Aarna Networks

Zero Touch Cloud Native 5G and Edge Computing for B2B Use Cases - Accelerate rollouts, reduce OPEX

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Sponsored by Oracle for Startups program

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About this report

Based on direct interviews with the co-founder, Amar Kapadia, this brief report introduces Aarna Networks, one of the many startups supported by the Oracle for Startups program.

Aarna Networks is an exciting and innovative business providing a vendor-independent platform to manage and orchestrate workloads across 5G networks and Edge devices.

The theme for this month is around startups in the 5G communications sector and how they are innovating and changing the competitive landscape.

CX-Create is an independent IT industry analyst and advisory firm, and this report is sponsored by the Oracle for Startups program team.

The business context for Aarna Networks

Key drivers

Digital transformation and the need for rapid innovation

Businesses are busily transforming and digitizing their operations, supply networks, and customer engagement capabilities across all sectors. Many are also adapting their business models to access new opportunities and offset the twin economic ravages of commoditization and the Covid-19 pandemic.

The need for end-to-end automation and real-time responses has never been greater, and developments in cloud native infrastructure and edge technologies coupled with emerging 5G networks represent a massive transformational opportunity to innovate faster and at a lower cost. This decade, we can expect considerable innovation from autonomous driving to smart cities, factories, farming, VR/AR, and holographic conferencing and gaming. All of which depend on 5G and edge computing.

A 2020 study by Nokia Bell Labs estimates that 5G will add $8 trillion to global GDP by 2030.

Elasticity and complexity

On the downside, this combination of 5G network services, cloud-provisioned applications, and edge devices introduces exponential software complexity. It must be managed and optimized to serve each organization with competing initiatives such as assembly line automation vs. real-time customer experience delivery. It is a massive challenge in mixed application and edge device environments where no single vendor or service provider controls all the parts. The Nokia Bell Labs study also highlighted concerns over complexity and the lack of domain expertise as significant barriers to deployment.

To take advantage of 5G networks, edge services, and cloud native applications, enterprises will need the means to manage their networks and orchestrate digital workloads and traffic across highly dynamic environments.

It is this complex challenge that has given rise to Aarna Networks.

Key observations
- Aarna Networks eliminates the complexity associated with 5G and Edge networks
- Aarna Networks Multi Cluster Orchestration Platform delivers orchestration, lifecycle management, and policy-driven automation
- Aarna Networks delivers successful proofs of concept
- Oracle Cloud Infrastructure and the Oracle for Startups program prove their value
- Within one year, Aarna Networks will transition to 5G & Edge-as-a-Service

Aarna Networks the story so far

The beginning
Aarna Networks was co-founded by Amar Kapadia and Sriram Rupanagunta in 2018. The startup is headquartered in San Jose, USA, and has a development team in Bangalore, India. This was Kapadia and Rupanagunta's second startup, the first being an ethernet company in 2001, sold to Emulex in 2006, which Broadcom acquired and is now a leading ethernet provider. Kapadia is steeped in connectivity, and from his time at Mirantis, an OpenStack company, he honed his skills in network virtualization.

In recognition of the need for real-time zero latency, the initial aim of Aarna Networks was to connect end devices to edge applications via 5G. Critical use cases envisaged included:

- Industrial assembly lines with robotic edge devices and augmented reality plant maintenance
- Diagnostic equipment and pain management in hospitals
- Farming - optimizing planting by connecting onboard devices in tractors or combine harvesters with real-time information to improve crop yields
- Multiple real-time camera angles to augment the experience for fans to see the intricacies of play at sports stadiums.
- Compliance – where sensitive data must be secured and remain on-site behind the firewalls of a company's own data center.

Aarna Networks eliminates the complexity associated with the management of 5G and Edge networks
The co-founders realized that 5G and Edge brings exponential complexity to the communications network and edge computing application environment. To address this, they have developed a cloud native Multi Cluster Orchestration Platform (AMCOP). Its purpose is to orchestrate, manage the lifecycle and provide control loop automation for 5G network services and edge computing applications in B2B settings.

To give some idea on the degree of complexity in an industrial assembly plant or even a hospital, the number of manual steps could easily reach a staggering 200 million. Here's how: configuring the service mesh, firewall, network address translation (NAT), load balancer, Kubernetes network policies, and cluster-specific configuration would involve around 20 steps. Multiplied by 10,000 edge locations and interactions with around 1,000 applications, not unlikely in a factory or hospital, the manual steps soon add up: 20 x 10,000 x 1000 = 200 million. It is impractical and would be a waste of resources.This is why a multi-domain orchestration solution is required to hide this complexity, enabling businesses to reap the rewards of 5G and Edge computing and evolve their networks without interruption when adding new functional capabilities.

In Kapadia's own words, '*we exist to eliminate this complexity, improving the reliability of 5G Edge networks and reducing costs*.'

Solution overview

Application management is critical

According to Kapadia, an ideal 5G and Edge implementation has three key attributes:

1. **Zero-touch** – autonomous management of 5G network services and edge computing applications
2. **An extensive app catalog** – of cloud native network functions (CNF) and cloud native applications (CNA) to solve industry-specific problems
3. **Private & public connectivity** – for interactions between private and public networks, e.g., spectrum reuse, slice peering, public slice, roaming, and anchoring

Put simply, the Aarna Networks solution, once configured for a client and supported by some admistrative training, ensures that whatever the underlying complexity, the 5G network and edge computing environment runs flawlessly without needing an army of specialist engineers.

Aarna Networks Multi Cluster Orchestration Platform delivers orchestration, lifecycle management, and automation
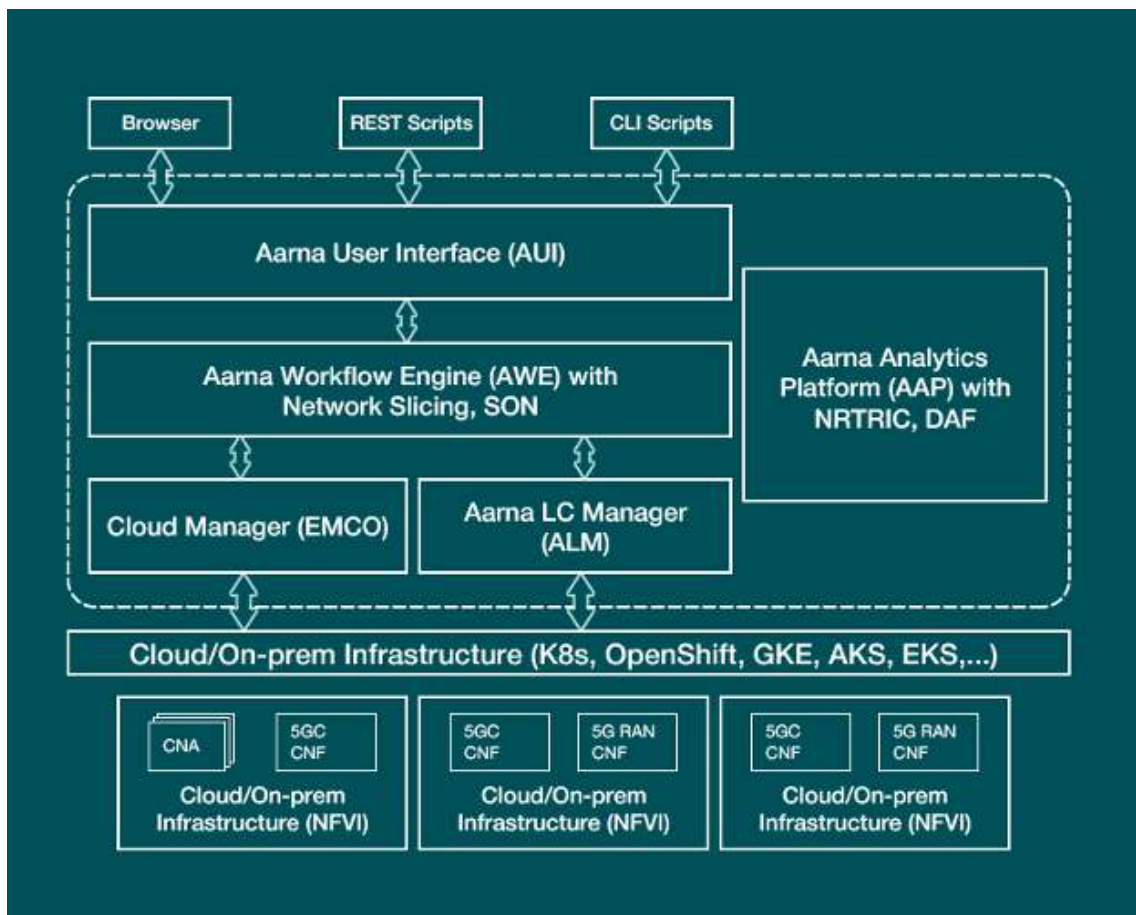

Figure 1: Multi Cluster Orchestration Platform (AMCOP) – Source: Aarna Networks

In the 5G and Edge computing world, everything is controlled by software, so specialized hardware is no longer needed. The architecture of AMCOP 2.0 is outlined in Figure 1. The solution performs three main tasks: orchestration, lifecycle management, and policy-driven closed-loop automation. It also provides support for network slicing to ensure prioritized workloads can run predictably. Above all, it replaces the complexity inherent in traditional manual approaches to managing these three critical tasks.

Aarna Networks AMCOP, currently in its second release, is cloud native, based on Open Source standards, and supports common 5G component standards such as network function virtualization (NFV), multi-access edge computing (MEC) platforms, and others like ETSI, 3GPP, MEF, and TMForum.

Faster roll-out massively reduced operational costs and greater customer satisfaction

By eliminating the manual provisioning and management burden, 5G and Edge networks can be rolled out fast at much lower costs. This allows organizations to evolve their networks more quickly and add new workloads to boost operational capabilities and accelerate innovation.

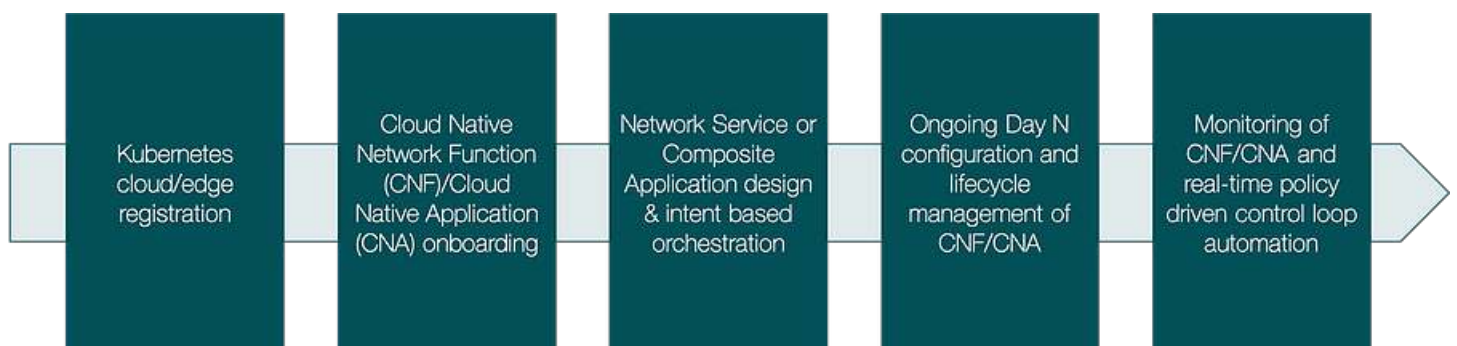Figure 2. outlines the sequence of tasks AMCOP executes.

FIGURE 2: TASK SEQUENCE EXECUTED BY AMCOP SOURCE: AARNA NETWORKS

The add-on, AarnaStream™, provides value network slicing, analytics (NONRTRIC, DAF), and SON.

Current position

Aarna Networks delivers successful proofs of concept

Aarna Networks has run four proofs of concept, presented at the Linux Foundation Networking Developer & Testing Forum. These presentations are intended for a technical audience and are available as recordings online.

Aarna Networks collaborated with several heavyweight organizations from academia, cloud and data center providers, communications and content providers, engineering, and large-scale manufacturers.

Major names include:

- Academia – John Hopkins University
- Cloud technology providers – Equinix, Oracle (using OCI for development), and Red Hat
- Content providers - Facebook
- Manufacturers like Airbus, Intel, and Rakuten
- Network specialists – Juniper Networks
- Specialist engineering firms such as Altran, part of Cap Gemini Engineering, and Tata Communications
- Telecommunications companies – Globe, Orange, T-Mobile, and Verizon

The POCs are now proven, and Aarna Networks expects to launch in the first half of 2022. The current constraint is a lack of 5G devices. However, according to the Global mobile Suppliers Association (GSA), the number reached 938 in July 2021, up from 588 at the end of January and 24% over the previous three months. Not all are commercially available, however as the pace accelerates, 2022 is likely to be a good year for Aarna Networks.

Current investors
Current investors include Perot Jain Ventures, KAAJ Ventures, Arka Venture Labs, and angel investors: Raju Reddy and Krishna Yarlagadda.

Oracle Cloud Infrastructure and the Oracle for Startups program prove their value
Aarna Networks developed AMCOP on the Oracle Cloud Infrastructure (OCI), selected for its high performance and security characteristics. The Bare Metal servers provide the scalability required for potentially massive workloads.

The Oracle for Startups program was also attractive economically with credits and a 70% discount over two years. The program has also provided additional exposure and additional opportunities for business development. When asked if Kapadia would recommend the Oracle for Startups program, he responded immediately with, 'Absolutely – the team and OCI combination have proved their value.'

Future direction

Within one year, Aarna Networks will transition to 5G & Edge-as-a-Service
Over the next twelve months, Kapadia expects Aarna Networks to transition from a software company to deliver 5G and Edge as-a-service. Currently, each reference architecture requires careful configuration, taking into account the unique setup of each client company. As the library of use cases expands, Kapadia anticipates that it will become much easier to configure, price, and provision 5G and Edge-as-a-service. The potential to extend Aarna Networks' strategic relationship with Oracle may also extend to include Oracle's CPQ solution as part of the as-a-service platform.

Go-to-market model
Currently, Aarna Networks partners with major systems integrators and also machinery and robotic automation manufacturers. Its extensive collaborative POC ecosystem is also likely to drive future opportunities. It has also conducted interoperability testing with several cloud and app providers,

including A10 Networks, Microsoft, Altran, Amantya Technologies, Mobilieum, Palo Alto Networks, Benu Networks, Red Hat, and Ulak.

If the company successfully transitions to 5G and Edge-as-a-service, it will provide an additional route to market.

CX-Create's viewpoint

The future for Aarna Networks looks extremely promising. The market for its solution is still at the early stages, and the message of simplicity over complexity at lower cost is likely to resonate as companies continue to transform and modernize.

5G and Edge offers tremendous scope for innovation across operations, customer experience, and delivery of new services and experiences.

Rapid adaptation will be the hallmark of successful businesses, able to capture external signals, make sense of them and act fast. Complexity will be more of a barrier to progress than a near-term lack of 5G devices. Aarna Networks, therefore, fulfills a genuine need to simplify and automate and strip out unnecessary costs.

Summary details
Table 1: Fact sheet

Solution name	Aarna Networks Multi Cluster Orchestration Platform (AMCOP 2.0)	**Solution category**	5G + Edge network management
Key industries	B2B –Aerospace, automotive, industrial, healthcare providers, precision farming	**Geographies**	Global
Deployment model	SaaS	**Licensing basis**	Subscription
Size of organizations served	Large enterprises	**Go-to-market model**	Via reseller partners – SIs and robotic automation manufacturers
Number of employees	23	**Key partnerships**	Oracle for Startups & OCI for development + a collaborative development ecosystem. Systems integrators and edge device manufacturers.
URL	www.aarnanetworks.com	**HQ**	San Jose, USA

Appendix

About CX-Create

Jeremy Cox founded CX-Create Limited in January 2021, a former principal analyst at Omdia (formerly Ovum) focused on customer engagement strategies and platforms.

He is recognized by major CX vendors, clients, and former colleagues as a leading thinker in customer experience and engagement. Formative experiences in the 1990s at IBM convinced him of the critical importance of understanding the business world from the outside-in. These insights were put to practical use in his former roles as a principal CRM consultant at KPMG Consulting and as an independent consultant supporting public and private sector organizations.

Our mission

CX-Create's mission is to help enterprises and the vendors that serve them remain relevant. The company's primary focus is to track and understand the constantly evolving customer experience world and share those insights with clients. Continuous innovation is also an essential component of persistent customer relevance, directly and indirectly, which is why we are enthusiastic about startups and the Oracle for Startups program.

Further reading

Four communications industry trailblazers accelerate monetization of 5G and Edge

Oracle gives startups a big lift and a boost for continuous innovation

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