DATASHEET

Rakuten Symphony

Symworld™ Cloud Native Platform

For Service Providers

Symworld™ Cloud Native Platform (CNP) is a superior Kubernetes cloud platform that runs both containers and Virtual Machines (VM), built from the ground up to outperform incumbent cloud solutions, provide industry leading features and flexibility, with unprecedented ease-of-use and automation.

Symworld™ CNP is ideal for providers looking to deploy Open Radio Access Networks (O-RAN), 5G Core, Private 5G, Multi-access Edge Compute (MEC) and enterprise applications, with an "as-a-service" model, in a secure, multi-tenant and roles-based environment.

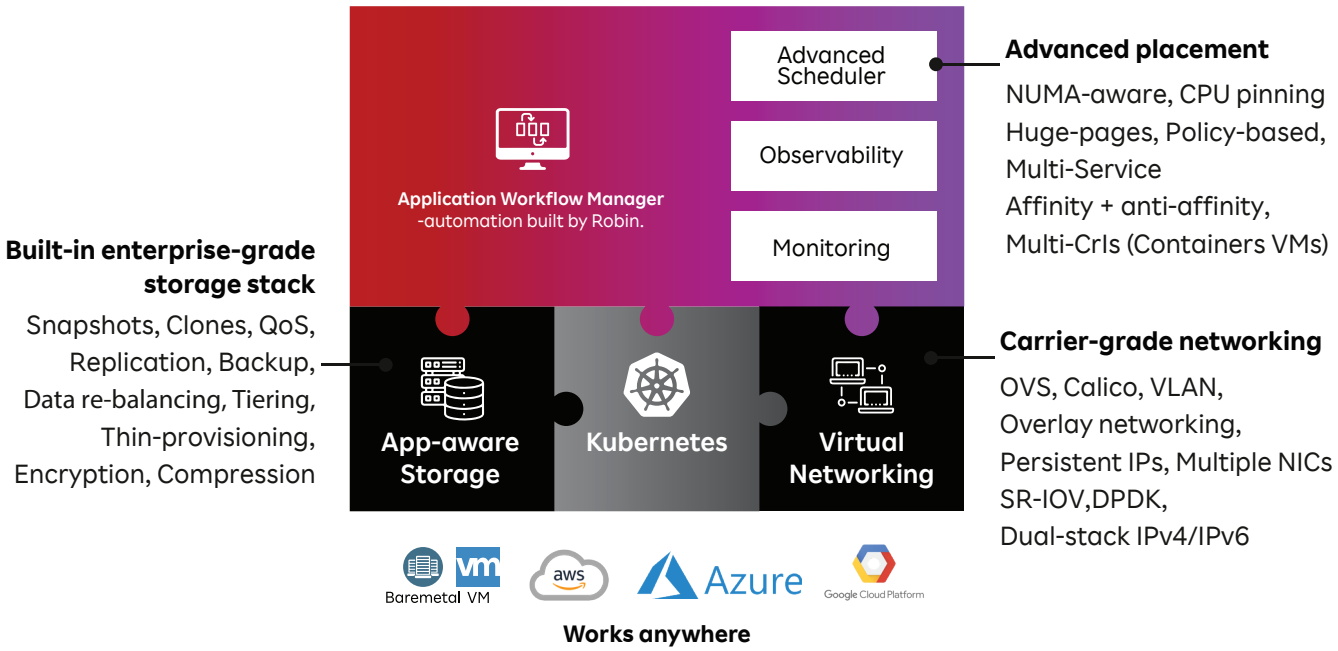
Furthermore, Symworld™ CNP provides these advantages using an intuitive, declarative interface, with advanced automation, that reduces deployment complexity, timelines and human error. You simply tell CNP your resources to include, then CNP builds a reusable policy, models all of the resource configurations and auto-configures them for you, across the service's entire life cycle - instantiate, start, stop, migrate, scale and delete.

Platform Overview

- Streamlined, declarative, policy pinning, that allows you to request desired outcomes instead of manually configuring every element, card, slot and virtual mapping under the covers – Symworld™ CNP dynamically and automatically does the work for you
- Symworld™ CNP continuously leads the industry by redefining intent-based workload placement, resource auto-detection, providing automated resource reservation and guaranteed Quality of Service (Qos) when auto-scaling/migrating/healing
- Built from the ground up with faster compute and storage, Symworld™ CNP provides superior infrastructure utilization - supporting more services on your existing infrastructure
- Provides 1-click application on-boarding, with a large ecosystem of pre-packaged partner solutions
- Supports multi-container run-time enabling containers and VMs in the same or multiple clusters
- Multi-cloud portable, application aware storage supporting snapshots, clones, QoS, replication, backup, data re-balancing, tiering, thin-provisioning, encryption and compression
- Carrier-grade networking supports Calico overlays, Single Root Input/Output Virtulization (SR-IOV), Data Plane Development Kit (DPDK) and Open vSwitch (OVS) underlays, as well as Network Interface Card (NIC) bonding, with Non-Uniform Memory Access (NUMA) aware affinity and anti-affinity, and dual-stack IPV/IPv6
- Supports both stateful and stateless Kubernetes-based applications

1-Click or API-driven end-to-end automation

Deploy, scale, heal, upgrade, snapshot, clone, backup, entire application pipelines



Advanced placement

NUMA-aware, CPU pinning
Huge-pages, Policy-based,
Multi-Service
Affinity + anti-affinity,
Multi-CrIs (Containers VMs)

Built-in enterprise-grade storage stack

Snapshots, Clones, QoS,
Replication, Backup,
Data re-balancing, Tiering,
Thin-provisioning,
Encryption, Compression

Carrier-grade networking

OVS, Calico, VLAN,
Overlay networking,
Persistent IPs, Multiple NICs
SR-IOV,DPDK,
Dual-stack IPv4/IPv6

Works anywhere

Key Benefits

- Accelerates infrastructure and service turnup timelines for faster time to market (TTM)
- Reduces integration touch-points for application on-boarding, application policies and life-cycle management
- Automated, declarative and foolproof workload placement, with an easy-to-use, comprehensive, workflow engine
- Edge-friendly, low-cost, small footprint
- Improves performance and reduces overheads, supporting VMs & containers on the same cluster, freeing you from vendors' container roadmaps and breaking legacy cloud platform silos

Customer Validated Efficiences

- First in-production containerized 5G stack, high throughput with millions of subscribers - full stack deployment with in-service Open RAN
- 80% reduction in deployment timelines
- 40% Opex reduction - Open RAN and 5G core
- 50% Capex savings - Open RAN and 5G core
- 30% faster VM performance compared to incumbent platforms
- Highest performing storage stack for Kubernetes - 3X faster storage performance
- Advanced data management capabilities
- Single click deployment across multi-cloud, hybrid-cloud environments

PLATFORM HIGHLIGHTS

Harmonized container and VM infrastructure

You are no longer tied to your vendor's containerization roadmap, licensing or support contracts. Realize sharable resource pools today, by deploying container-based Cloud-native Network Functions (CNF) and virtual machine-based Virtual Network Functions (VNF) on the same or separate high-availability clusters, reusing and sharing resources. This improves your flexibility in today's multi-vendor ecosystems. Furthermore, when using physical NF (PNF/VNF/CNF) aware orchestration platforms, one can implement PNF, VNFs, and CNFs in the same workflows.

Application-aware storage

Allocate storage while deploying an application or cluster and share storage among apps and users. Get Service Level Agreement (SLA) guarantees when consolidating applications, support for data locality, affinity, anti-affinity and isolation constraints, and tackle storage for applications that modify the root file system, snapshots, clone, QoS, replication, backup, data rebalancing, tiering, thin-provisioning, encryption and compression.

Advanced workload placement and QoS with an intelligent, declaratively configured, placement algorithm

Sym**world**™ CNP guarantees that a migrated, rolled-back or restarted application has the exact resources required to meet Service Level Agreements (SLAs), every time. This is "automatically" enacted by and enforced with a wide-reaching placement algorithm that auto detects, connects, and configures all of the resources needed for your application, based on easy-to-configure and reusable resource policies.

Resource allocation is declarative and based on your desired outcome, not all of the steps to get there. For example, you say "Give me 5 CPUs, multiple NICs and persistent IP addresses", then Sym**world**™ CNP secures and configures them to support the application and later reuses those rules, based on triggered roll-back and restart events. In other words, Sym**world**™ CNP users are not required to identify and configure free CPUs, NIC slots, NIC teams, SR-IOV virtual function IDs, IP address managers, NUMA nodes and the like, for every condition or state. Sym**world**™ CNP does the work for you.

This not only helps simplify day 1 turnup activities, but also simplifies day 2 planning and lifecycle operations. It leads to a better understanding of failover behavior, before it happens and with a far more efficient use of resources, with less human error.

Popular Sym**world**™-CNP-aware variable include NUMA-awareness, CPU-pinnig, multi-servie affinity / anti affinity policies, min/max IOPs values to eliminate noisy neighbors, CPU Pinning. Auto-discover SR-IOV-enabled NIC cards, FPGA and GPU resources from the same NUMA node and allocate them to specific applications.

Advanced networking

NFs need greater networking flexibility and segmentation to maintain high throughput applications with minimal jitter. NFs have additional requirements, most of which are not addressed by legacy cloud platforms that can include: per- pod multi-IP network support, SR-IOV underlay networks for high throughput low jitter and redundancy, OVS underlays, Calico overlays, IPv4/IPv6 dual stack, persistent IP addresses across starts, stops, heals and migrations, as well as built in metalLB load balancer.

New paradigm in dynamic workload monitoring

Go beyond simple lists, logs, and utilization graphs. Sym**world**™ CNP clusters and the policies they auto-enforce, are application aware, calculating placement based on detailed resource requirements, topology awareness, affinity/anti-affinity and service composition to name just a few. This enables the operator to better the system as a whole and make more informed decisions in case of customer impacting events and service degradation due to the addition of new services/applications or failure events.

1-click application bundles and workflow automation for everything-as-a-service

Sym**world** CNP application management is driven by an intuitive, context-aware and easy-to-use workflow manager, with reusable elements. Furthermore, Sym**world**™ CNP's built-in roles based access and multi-tenancy promotes internal and external customer self-service, with an app-store experience, utilizing bundles for dozens of as-a-service network functions, MEC and enterprise applications. Slash deployment and management times from weeks to minutes.

Large ecosystem of pre-integrated NFs and supporting applications

Provider applications include 5G Core, Open RAN, MEC hosting e.g. Content Delivery Networks (CDN) and high definition on-line gaming. Sym**world**™ CNP supports commonly used enterprise solutions including Cloudera, MySQL, Oracle, Elastic search, MongoDB, WordPress, Splunk, and many more – all with the ease of one-click deployment. Furthermore, our adaptive team will work with your vendor of choice to onboard additional provider NFs and customize Container Network Interface (CNI) plugins.

Closed-loop automation

Automate based on thresholds, deploy complex workloads and perform rolling upgrades. Safe-upgrade technology guarantees that failed upgrades can be rolled back without disrupting the application.

High availability (HA) and additional stateful application support

With Sym**world**™ CNP there is no single point of failure. Get automatic app- aware data failover for complex distributed applications on bare metal. Sym**world**™ CNP is the ONLY product to provide HA for stateful applications along-side traditional stateless applications.