Connect

ROSA - Red Hat OpenShift on AWS

Technical Overview

Red Hat

Who?

Managed OpenShift Black Belts (MOBB) Mission

To remove customers' organizational, competitive, and technical blockers to enterprise-wide adoption of Managed OpenShift (ROSA, ARO, OSD)

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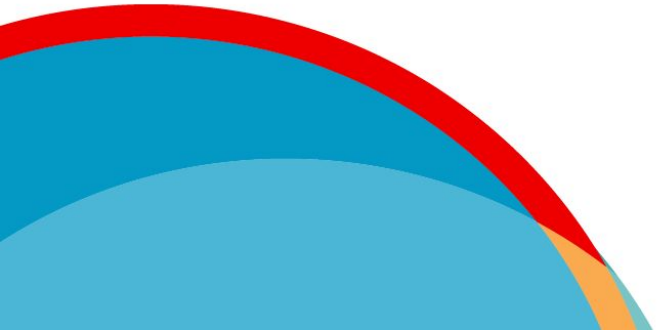
Red Hat

Agenda

- Review of Red Hat OpenShift Service on AWS (ROSA)
- ROSA Architecture Models
- ROSA Classic VS Rosa Hosted Control Plane (ROSA HCP)
- ROSA integration with AWS services
- Cloud Native Development with ROSA



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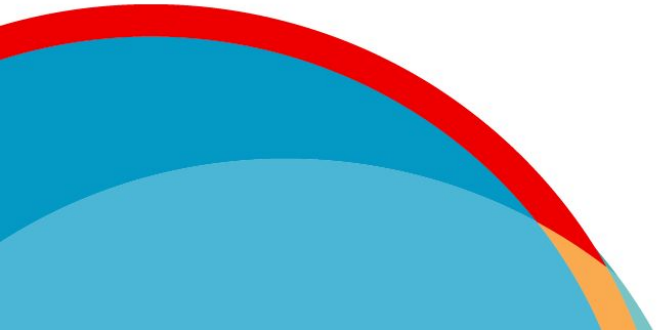
Review of Red Hat OpenShift Service on AWS (ROSA)



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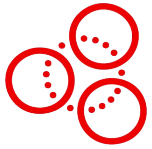
OpenShift cloud services are 1st party, cloud native solutions.

Red Hat OpenShift Service on AWS

Azure Red Hat OpenShift

Red Hat OpenShift on IBM Cloud



Integrated Dev tools and cloud native services

Joint Support & Engineering

Automation and Day 2 Operations

Security and compliance

Single invoicing, utilize cloud committed spend

Red Hat

Red Hat OpenShift Service on AWS

A turnkey application platform native to AWS

Focus on innovation

Simplify operations so your teams can refocus on innovation, not managing infrastructure.

Accelerate time to value

Quickly build, deploy, and manage applications that scale as needed.

Hybrid cloud flexibility

Deliver a consistent experience on premises and in the cloud.

Red Hat | aws

Modern Application Computing Services Landscape

Application Platform

Accelerate and standardize application Management

Containers Orchestration

Deployment, scheduling, and scaling, containerized applications

Containers Infrastructure

Registry, Networking, CI/CD

Compute

Third-party tooling

DATADOG sumo logic sysdig New Relic Prometheus Grafana OpenTelemetry

Build your Own Application Platform

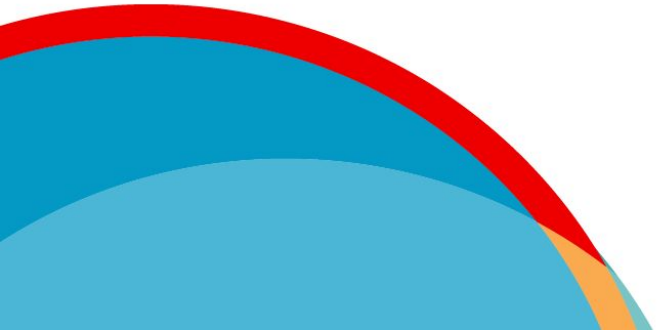
- AWS Proton
- AWS App Runner
- EKS Blueprints
- AWS X-Ray
- Cloud Watch
- Amazon Managed Prometheus
- Amazon Elastic Container Service (Amazon ECS)
- Amazon Elastic Kubernetes Service (Amazon EKS)
- Amazon Elastic Container Registry (Amazon ECR)
- AWS Cloud Map
- AWS App Mesh
- AWS CodePipeline
- Elastic Compute Cloud (Amazon EC2)
- Fargate

Turn-key Application Platform

ROSA

Red Hat OpenShift Service on AWS

ROSA Architecture Models (ROSA Classic)



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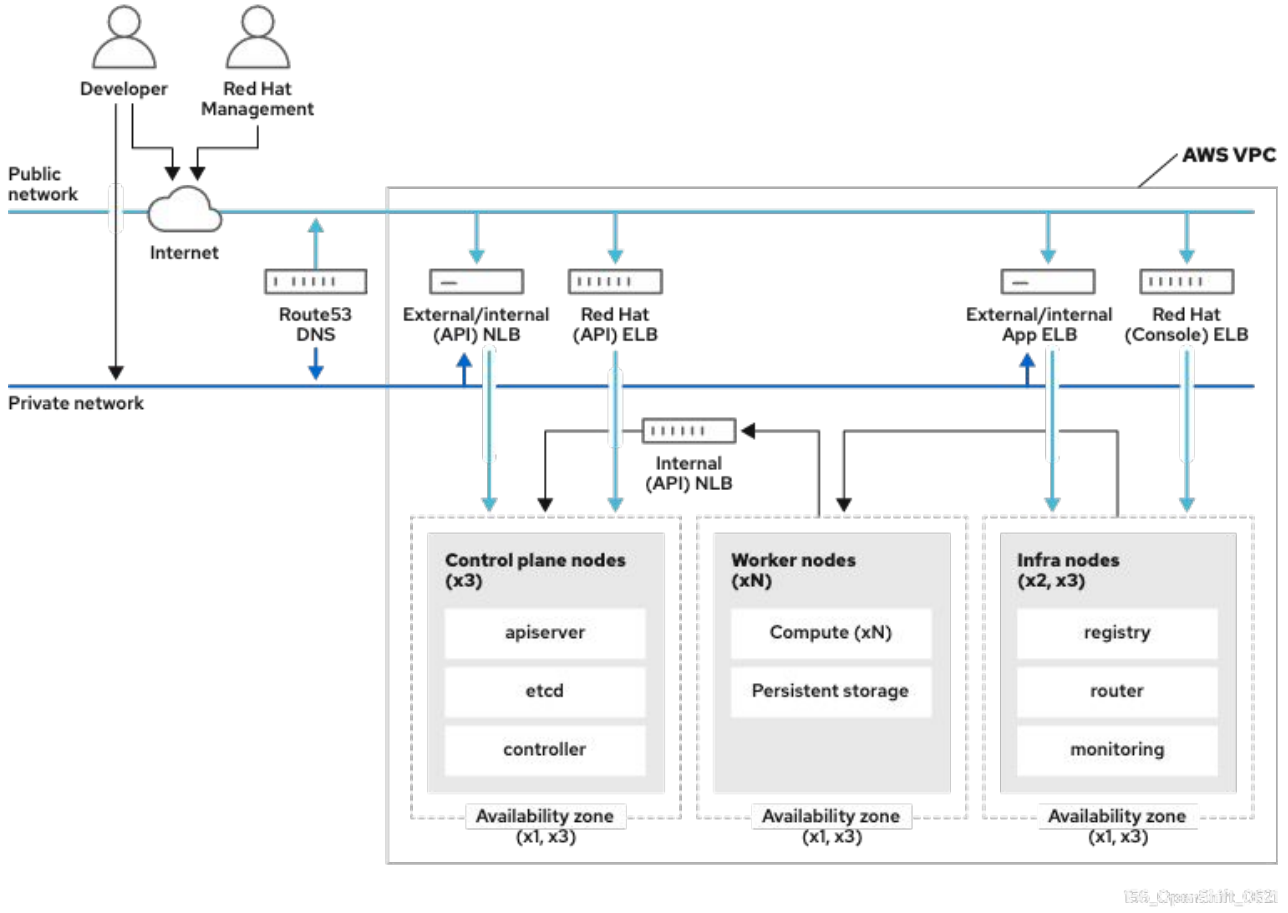
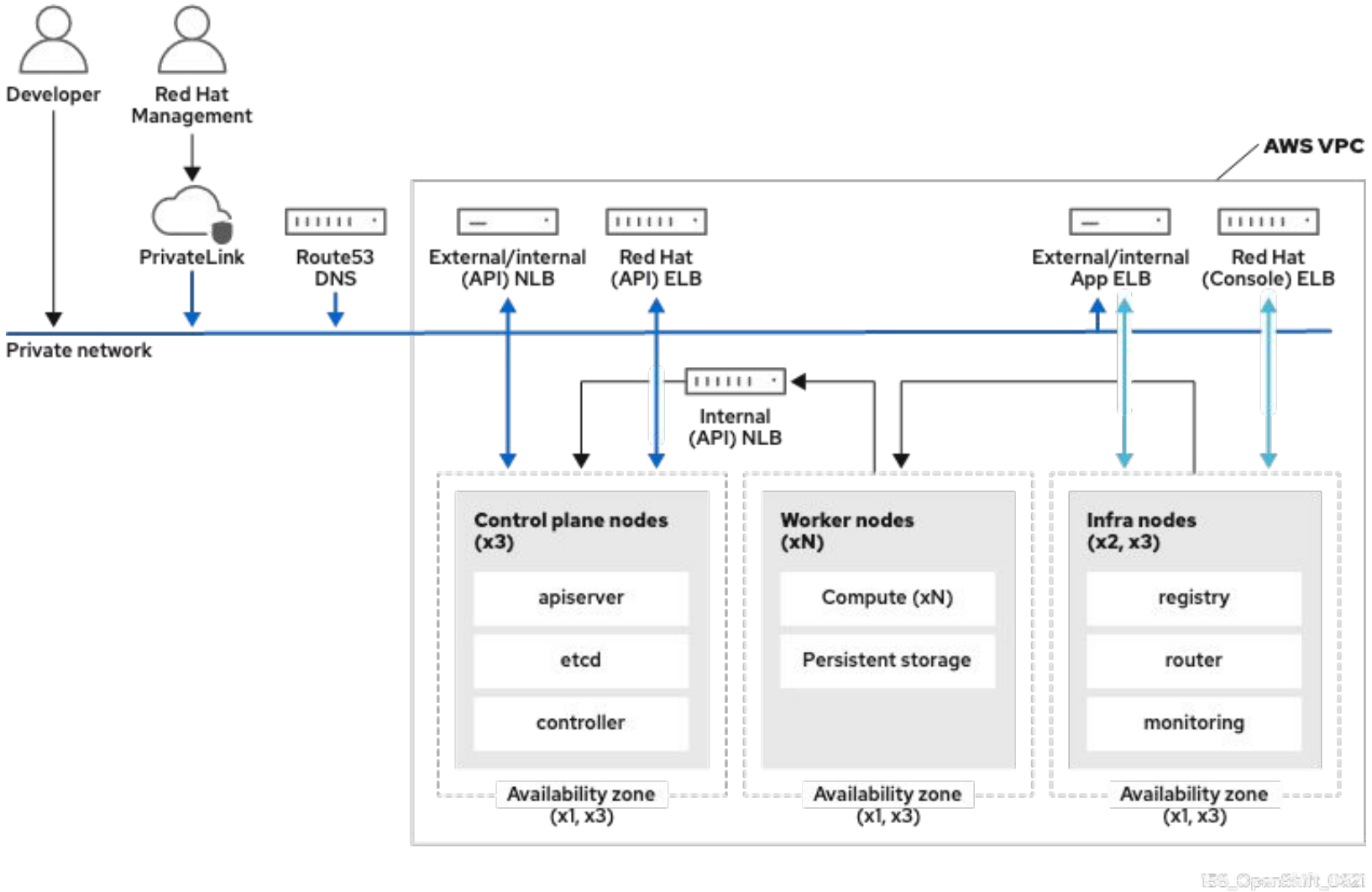
Public / Private Networking (ROSA Classic)



Source: https://docs.openshift.com/rosa/rosa_architecture/rosa_architecture_sub/rosa-architecture-models.html

Red Hat

PrivateLink Diagram (ROSA Classic)



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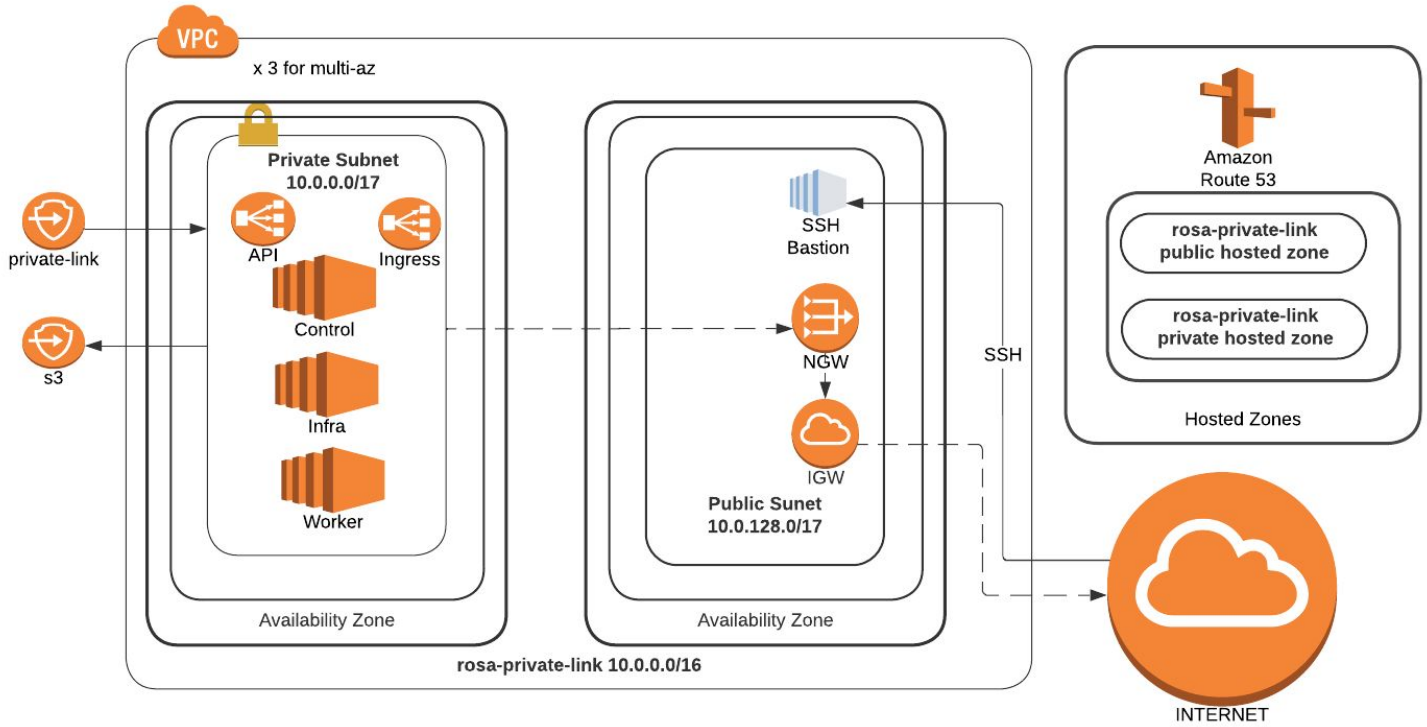
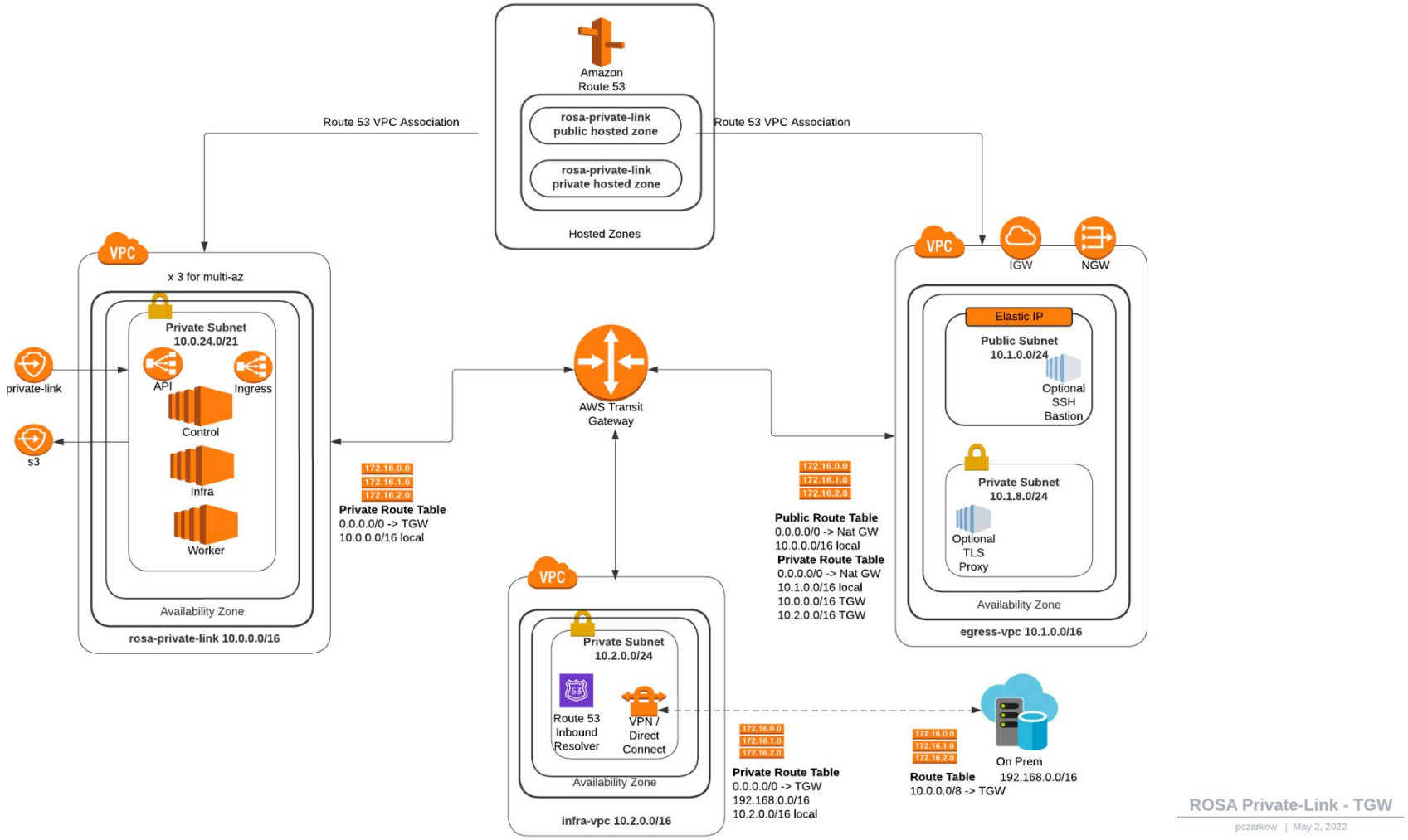
Private Link Networking

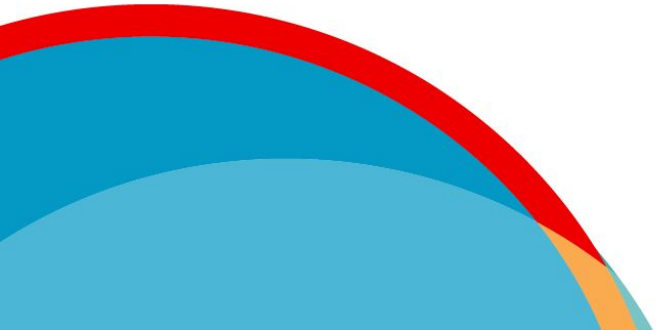


Private Link Networking (Transit Gateway)



Source: https://github.com/rh-mobb/ansible-rosa

ROSA Classic
VS
Rosa Hosted Control Plane
(ROSA HCP)



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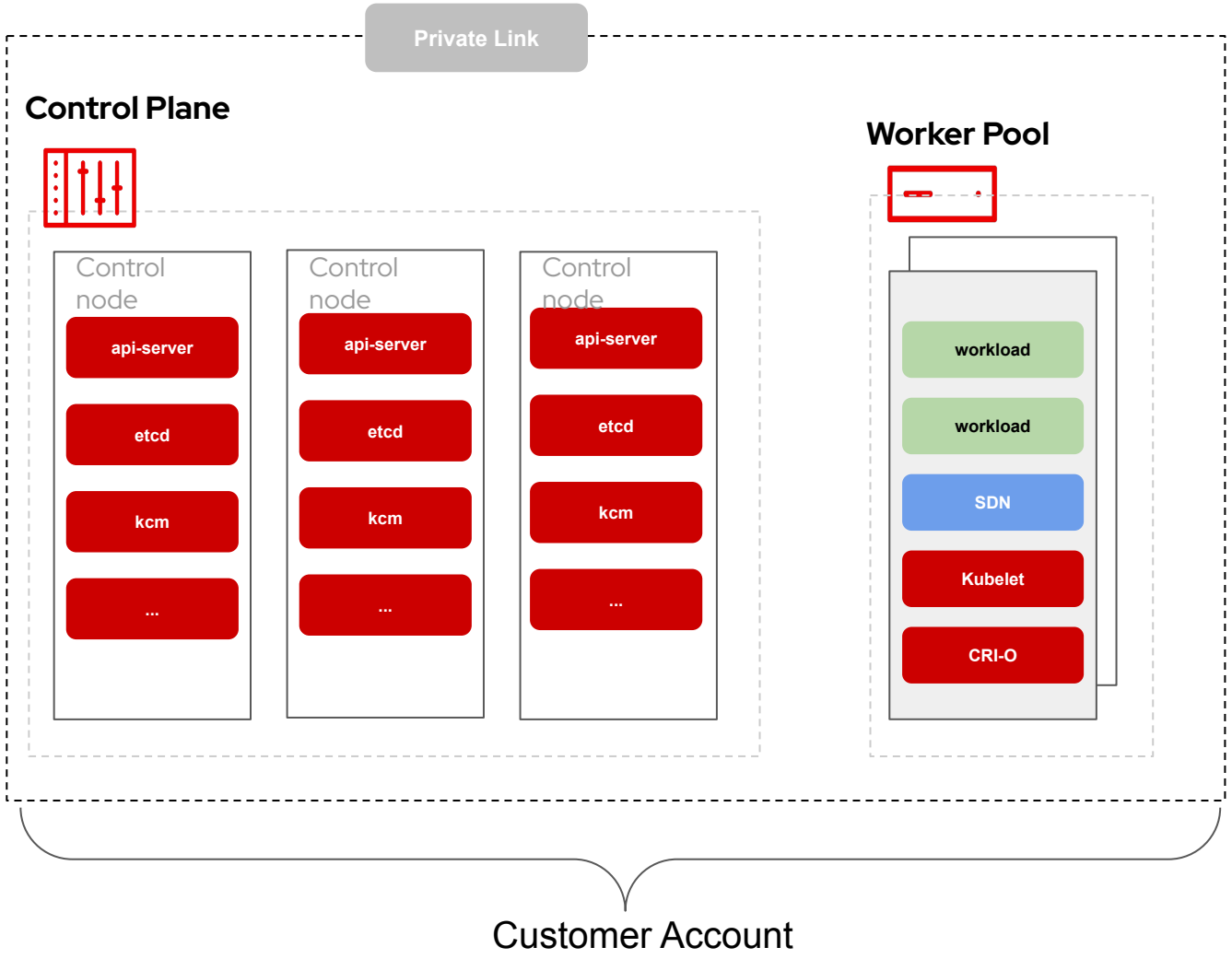
ROSA with hosted control planes Benefits

- **Cost Savings**
  - Customers reduce costs by 5x on average vs hosting the control plane in their own account
    - Significantly reduced AWS infrastructure costs (typically $8k / cluster / year)
  - Quickly and easily spin up or tear down clusters when needed for efficiency and cost savings
  - More flexibility and portability for annual billing allowing customers to easily change between node types
  - Smaller overall footprint (2 nodes vs 7)
  - Scale worker nodes to 0 (post GA)
- **Operational efficiency**
  - Provisioning time ~ 10 minutes for a new cluster – get started and build/deploy apps faster
  - Seamless autoscaling of control plane at no additional cost
  - Installer runs in ROSA Service account reducing required permissions
  - Designed to be managed; taking what we learned from operating OpenShift at scale, making improvements and putting it into the core product out of the box for a better experience
- **Increased reliability**
  - Control plane is always HA over multiple availability zones
  - Selectively upgrade control plane and worker nodes separately, giving increased control and flexibility for customers
  - Increased resiliency from offloading control plane infra management, reducing the chance of accidental misconfiguration or deletion of resources

Classic OpenShift Architecture

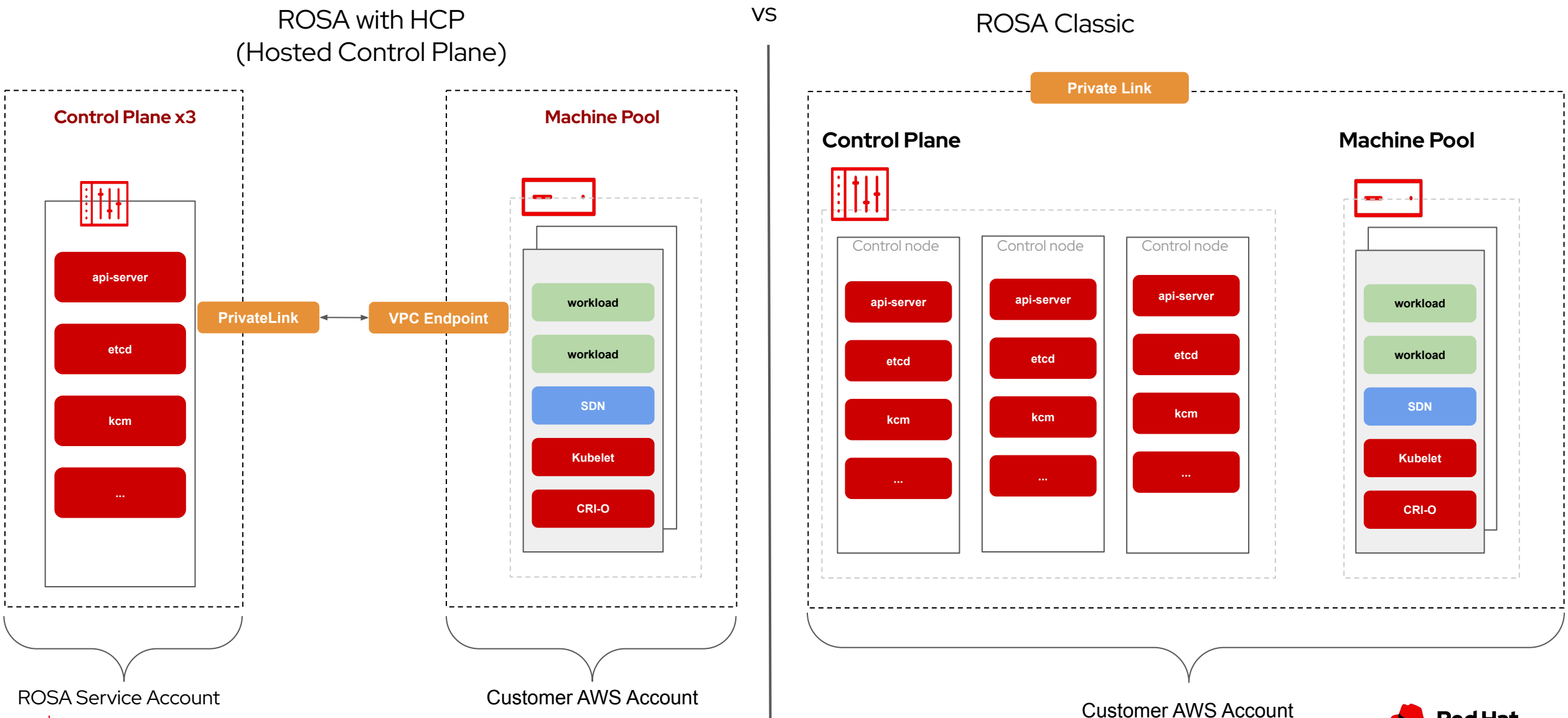


Private Link

- Cluster API Server published using AWS Private Link
- API Server is accessed by Red Hat management system (HIVE) to allow programmatic access to API server
- Private traffic passes through private network not through the Internet

Red Hat

What is Hosted Control Plane (HCP) for ROSA



ROSA with HCP

- Control plane components run in Red Hat's AWS account
- Control plane components are exposed to worker nodes through AWS PrivateLink
- Worker nodes communicate with control plane over PrivateLink connection
- Red Hat SRE management traffic takes place within Red Hat's AWS account
- Red Hat network access to customer VPC is minimized

VS

ROSA Classic

- Control plane components run in customer's AWS account
- Control plane components are exposed to Red Hat management traffic through AWS PrivateLink
- Worker nodes communicate directly with control plane nodes within same VPC

ROSA with hosted control planes vs ROSA “Classic”

	Hosted Control Plane	Classic
What is it?	Control plane components (e.g., etcd, API server, oauth) are hosted on AWS in a Red Hat owned and managed OpenShift cluster	Control plane, infra & worker nodes all live in customer’s AWS account
Provisioning Time	~10 minutes	~40 minutes
Architecture	• Underlying control plane infrastructure is fully managed and directly unavailable to end customers except through dedicated and explicitly exposed endpoints	• Customers are responsible for control plane, infra and networking • All-in-one OpenShift on AWS infrastructure architecture
Footprint	1 cluster = minimum 2 worker nodes	1 cluster = minimum 7 nodes (3 control plane, 2 infra, 2 worker nodes)
Upgrades	Selectively upgrade control plane and worker nodes separately	Entire cluster is upgraded at one time

Red Hat

ROSA with hosted control planes vs ROSA “Classic”

	Hosted Control Plane	Classic
Deployment	• Deploy using ROSA CLI (web UI coming soon) • Customers provision "Hosted Clusters" that deploy the control plane components into Red Hat's Management clusters • Customers request "Machine Pools" that deploy worker nodes into the customer's AWS account	• Deploy using ROSA CLI or web UI • Full cluster provisioning occurs in customer’s AWS account
Regional Availability	Initially 6 regions available us-east-1, us-east-2, us-west-2, eu-west-1, eu-central-1, ap-southeast-3	Available for purchase in all countries where AWS is commercially available
Compliance	No compliance certifications or FIPS at GA	ISO 27001, 17, 18; SOC 2 Type 2, SOC 3, PCI-DSS, HIPAA
Add-ons	No add-ons support at GA	RHOAM, RHODS

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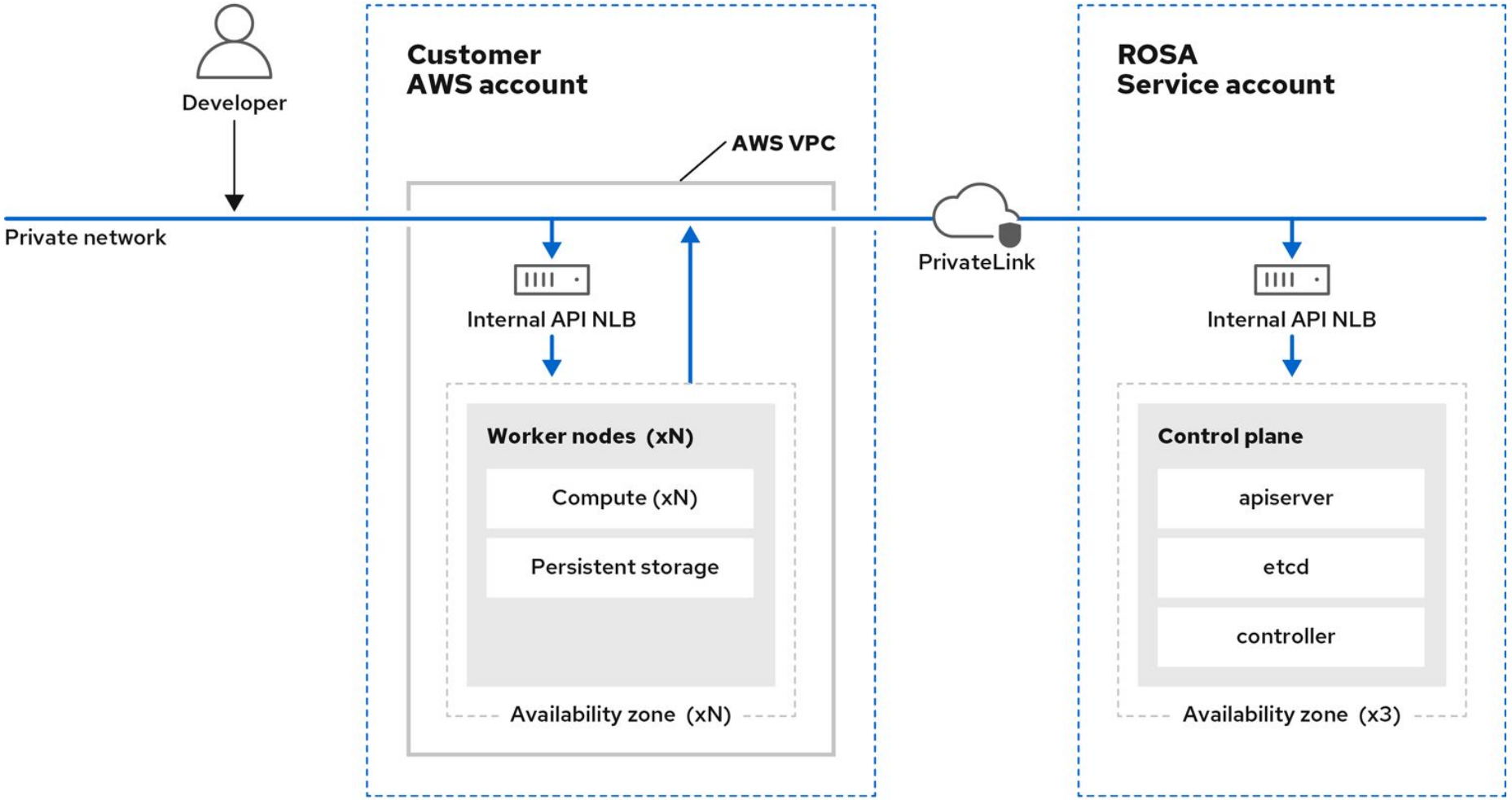
Public Diagram (ROSA HCP) [Tech Preview]



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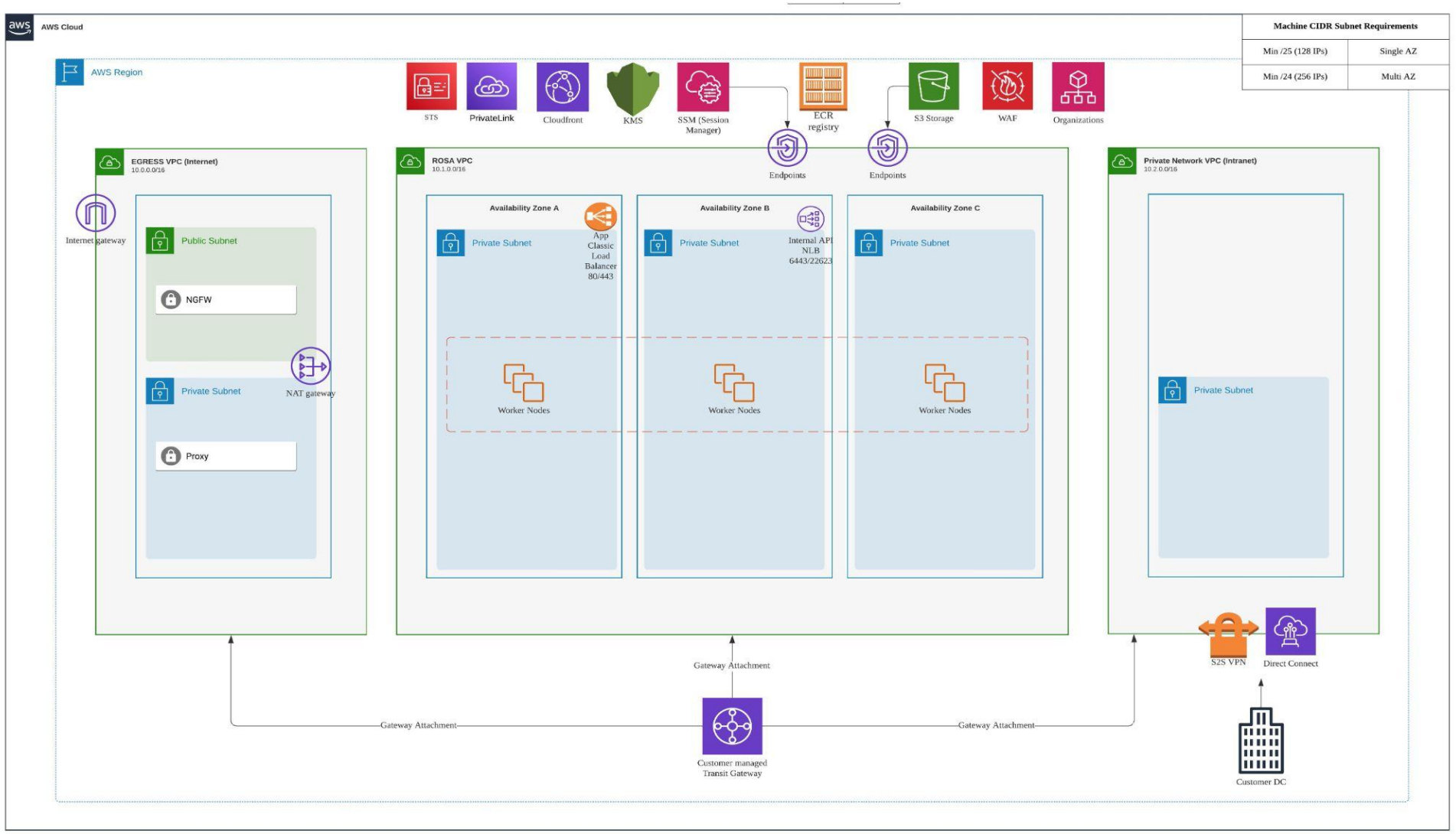
ROSA reference architecture (hosted control plane)



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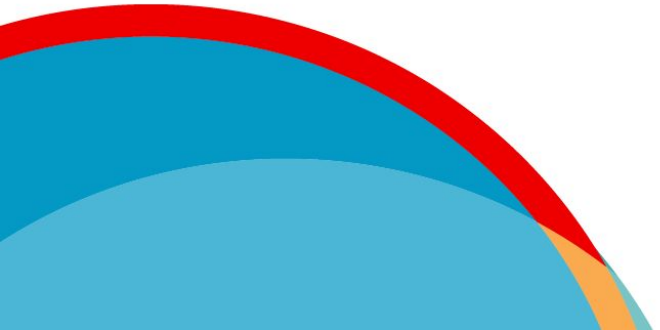
ROSA integration with AWS services



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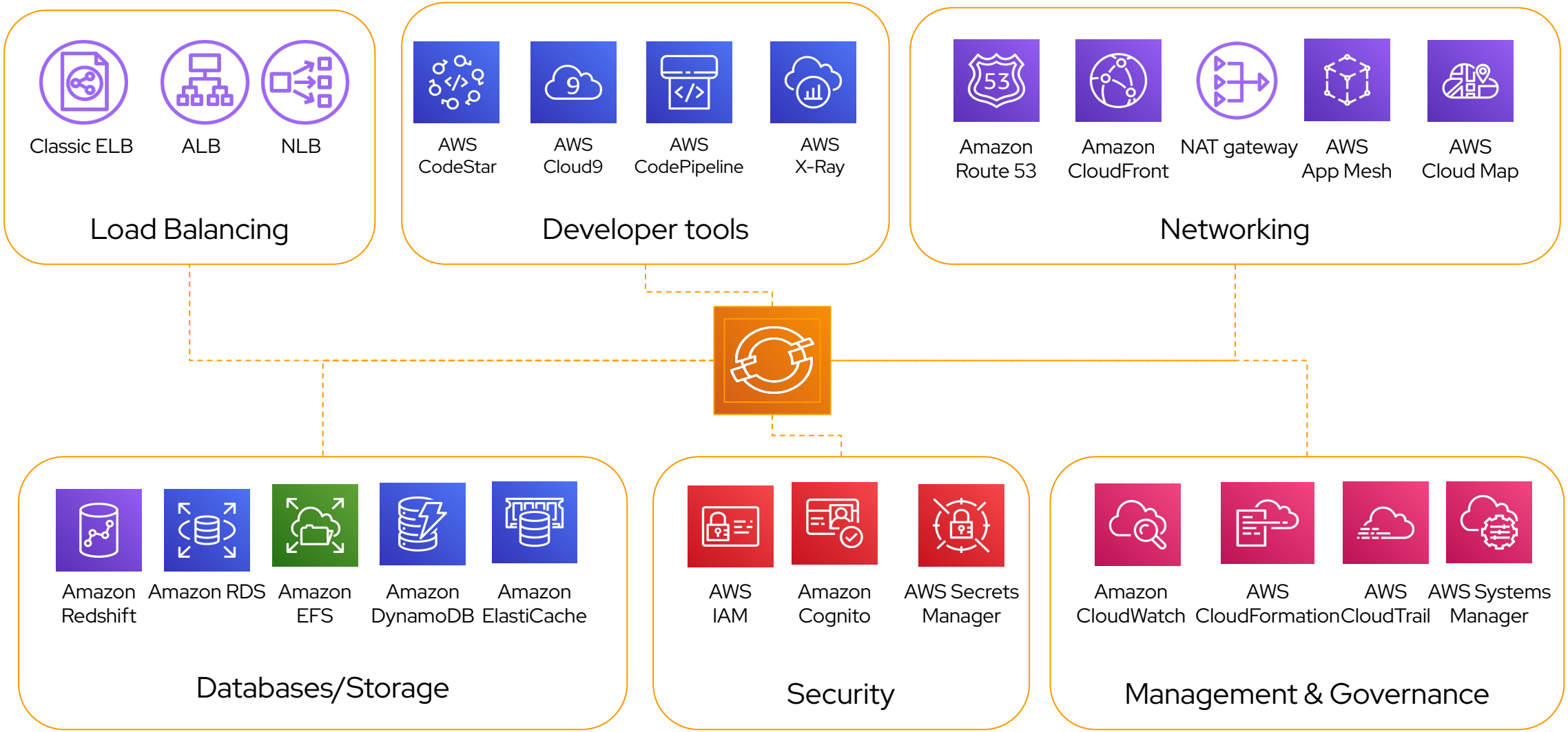
Integration with AWS Services



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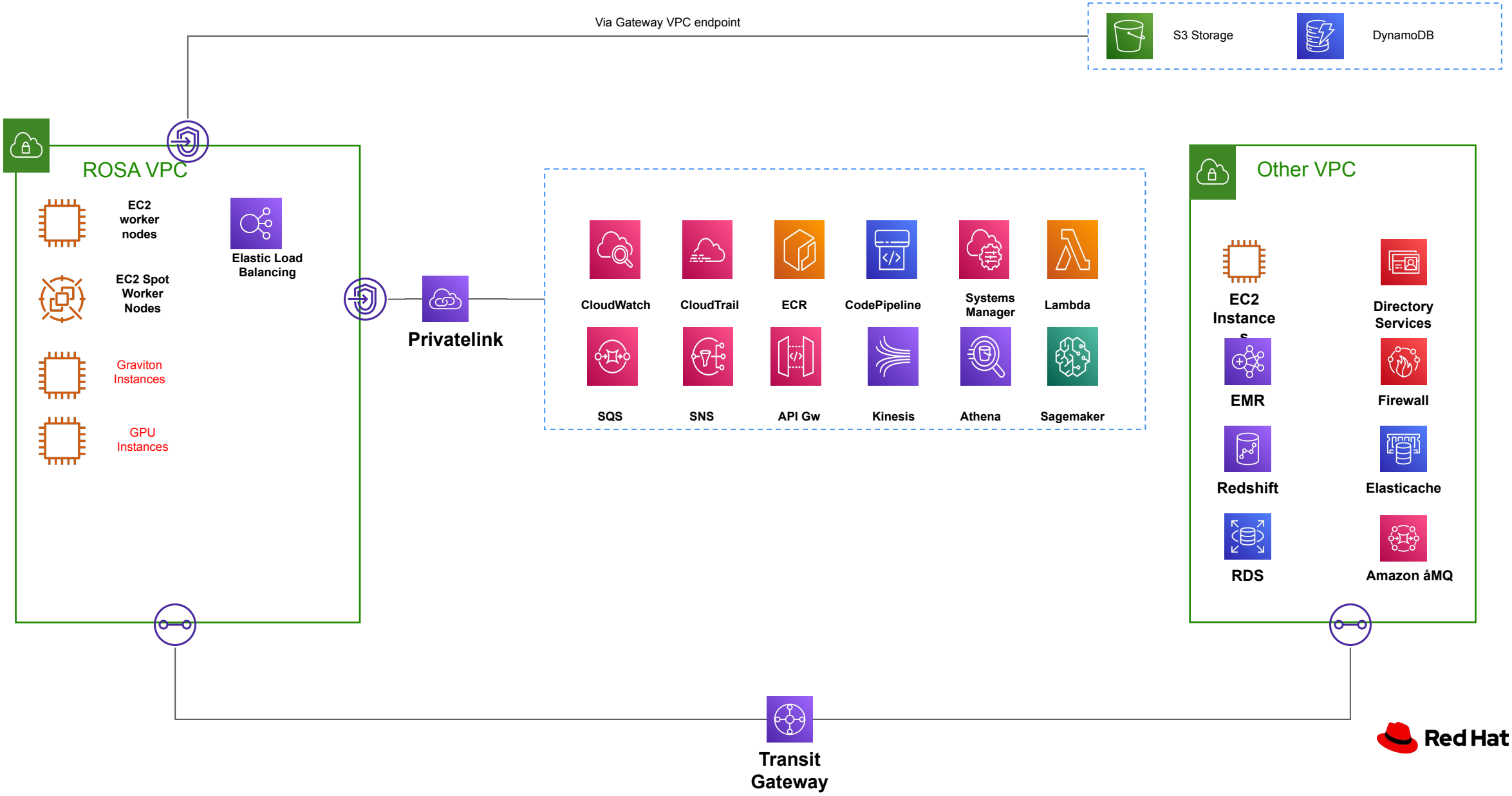
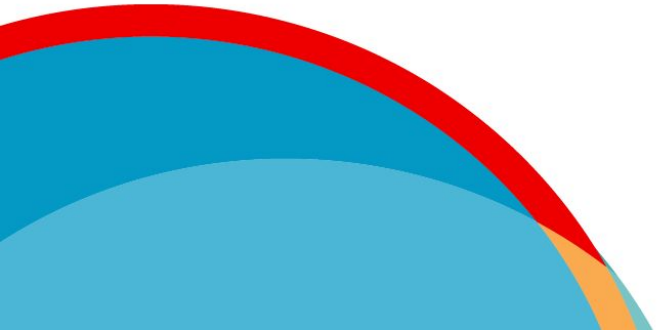
Securely connect to other AWS services



Cloud Native Development with ROSA



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Why cloud-native development?

Revitalize business for the digital economy

The ability to adapt is as important as the ability to plan

Software as a competitive edge

Companies must have core competency in software development to compete

Modern customer experience

Customers expect your business to provide personalized, secure services anytime, anywhere

Creating value depends on your ability to develop and deliver high-quality applications faster on any cloud

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Adopting a Cloud Native Approach

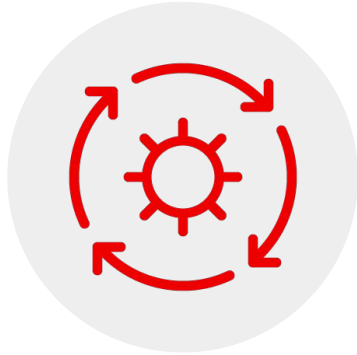
Top Considerations

Speed

Increase developer productivity and ship quality applications faster

Security

Application and supply chain security from start to production



Scale

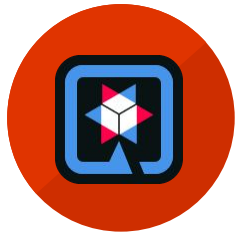
Automate and scale application delivery on hybrid cloud infrastructure

Innovate your new future and optimize what you have

Red Hat

Cloud-native delivered with Red Hat

Red Hat Container and Operator Catalog
Database | Message Broker | Integration | Business Process | More



Red Hat build of **Quarkus**

OpenShift **Serverless**

OpenShift **Pipelines**

OpenShift **GitOps**

OpenShift **Service Mesh**

Red Hat OpenShift

Enterprise Kubernetes Platform
Networking | Automated Operations | Ingress | Storage | Monitoring | Logging | Registry

Physical

Virtual

Private cloud

Public cloud

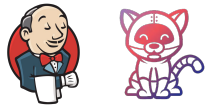
Edge

Red Hat

A Comprehensive DevOps Platform for Hybrid Cloud

Automate building container images using Kubernetes tools

Kubernetes-native on-demand delivery pipelines



Declarative GitOps for multi-cluster continuous delivery

OpenShift Builds | **OpenShift Pipelines** | **OpenShift GitOps**

OpenShift

GitHub GitLab Azure DevOps AWS CodePipeline Jenkins

Continuous Integration & Continuous Delivery

OpenShift Build

Automate building container images using Kubernetes tools

OpenShift Pipelines

Kubernetes-native on-demand delivery pipelines

OpenShift GitOps

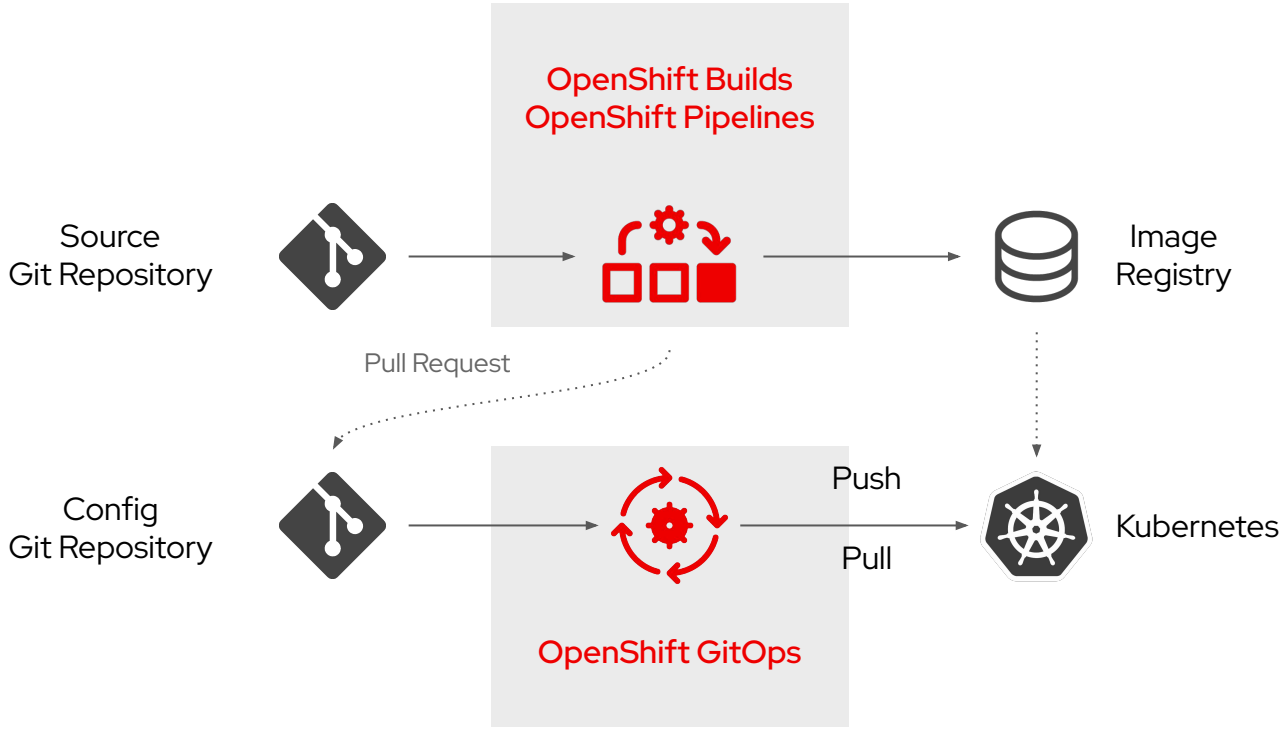
Declarative GitOps for multi-cluster continuous delivery

Ecosystem Integrations

GitHub GitLab Azure DevOps Travis CI

Red Hat

The GitOps Application Delivery Model on ROSA



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Thank you

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