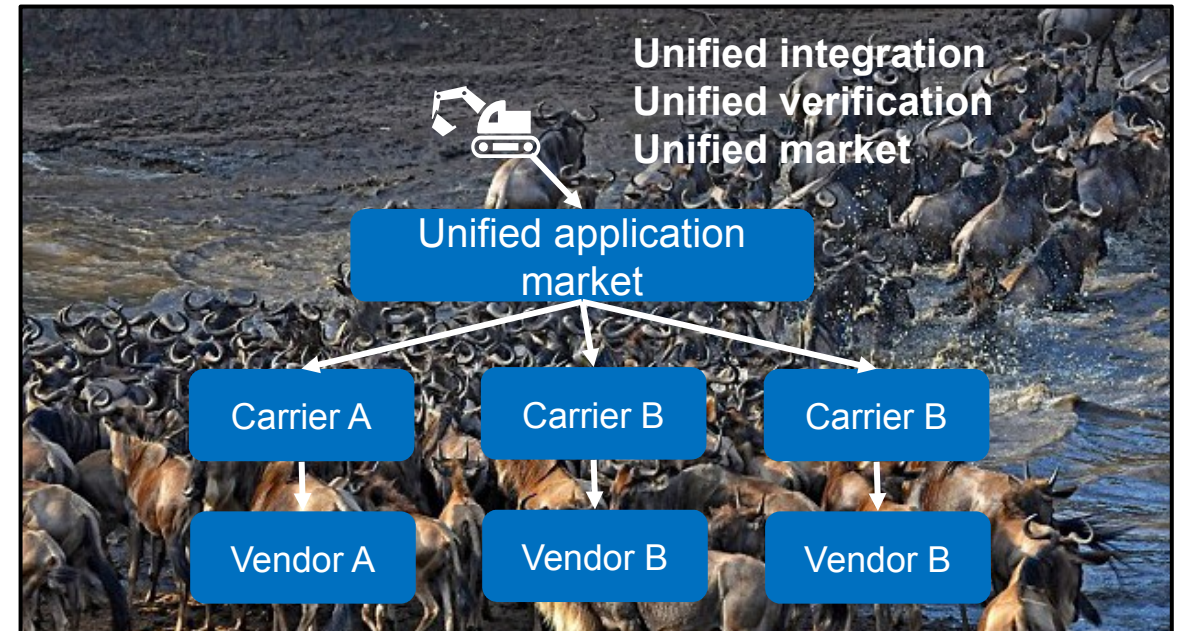
Manually integrated growth mode

Focus on Few application types

Hundreds of applications

- There is no **unified platform** for innovative achievements in the industry. Everything is reorganized from scratch, every year.
- No **closed loop of business** is formed, and projects are almost impossible to replicate.
- There is no drive for innovation, and the **technology growth is slow.**

Large-scale Ecosystems of Edge Computing Industry

Unified integration
Unified verification
Unified market

Unified application market

Carrier A Carrier B Carrier B

Vendor A Vendor B Vendor B

Self-reproduction growth mode

Diversified application types

Millions of applications

- **New Ecosystem:** Building Industry Application Ecosystems with Unified Market and Shared Applications
- **The open and unified market**, unified integration, and unified verification enable convenient circulation of an application across vendors and carriers, reduce application replication costs, and build a large-scale, self-growth, and diversified new ecosystem

EdgeGallery: Open source, Developer Centric, 5G MEC Application Ecosystem
Apache 2.0

Positioning

 Build de facto standards for the 5G edge computing architecture and enable openness in the telecom field.

 Lower the threshold for bringing enterprise applications onboard, form a large scale, and build a B2B business ecosystem.

Value

5G Connection Capability
make 5G accessible

✔ **Interconnection with the 5G network:** interconnected with 5G NEs to implement multi-dimensional dynamic traffic distribution.

✔ **5G capability invoking that complies with the ETSI standard:** wireless information, location, terminal identity, and bandwidth management.

✔ **Efficient network data plane:** Supports multiple network planes and latency sensitive network (TSN).

✔ **Built-in value-added network:** integrates network capabilities such as DNS, FW, NAT, and LB.

Edge Native Platform Architecture
make edge services trustworthy and manageable

✔ **Open platform framework:** plug-in framework, unified governance of applications, services, and APIs.

✔ **Lightweight resource management:** lightweight container/VM management, compatible with heterogeneous hardware accelerations.

✔ **Full-stack security mechanism:** multi-user security isolation, data security, application security, and network security.

✔ **Highly reliable management and operation:** MEC Mesh, blockchain ledger and self-service management.

Diversified and Open Edge Ecosystem
easily bring applications onboard and make business replicable

✔ **Simplified application development:** Agent codeless integration, online IDE tool, online CI/CD, and ARM migration.

✔ **Convenient application verification:** online simulation sandbox and online community 5G trial network.

✔ **Unified application portal:** unified authentication and application sharing for application markets.

✔ **Diversified ecosystem sharing:** integration and interconnection with the public cloud, compatible with the commercial platform.

EDGE GALLERY

EdgeGallery Building Blocks
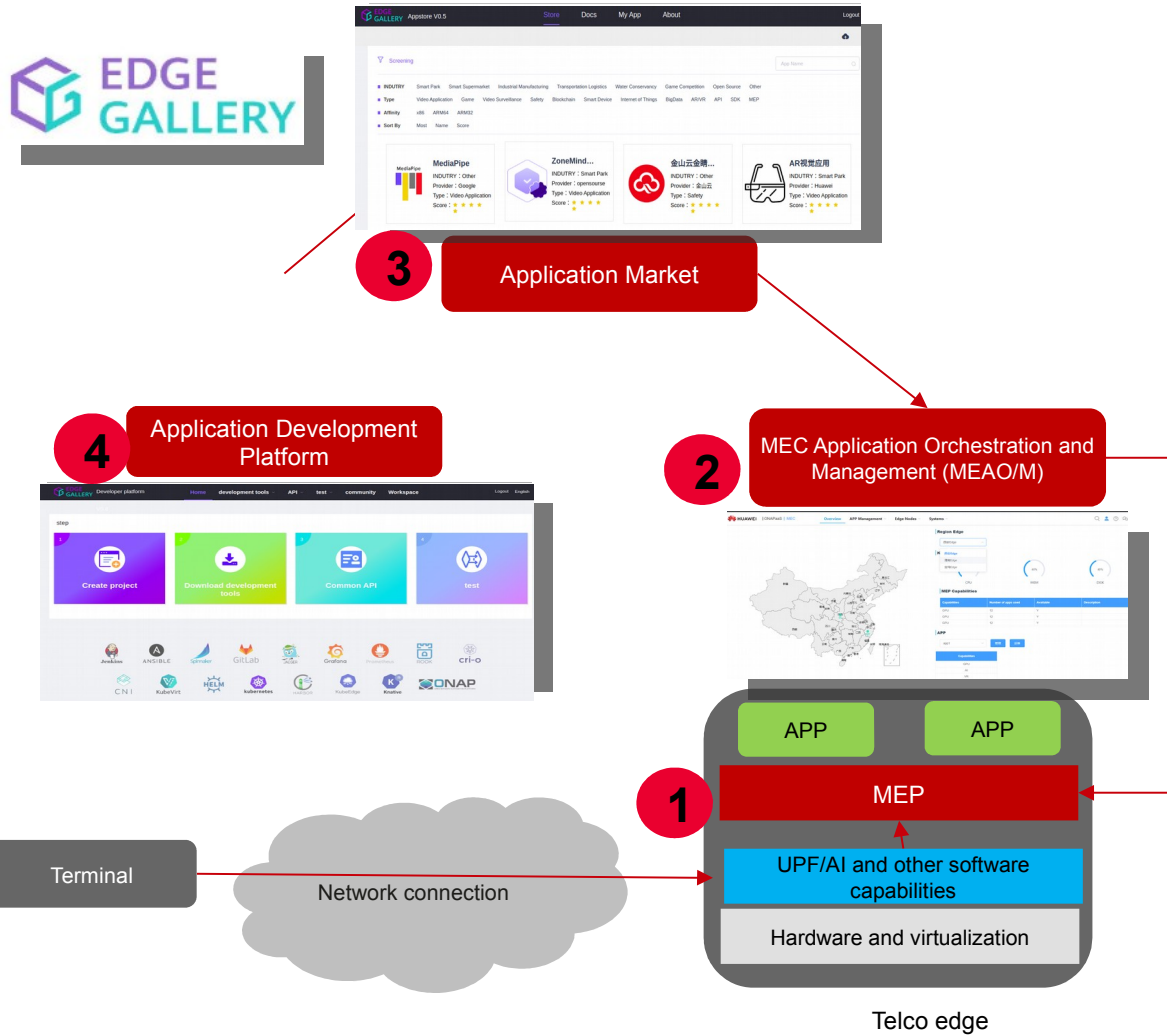
MEP: Autonomous, Rich in Platform & network capabilities, Support heterogeneous architecture

MECM: Application orchestration, Application LCM, FCAPS, Policy driven closed Loop
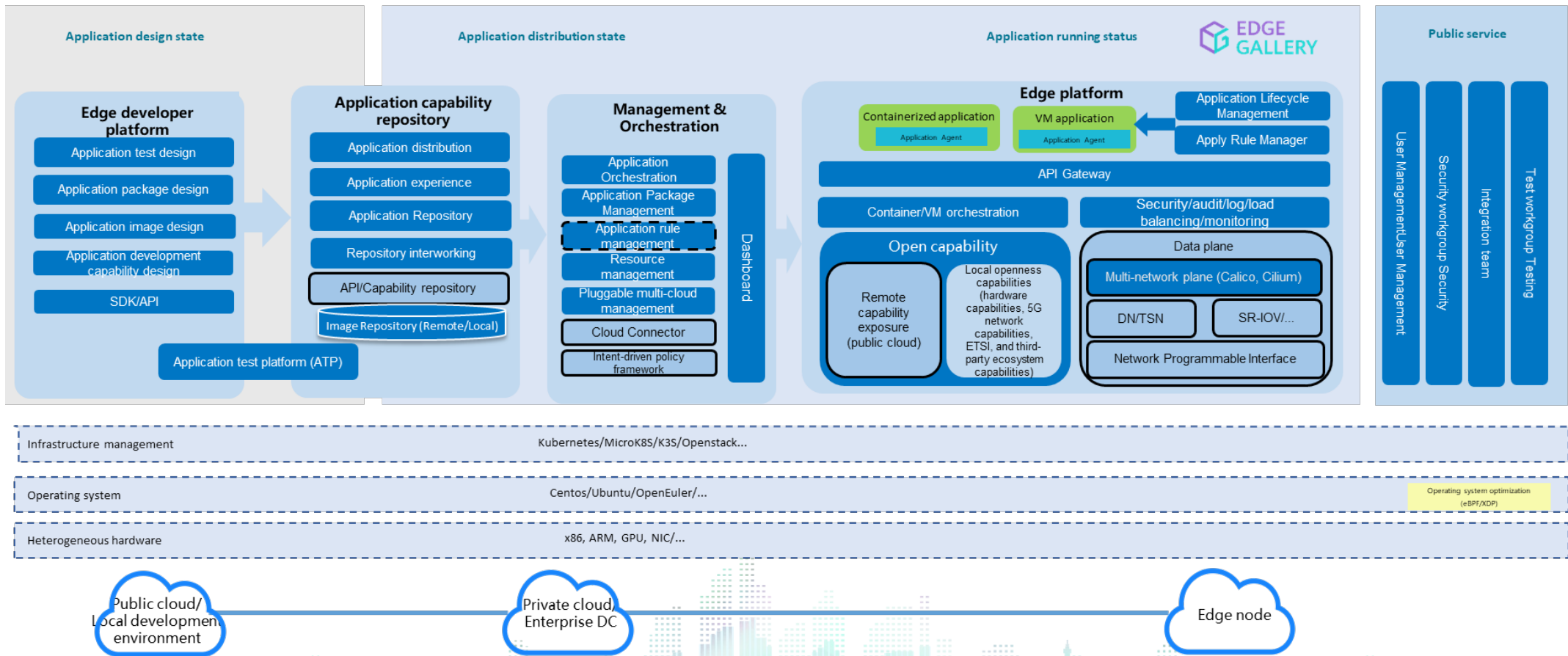
MEC Developer Platform: Provides Tool Chain, SDKs, APIs & Sandbox features for application development, packaging and testing.

MEC App Repository: Unified App Package Format, Standardized API Between Operator App Store and MECM
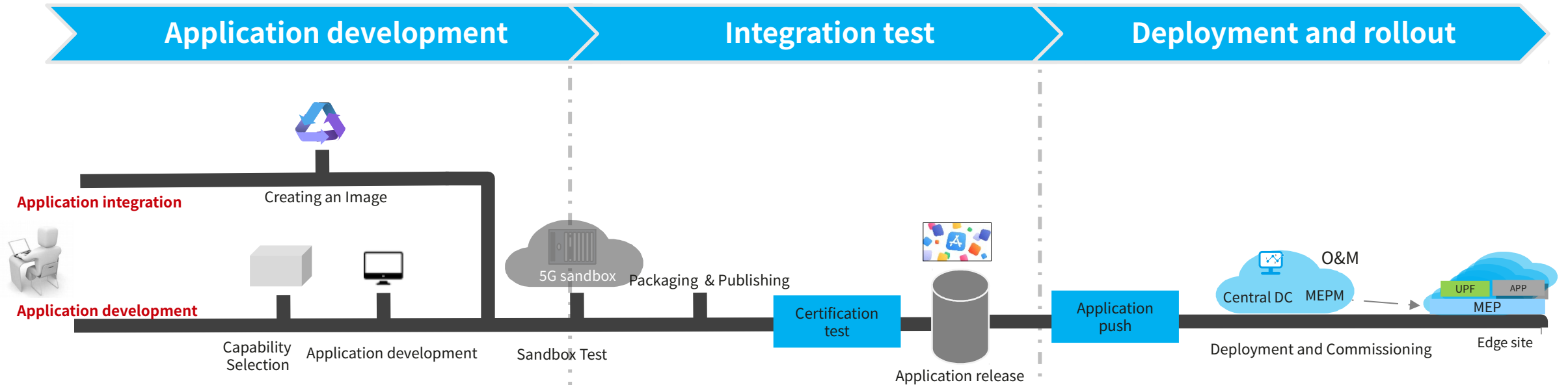
Functional View

Current   Future

Application design state

Edge developer platform
- Application test design
- Application package design
- Application image design
- Application development capability design
- SDK/API

Application test platform (ATP)

Application capability repository
- Application distribution
- Application experience
- Application Repository
- Repository interworking
- API/Capability repository
- Image Repository (Remote/Local)

Application distribution state

Management & Orchestration
- Application Orchestration
- Application Package Management
- Application rule management
- Resource management
- Pluggable multi-cloud management
- Cloud Connector
- Intent-driven policy framework

Dashboard

Application running status

EDGE GALLERY

Edge platform

Containerized application | VM application
Application Agent | Application Agent

Application Lifecycle Management

Apply Rule Manager

API Gateway

Container/VM orchestration | Security/audit/log/load balancing/monitoring

Open capability

Remote capability exposure (public cloud)

Local openness capabilities (hardware capabilities, 5G network capabilities, ETSI, and third-party ecosystem capabilities)

Data plane

Multi-network plane (Calico, Cilium)

DN/TSN | SR-IOV/...

Network Programmable Interface

Public service

- User Management/User Management
- Security workgroup Security
- Integration team
- Test workgroup Testing

Infrastructure management — Kubernetes/MicroK8S/K3S/Openstack...

Operating system — Centos/Ubuntu/OpenEuler/... — Operating system optimization (eBPF/XDP)

Heterogeneous hardware — x86, ARM, GPU, NIC/...

Public cloud/Local development environment — Private cloud/Enterprise DC — Edge node

✓ **Industry-friendly: model-driven, scenario-specific, and codeless/low-bit-rate applications** - Resolve the problem of application replication.

✓ **Developer-friendly: full-journey design, development design, deployment, commissioning, and installation for developer experience-oriented applications**
   - Resolve the problem of high development requirements.

✓ **Business-friendly: unified authentication, distributed federation, and integrated development and O&M of DevSecOps edge security**
   - Resolve the issue of difficult commercial monetization.

✓ **Friendly deployment: Infrastructure independent, modular design, and on-demand deployment, meeting different application scenarios**
   - Resolve diversified industry deployment issues.

EDGE GALLERY

Wizard-based Application Development, Test and Deployment

Application development	Integration test	Deployment and rollout

Application integration

Creating an Image

Application development

Capability Selection

Application development

5G sandbox

Sandbox Test

Packaging & Publishing

Certification test

Application release

Application push

O&M

Central DC   MEPM

UPF   APP

MEP

Deployment and Commissioning

Edge site

Optimized app development and deployment process.
- Provide an E2E tool chain for existing application integration and new application development scenarios.
- Provides 5G environment to meet different development and test requirements.

App Verification/Certification tool chain
- Provides an app test and certification platform for carrier partners to customize certification test cases.
- App certification reports are provided to verify the compliance between apps and carriers' live network specifications.

Deployment & Rollout
- Provides the distributed federation capability of app repositories to implement interworking with third-party app repositories.
- Visualized deployment & commissiong of application to desired edge(s).
- Monitoring of deployed application(s)

GALLERY

EdgeGallery Community

25+ Participating companies

40+ Applications

categorization	Quantity	Scenario
B2B enterprise	20+	Security, categorize, traffic, robot
B2C consumers	20+	Game, VR

Focus on five industry scenarios

- Smart campus
- industrial manufacturing
- Transportation and logistics
- gaming
- Security and others

EdgeGallery Contribution (200+Kloc)
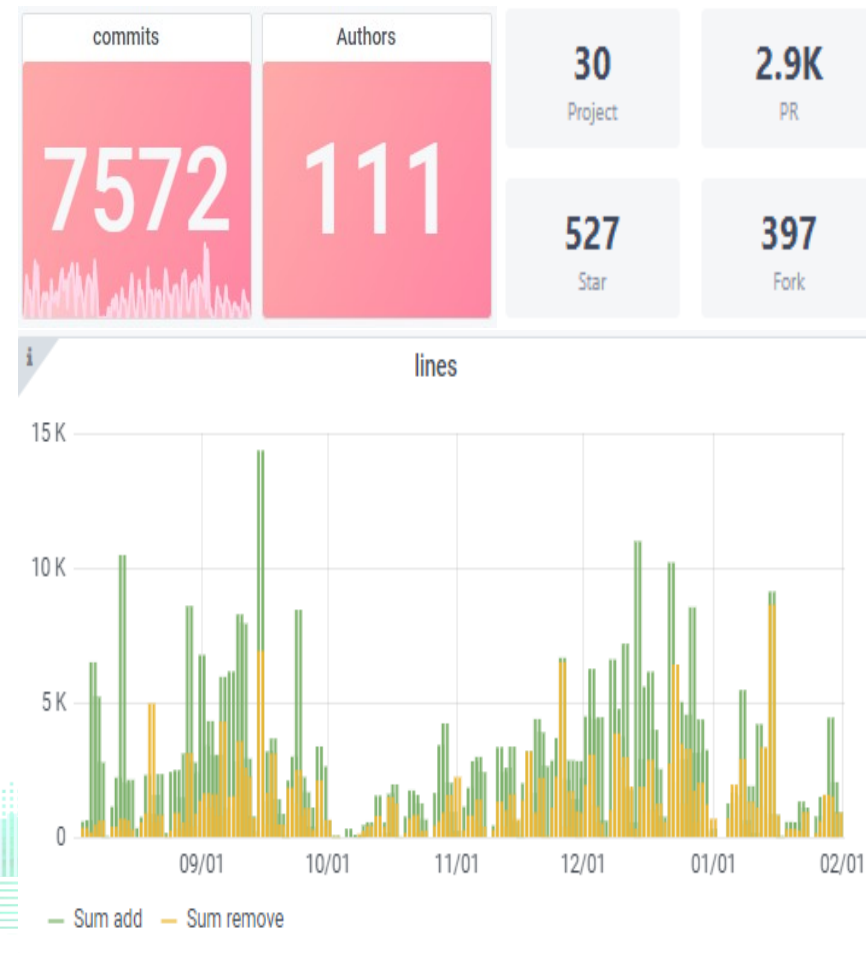
EdgeGallery and Industry Collaborations

- Huawei, China Mobile, Tencent, and ARM have initiated the 5G MEC BP in Akraino.
- The EdgeGallery is the upstream project of the BP.

- This function is used as the reference implementation of the Operator Platform.
- Defines the MEC NBI.

- The only open source project that complies with the ETSI MEC architecture.
- Compatible with ETSI API standards
- Participate in ETSI Plugtest 2020

- Work with CAICT to deploy EdgeGallery on the 5G trial network in Shenzhen.
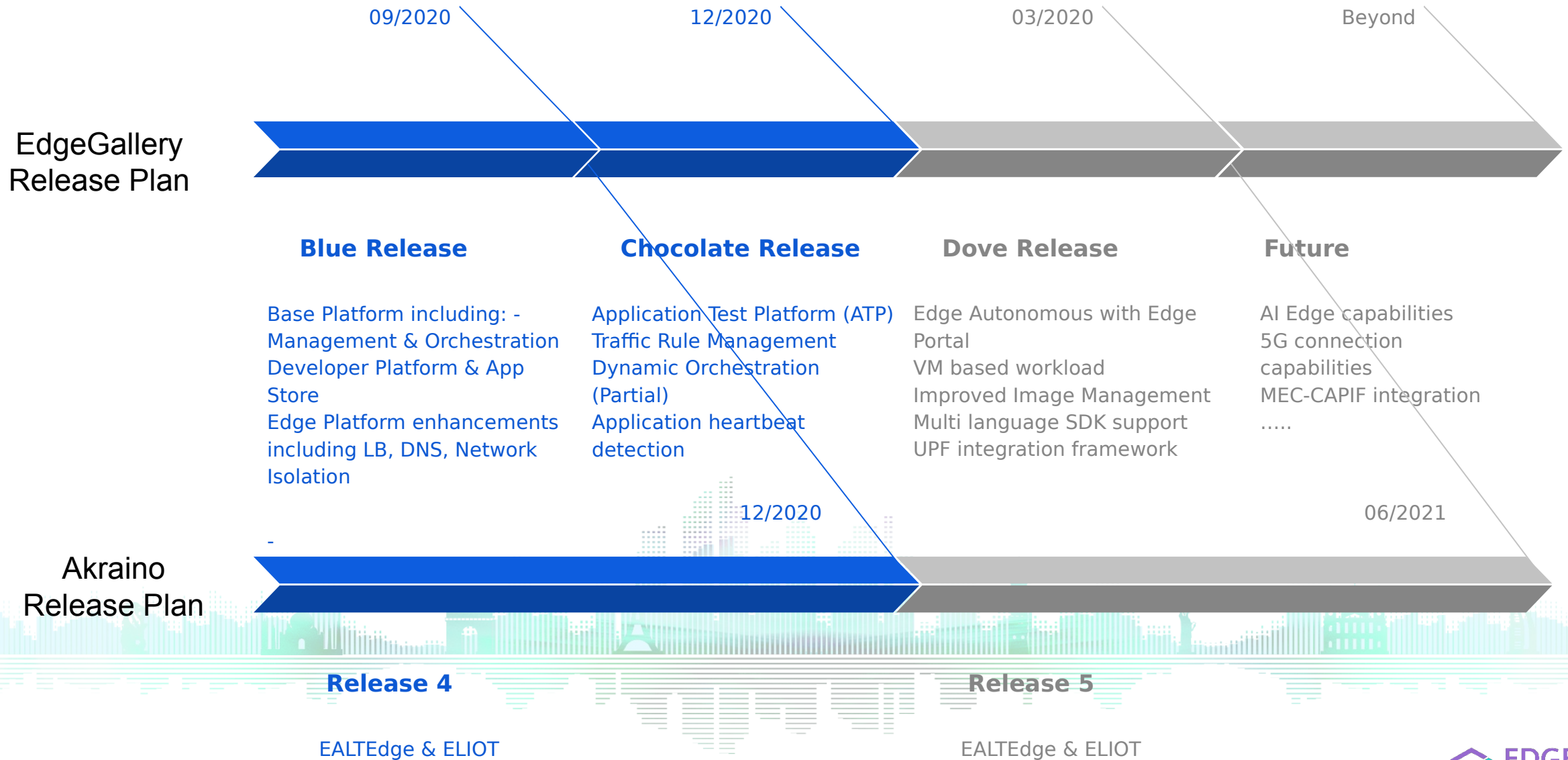- Jointly incubate the 5G MEC application ecosystem.

- Jointly recommend the 5G MEC application verification lab.
- Cooperation on MEC cyber security topics.

- EdgeGallery is an innovative platform for 5G NDA.
- Reference implementation of the 5G DNA deterministic network capability.

EdgeGallery & Akraino Release Mapping

EdgeGallery
Release Plan

09/2020
12/2020
03/2020
Beyond

Blue Release

Base Platform including: -
Management & Orchestration
Developer Platform & App
Store
Edge Platform enhancements
including LB, DNS, Network
Isolation

Chocolate Release

Application Test Platform (ATP)
Traffic Rule Management
Dynamic Orchestration
(Partial)
Application heartbeat
detection

Dove Release

Edge Autonomous with Edge
Portal
VM based workload
Improved Image Management
Multi language SDK support
UPF integration framework

Future

AI Edge capabilities
5G connection
capabilities
MEC-CAPIF integration
.....

12/2020
06/2021

Akraino
Release Plan

Release 4

EALTEdge & ELIOT

Release 5

EALTEdge & ELIOT

EDGE GALLERY

Lets Build a unified 5G MEC industry platform!

| Official website | Code Repository | WeChat assistant |

https://www.edgegallery.org   https://gitee.com/EdgeGallery

Welcome to the EdgeGallery community.

Making EdgeGallery a de-facto 5G MEC Platform by collaborating with APP Vendors, Operators, SDOs, Open source communities globally.

Thank you.