p *+61 1300 113 112*
e *info@hyperscalers.com*

Solving Information Technology's
Complexity

Hyperscalers RackN Appliance

Introduction document

Hyperscalers with RackN

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1 INTRODUCTION

Hyperscalers RackN Appliance solves the problem of Infrastructure Automation and Orchestration (IAO)/ Bare Metal Provisioning (BMP) and Infrastructure as a Service (IaaS)/ Infrastructure as Code (IaC) within data centres. Hyperscalers in partnership with RackN offers Digital Rebar Platform (DRP) to solve this problem and ease the management of physical hardware of Enterprises, Cloud providers and Co-location operators.

The purpose of Digital Rebar is removing the common, repetitive, non-value-added toil that most IT operations teams struggle with every day. It does not require complex components, infrastructure, and knowledge because we think that's the way it should be.

We help operations teams two ways:

1. by providing an automation catalog that covers the most common hard IT challenges like installing operating systems, updating firmware and building inventories.
2. by including a strong Infrastructure as Code process that encourages teams to reuse and standardize processes beyond our catalog

We know that a strong infrastructure foundation leaves companies to focus on the value-added work [1].

Streamlined Multi-O/S Provisioning

- Network Boot via PXE, IPXE
- Multi-Operating System – Linux, Windows, VMware
- Multi-Architecture – Intel, AMD, ARM64
- Image Based Deployment – Linux, Windows, VMware
- Immutable Operating Systems
- Boot via Media Attach
- Secure Boot Enabled [2]

Full Bare Metal Lifecycle with or without Out-of-Band Management

- BMC protocols including IPMI, Redfish, Vendor API, and none
- RAID configuration
- BIOS & Firmware configuration
- Automatic Discovery, Inventory and Classification
- VMware ESXi and VCF installation [2]

RackN Digital Rebar Platform tries to fill in the following three unique gaps left by other automation tools.

Integrating Provisioning and Configuration

Filling the gaps in the industry required RackN to create a workflow system that seamlessly blends provisioning and configuration actions throughout a components lifecycle. *For bare metal infrastructure*, that means coordinating the many protocols and management operations needed to bootstrap, flash, and install a server into what appears to be a single process. *For virtual and cloud infrastructure*, that means normalizing and coordinating the many APIs required with post-provisioning operations such as handing off between Terraform and Ansible [2].

Reuse from Modular and Portable Infrastructure as Code (IaC)

Building an integrated workflow platform is not sufficient; we had to ensure that the automation we created could be used broadly and shared across different customers. This presented two distinct challenges. First, our target customer sites are secured so our solution needed to be portable and versioned in a way that allowed customers to download and install it themselves. Second, we had to accommodate the heterogeneous, multi-vendor nature of infrastructure in a stackable modular way that allowed customers to select just the components they needed [2].

Connecting Sites with Decentralized Management

Our *on-premises, air-gap ready* platform played a critical role in our distributed management design. Site autonomy is a customer requirement that creates resilient architectures when applied generally. Without the option of centralized control, RackN built a federated system based on loosely coupled sites that mirror each other's data. Our modular IaC system is the keystone to a model's success because it allows operators to maintain a consistent automation baseline throughout the system [2].

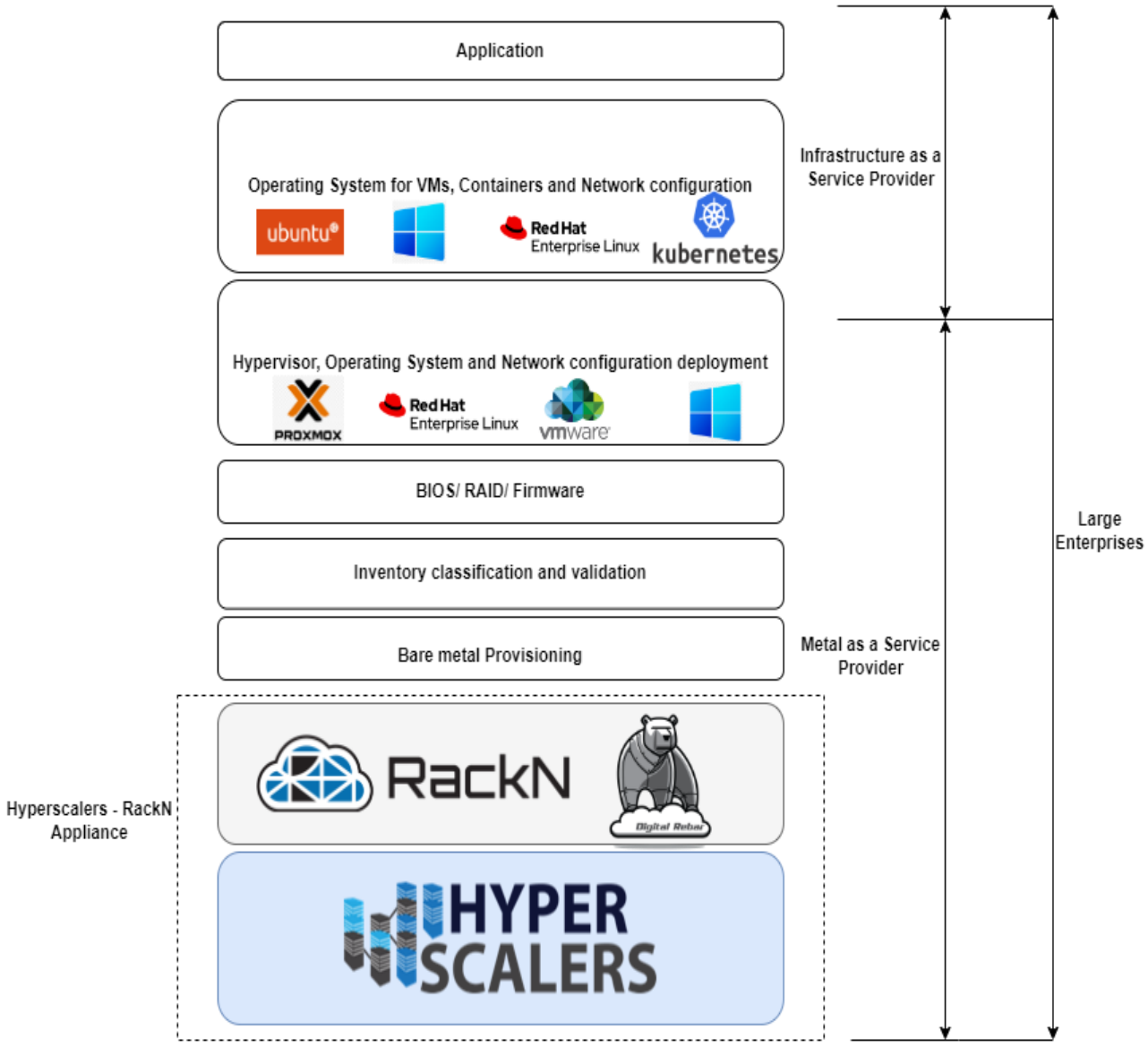

Figure 1 Hyperscalers - RackN Appliance

2 HYPERSCALERS FEATURED HARDWARE

Hyperscalers have identified the hardware configurations that can be categorised based on the customer use cases as the below. RackN appliance can be deployed in any of these high-performance servers.

S5X – 1U

S5K-1U

S5X-1U [3]	CPU – 2 x 3rd gen Intel® Xeon Scalable processor (Up to 270W) Memory – Up to 8TB in 32 Slots System Management - Redfish v1.1, IPMI v2.0 Compliant, on board "KVM over IP" support Storage - 12 x 2.5" drive bays + 2 x M.2 slots (All flash)
S5K-1U [4]	CPU – 2 x AMD EPYC™ 7002/7003 Series Processors (Up to 280 W) Memory – Up to 4TB in 32 Slots System Management - Redfish v1.1, IPMI v2.0 Compliant, on board "KVM over IP" support Storage - 12 x 2.5" drive bays + 2 x M.2 slots (All flash)

3 FEATURES OF HYPERSCALERS RACKN APPLIANCE

Hyperscalers RackN Appliance provides best in class Infrastructure Automation and Orchestration (IAO)/ Bare Metal Provisioning (BMP) and Infrastructure as a Service (IaaS)/ Infrastructure as Code (IaC) supporting a wide range of processes and systems. RackN is also able to integrate with existing MaaS by having them hand off to the RackN agent to complete installation of operating system.

For Metal as a Service Providers

RackN Features:

• BMP is only a small stage as part of system commissioning, so integration and handoffs are critical.

• BMP should not be treated as a onetime activity. Best practice data centres assume a constant refresh cycle for operating systems [5].

RackN Differentiators:

• RackN offers highly available and high scale configurations for IAO/BMP. Unlike vendor server management wrappers, our designs assume customers are driving IAO from other automated processes that rely on consistent results with accurate feedback.

• RackN small footprint can be run and managed from a top of rack switch to minimize data center overhead.

• RackN provides many performance enhancements for IAO that improve provisioning speed 10x or better.

• RackN offers image-based deployments for a wide range of O/S.

• RackN has advanced integrations for VMware ESXi that provides unmatched control of the process.

• RackN discovery and templating process simplifies IAO/BMP processes by allowing configurations to be automatically customized for each system

• RackN DHCP integrations enable improved performance and control compared to other BMP systems that rely on an external DHCP system.

• RackN supports advanced security configuration that reduce or eliminate insecure protocols during BMP.

• RackN workflows and classifiers allow systems to be provisioned without any human input when needed [5].

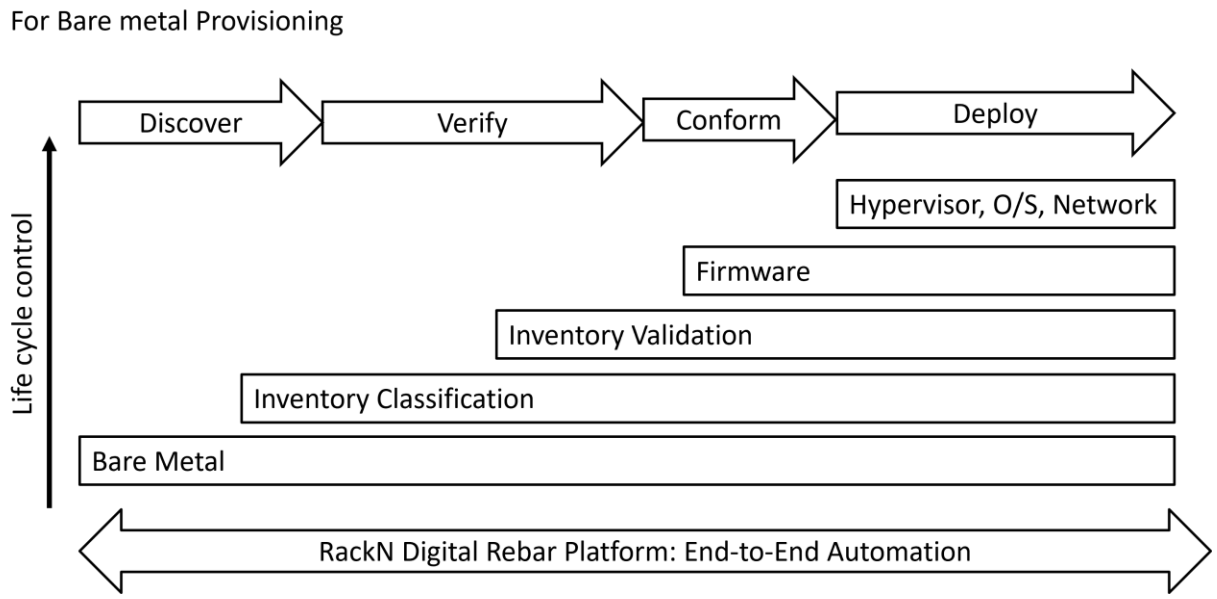

Figure 2 Generic Pipeline for Bare Metal Provisioning [6]

For Infrastructure as a Service Providers

Multi-cloud Infrastructure as a Service (IaaS)/ Infrastructure as Code (IaC) is a tooling category that allows developers to automate infrastructure building and teardown operations against cloud Application Programming Interfaces (API). This allows teams to define multisystem environments in a declarative way to be built automatically using a cloud API (aka an Infrastructure as a Service or IaaS). These tools are designed as a middle layer between an IaaS and Configuration Management (CM) systems, so they require customers to maintain both systems. While RackN provides bare metal IaaS APIs to enable IaC integrations, it also offers a complete IaC feature capability that integrates with our other control features [5].

RackN Features:

• Infrastructure as Code is an important design discipline for scale operators and is highly encouraged by RackN.

• RackN content and workflows provide all the features of an IaaS platform with significantly more control and state management.

• RackN bare metal APIs are designed for easy self-service by IaaS tools while also being highly transparent for operators to monitor and support self-service users [5].

RackN Differentiators:

• Since RackN API keeps running service, it is able to maintain the state of the system in addition to providing declarative configuration.

• RackN events and plugins allow operators to integrate IaaS actions into other workflows and notifications.

• RackN content management system is both versioned and code controlled to be an ideal IaaS format.

• The unique RackN composable architecture allows teams to collaborate on IaaS components with clear separation of duties [5].

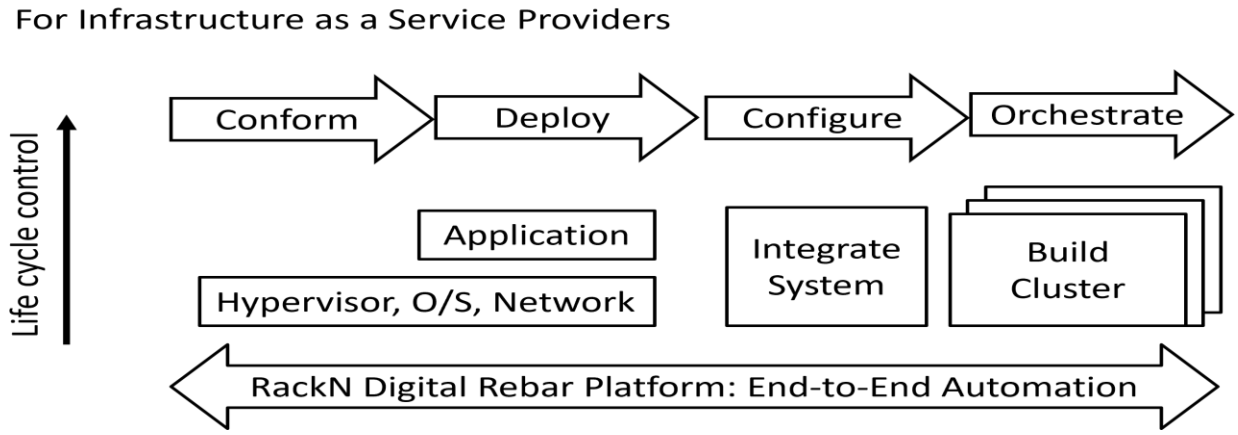

Figure 3 Generic Pipeline for Infrastructure as a Service Providers [6]

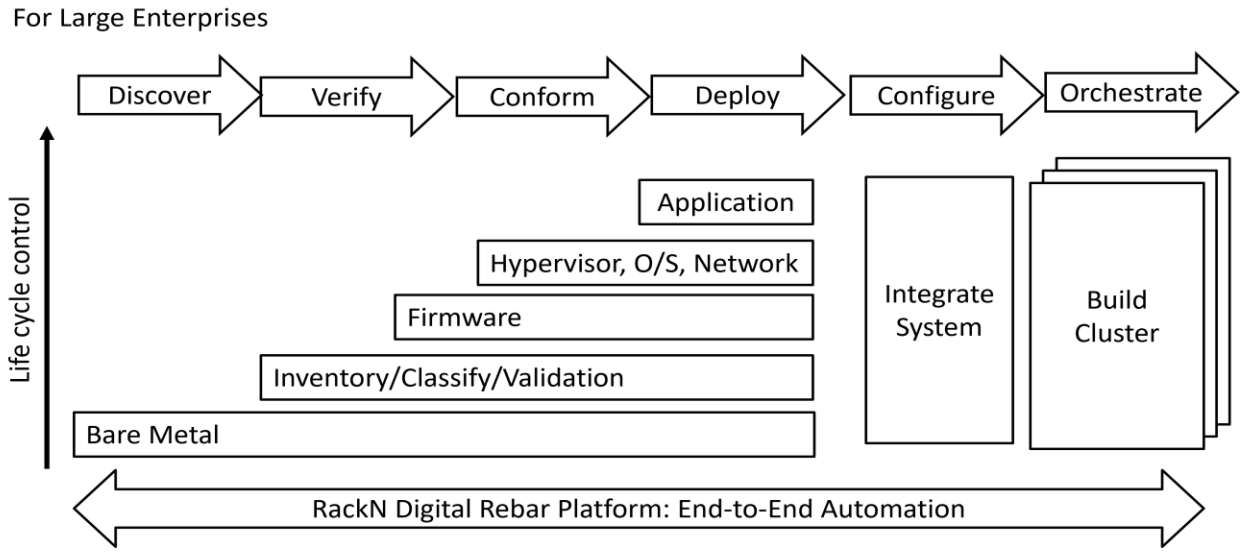

Figure 4 Generic pipeline for large enterprises [6]

4 WHO WE ARE?

Hyperscalers [7] is the world's first open supply chain Original Equipment Manufacturer- OEM, solving Information Technology challenges through standardization of best practices and hyperscale inspired practices and efficiencies. Hyperscalers offers choice across two open hardware architectures:

- Hyperscale - high efficiency open compute equipment as used by macro service providers
- Tier 1 Original – conventional equipment as per established Tier 1 OEM suppliers.

Each architecture is complete with network, compute, storage, and converged GP GPU infrastructure elements, and is open / free from vendor lock-in.

Hyperscalers' appliance solutions are packaged complete with hardware, software and pre-built (customisable) configurations. These were all pre-engineered using an in-house IP Appliance Design Process and validated in partnership with associated major software manufacturers. Many can be "test-driven" using Hyperscalers Lab as a Service (LaaS). Hyperscalers appliance solutions are ideally suited to IaaS PaaS and SaaS providers looking to implement their services from anywhere.

RackN [8] is founder-owned, profitable software company specializing in data center automation based in Austin, Texas. The RackN team has made careers in data center infrastructure and automation. We were founded by engineers who experienced the challenge of data center operations with companies like Dell, IBM, Netapp, Symantec, USMC. And we've been founders at start-ups in the infrastructure space building leading cloud, networking and storage capabilities. Our vision comes from a belief in the transformational power of automation for completely managing the IT foundational layer (aka bare metal). We improve data center operations by making advanced techniques from cloud operators accessible at any scale site and between sites.

5 REFERENCES

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