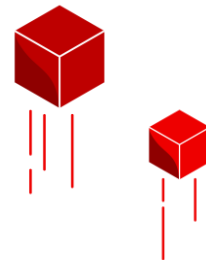# Red Hat Cost Management
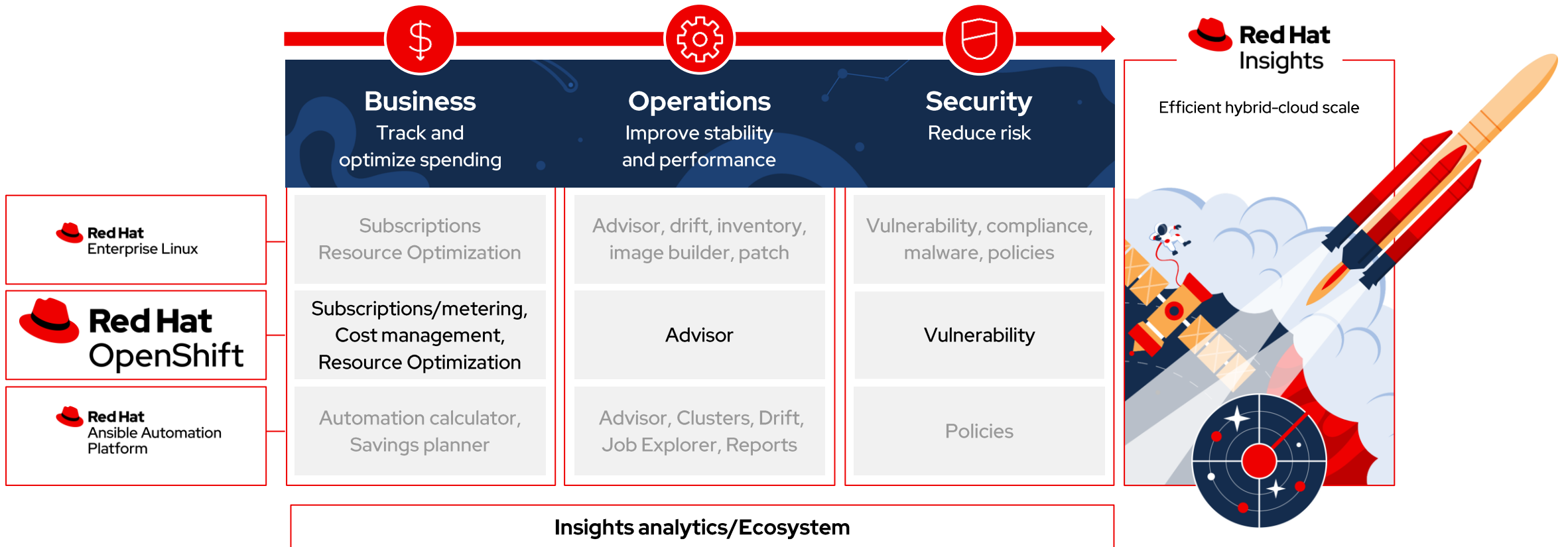## Business value and roadmap

Pau Garcia Quiles

Principal Product Manager, Red Hat Insights

Business value

Red Hat Insights

A full suite of free services for connected customers

	Business Track and optimize spending	Operations Improve stability and performance	Security Reduce risk
Red Hat Enterprise Linux	Subscriptions Resource Optimization	Advisor, drift, inventory, image builder, patch	Vulnerability, compliance, malware, policies
Red Hat OpenShift	Subscriptions/metering, Cost management, Resource Optimization	Advisor	Vulnerability
Red Hat Ansible Automation Platform	Automation calculator, Savings planner	Advisor, Clusters, Drift, Job Explorer, Reports	Policies

Insights analytics/Ecosystem

Red Hat Insights

Efficient hybrid-cloud scale

IT in the organizational hierarchy

Business

Sales	Marketing	Production
Finance	HR	R+D+i

IT

```
                    CIO
                     |
          +----------+----------+
          |          |    IT Governance
          |          |          |
   Application    IT Operations   IT Security
   Development
```
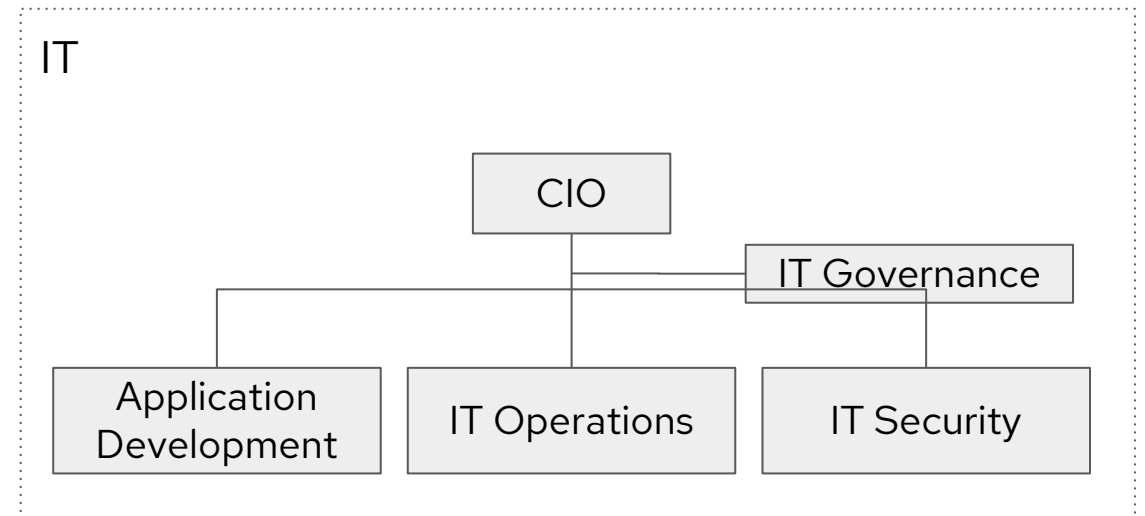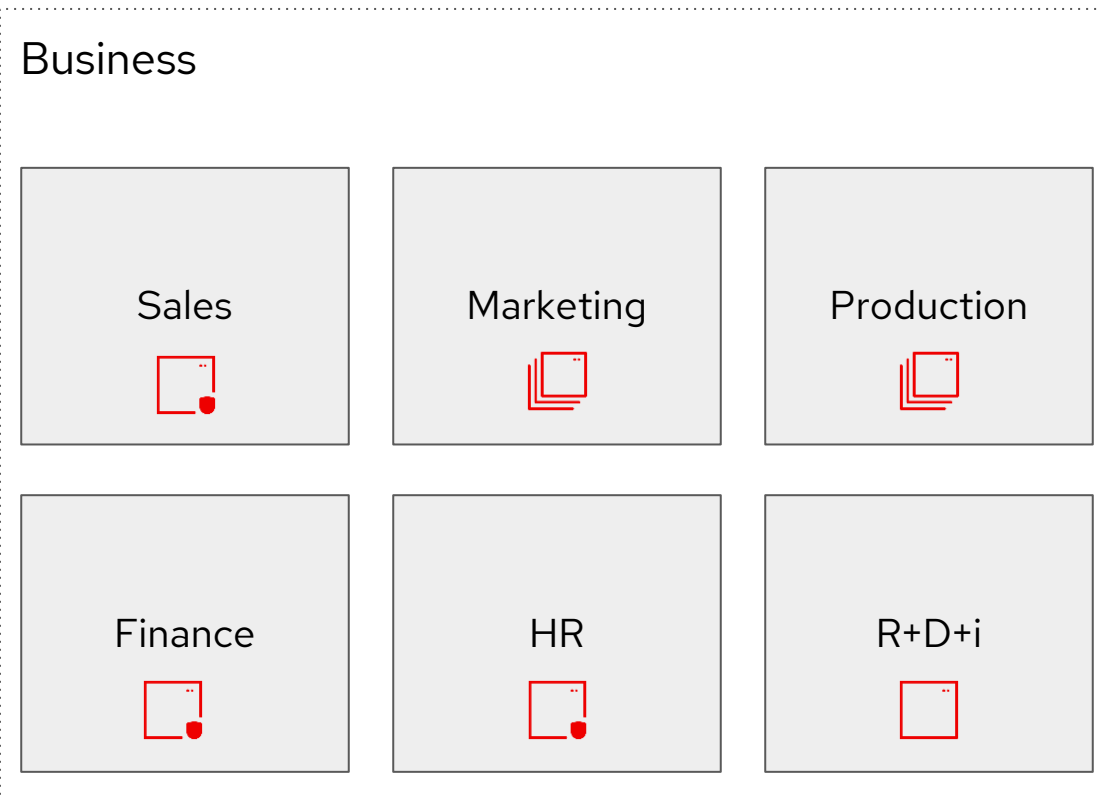
Different personas, different needs

LOB App Owner /IT Dev Lead
"I want to...

- ...Forecast capacity needs, and what-if scenarios"

- ...Know when I am over the budget"

**FinOps Guy
(IT Governance)**
"I want to...

- ...Map charges to projects and organizations"

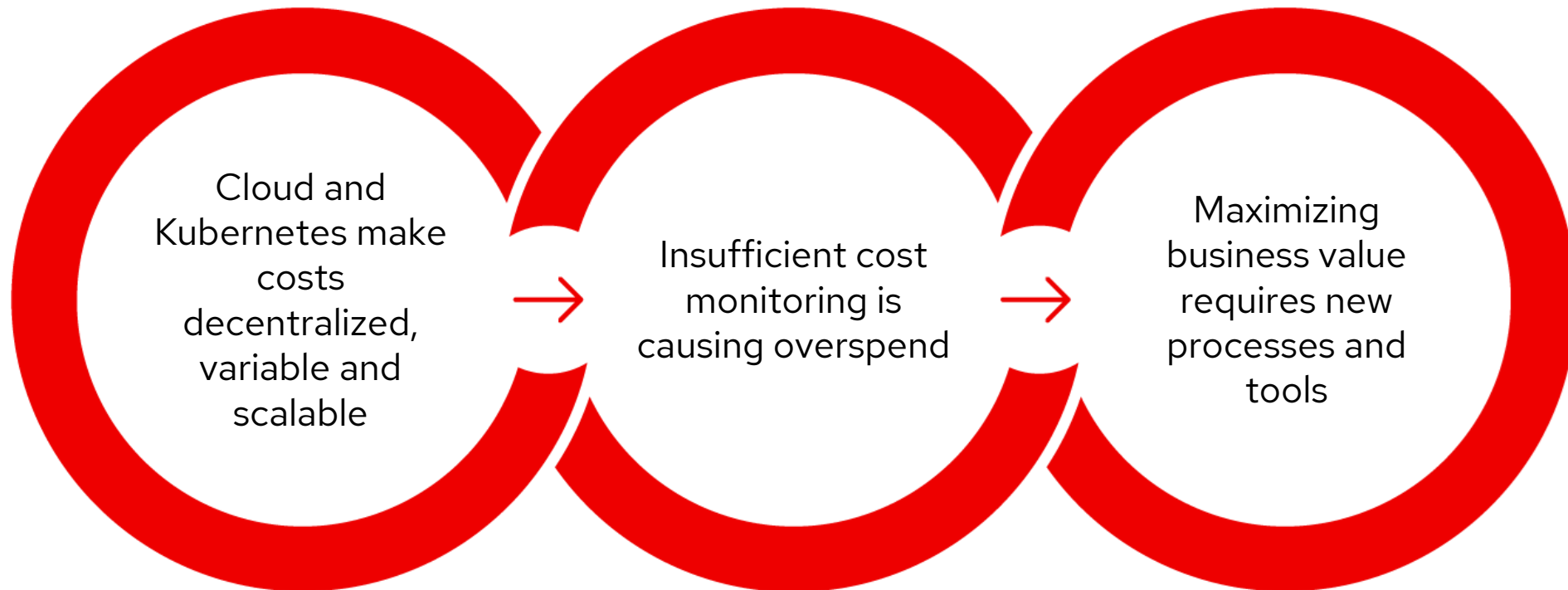- ...Set up showback and/or chargeback reports"

IT Operations
"I want to...

- ...Drill down into details for root cause analysis"

- ... Know unexpected behaviours"

The market trend

Cost management for Kubernetes and Cloud

Cloud and Kubernetes make costs decentralized, variable and scalable → Insufficient cost monitoring is causing overspend → Maximizing business value requires new processes and tools

https://www.cncf.io/blog/2021/06/29/finops-for-kubernetes-insufficient-or-nonexistent-kubernetes-cost-monitoring-is-causing-overspend/

Microsurvey of the CNCF and the FinOps foundation about Kubernetes and cloud costs

Cost Management

For Red Hat OpenShift Container Platform

Visualize costs

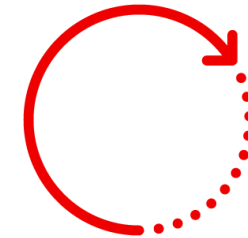Review OpenShift costs aggregated across hybrid infrastructure so you can stay on budget

Show Red Hat related costs in context
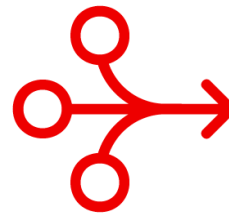
Allocate costs

Understand spending habits and distribute costs into projects, organizations, and regions

Improve communication between IT and line of business (LOB)

Communicate and Influence behaviours

Models costs to align operations, developers and business.

Make those responsible accountable so they take action

Cost Management v2: FINsights

Included with your OCP subscription

Modeling costs cloud and on-prem clusters

Cost models with input from cloud bills and OCP metrics. Advanced rating with tag based rating and effective usage

OpenShift Cost Visibility and Distribution

Red Hat OpenShift · Microsoft Azure · ORACLE CLOUD **IN PROGRESS** · Google Cloud Platform · aws

Provide insights about how OpenShift costs are distributed, including cloud infrastructure costs from multiple accounts

Business Mapping

Filter and group costs and resource using hierarchical information, labels and tags

Cost explorer (time-based views)

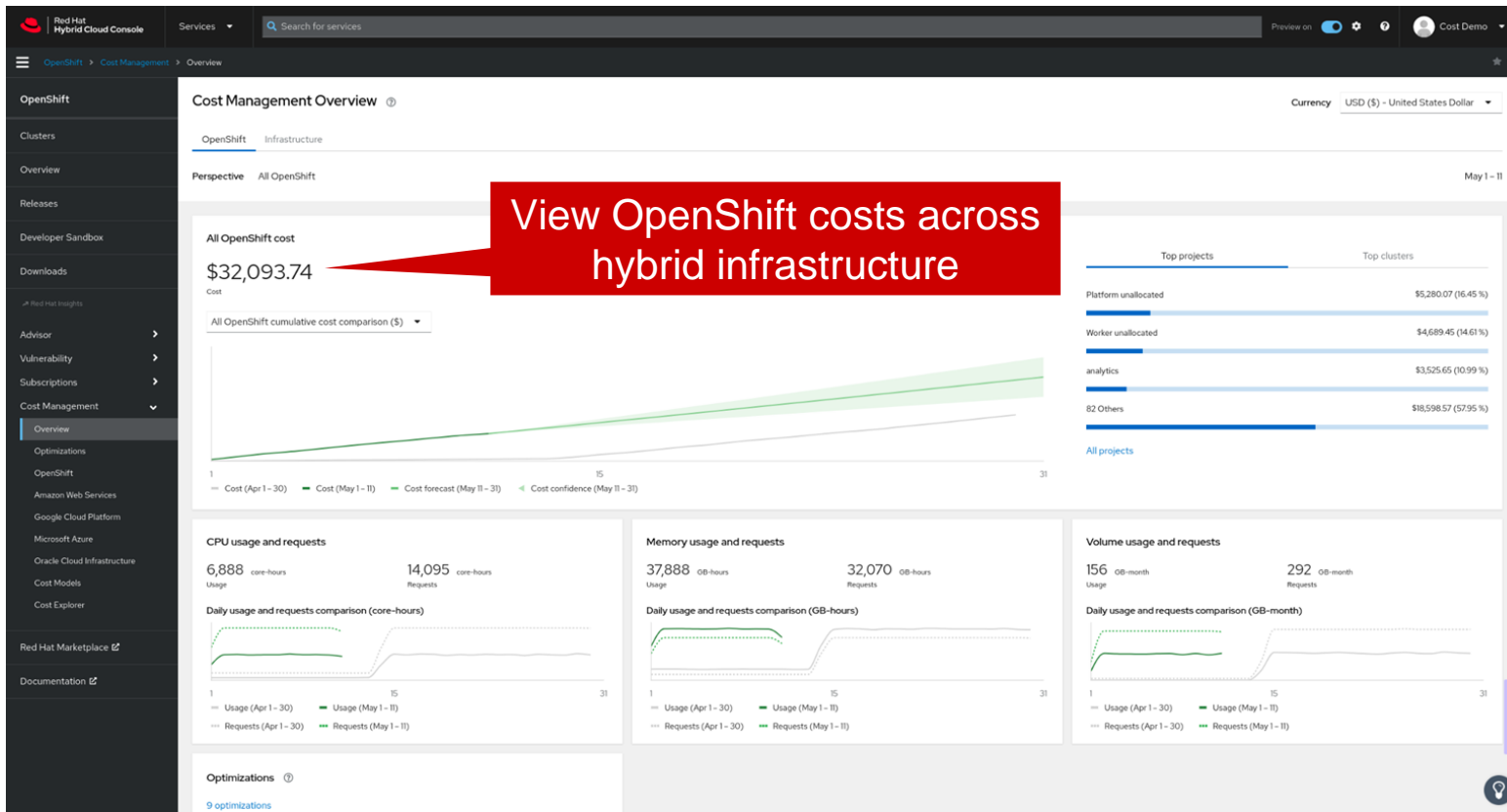Dashboard, details and cost explorer views

Cost Management operator

CPU, Memory, Storage

Resource Optimization

NEW

Specific recommendations to enhance performance and save money

Red Hat | intel

Cost management for Red Hat OpenShift

Red Hat SaaS offering to provide customers with cost visibility across OCP clusters on-premises and in the cloud

- Visualize costs across hybrid cloud infrastructure

- Track cost trends

- Map charges to projects, labels and organizations. Slice and dice the data with filters

- Use cost models to normalize data from the cluster and clouds

- Generate showback exports and utilize them to build your chargeback reports

Cost Management Use Case Examples

| Use Case	Details	Stakeholder(s)
AWS visibility	- High number of AWS accounts (both master and linked accounts) - Needs consolidated view of costs	All
OpenShift visibility	- Multiple OCP clusters - Needs consolidated dashboard to see resources and overall costs	IT Ops
OpenShift infrastructure costs	- Multiple OCP clusters on AWS - Needs to understand the overall costs that AWS is charging to run OCP	All
OpenShift cost per project	- Running several projects in different OCP clusters - Needs to understand the cost of each project	LOB Owner, IT Ops
Visibility into business costs	- FinOps tasked to report the cost of running services - Needs to group by user, region, department and/or application and recover charge to the LOB cost center	FinOps, LOB Owner
Workload optimization	- Are my DevOps teams requesting the resources they need? - Can I save some money? Should I spend more somewhere to improve performance?	IT Ops, IT Dev Lead

Visualize costs

Problem	Cost management
It is difficult to understand what resources are being used by my application and incurring cost	Cost management uses Prometheus metrics and connects to your cloud accounts to provide full disclosure of resources, cloud services and costs for all clusters, no matter how long those resources are active or where
I am confused about the actual total cost of my cluster	Cost management uses cost models and bill information from cloud providers, along with tags and labels, to identify and show the cost of your cluster including supporting services and custom costs
Multi-cluster, multi-cloud hybrid environments are a challenge	Cost management shows a single pane of glass for all your clouds and clusters
I want to know what is the cost of my application running on multiple clusters	Even if applications are deployed in different clusters or joint inside a cluster, Cost management uses labels to identify them and provide easy reporting on costs and resources
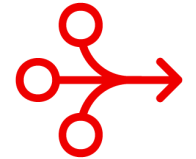
Allocate costs

Problem	Cost management
It is hard to identify what services in the cloud are used to provide OpenShift	Cost management identifies services through metadata and labels to provide a full vision of costs per cluster
It is hard to identify how much a project costs per month	Cost management distributes costs based on real usage and cluster capacity to provide full visibility
There is not a one-to-one relationship between projects and applications in Kubernetes	Cost management uses tags and labels to identify the relationships between OpenShift projects, clusters and cloud services. By combining this with your CMDB, you can generate a report of your business applications.
I want to know how much my cost center is spending	You can use metadata to group and show together the costs of different projects and applications
I have more costs than just OpenShift or clouds	Cost management provides a rich REST API that can be used to consume and enrich data in BI and reporting tools: Excel, Power BI, Tableau, Grafana, etc.
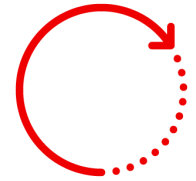
Influence behaviors

Problem	Cost management
Developers are not aware of the impact of their architectural decision in the overall costs of the platform	Adding costs visually to the development process aids with the accountability of developers
Our clusters are empty, but reservations forbid new workloads to be added	Cost management cost models allows developers to use what they need, while admonishing their usage to encourage them to change their ways
The total cost of ownership of the solution is higher than it should be due to low utilization	Cost management provides insights about resources and costs to identify gaps and waste.
We are not sure our OpenShift resource requests and limits are right	Cost management monitors your workload and provides specific resource optimization recommendations based on different time frames.

Roadmap

Cost Management offers unique granularity to OpenShift customers

The solution for MSPs to charge internal/external customers fully-loaded per-project/per-application costs

Cost of running OpenShift

Control plane (incl. HyperShift), unallocated capacity, show/hide internal costs, distribute/not internal costs, etc

Attribute cost of additional services

Include non-computing services: network traffic, storage, GPU, databases, etc

Moneytree

Import hyperscaler hierarchy: accounts, groups, categories, etc and enhance tagging/retagging capabilities.

Budgets

Set a baseline for an entity and find out how you are performing against it, get alerts, etc

Red Hat | intel

Resource Optimization for OpenShift

Most customers are using only 20% of their cluster capacity while they think it's 50%

Utilization reports

- Pod-level request vs usage reporting
- Identify pods with no request or limit
- Phone-bill like itemization: "this project costs this much because it used this many resources"

Best-size pods

- Leverage historical data to identify all pods of the same kind, calculate average use and give recommendations
- Workload-based recommendations (Python, Java, etc)

Leverages Kruize technology by IBM/RH

Recommend cluster size

Alternatives:

- Consolidate more pods per worker
- Keep workers but make them smaller

Leverages CCO technology by RH R+D

Future: expand towards actionable resource optimization

- Recommend optimal configuration settings for applications *(leverages Hyper Parameter Optimization by IBM/RH)*
- Automigrate workloads to always run on spot instances *(leverages SpotOS technology by RH R+D)*
- Financial security: identify and throttle down attacks using autoscalers to bankrupt you.

Cost Management

H2 2023 and beyond

15-months of data and custom reports

Regulatory and internal needs result in different reporting periods. Generate and compare myperiod–over–myperiod, handle different granularities, etc

Cost Model 2.0

Simplify cost model creation, distribute additional costs (project, external, etc), over multiple clusters and allow custom cost distribution.

CO2 footprint

Integrate KEPLER data to report not just the dollar cost but also the CO_2 cost of a workload

Cost Management for RHEL

Account for and distribute cost of RHEL virtual machines and its associated services

Key take-aways

1. Red Hat Cost Management provides you with a single pane of glass for all your OpenShift and cloud spending
2. Custom cost models give you freedom to define costs
3. APIs are provided to integrate Cost Management with other sources of data and generating reports
4. Included in your Red Hat subscription
5. Expanding rapidly beyond OpenShift
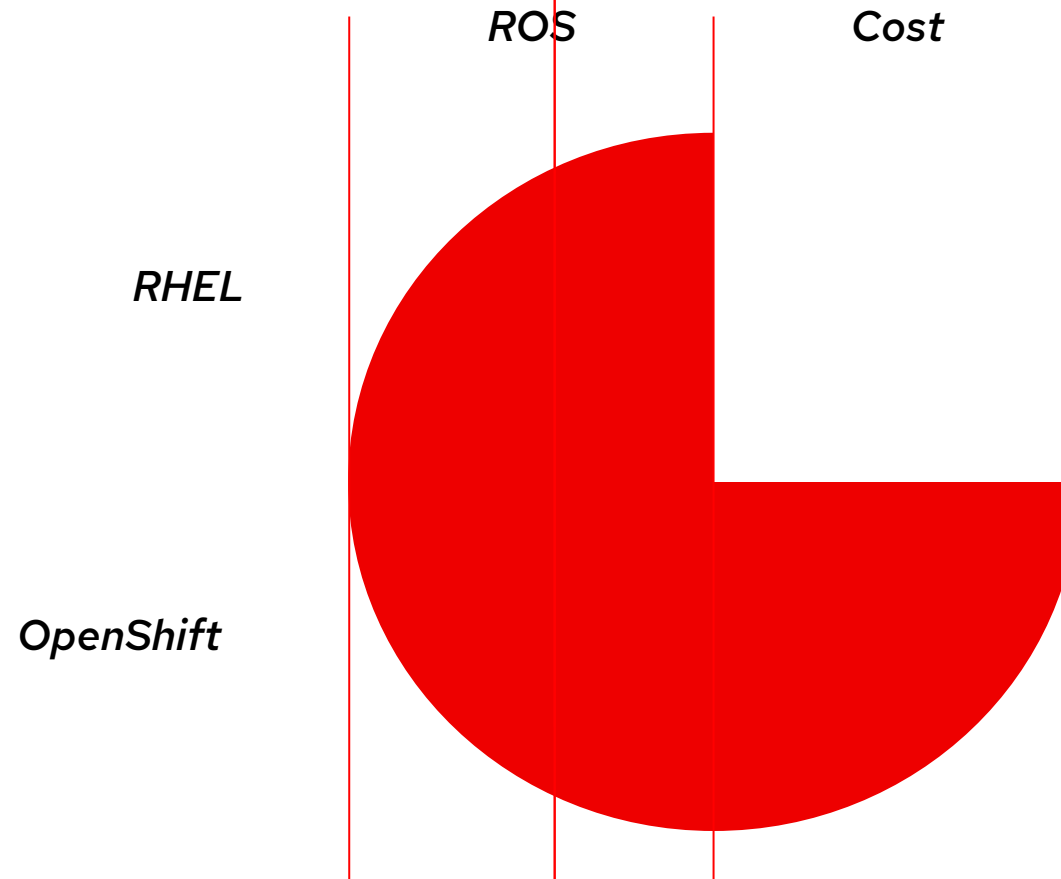
Goal: **FINsights**
ONE product

Resource Optimization and Cost Management

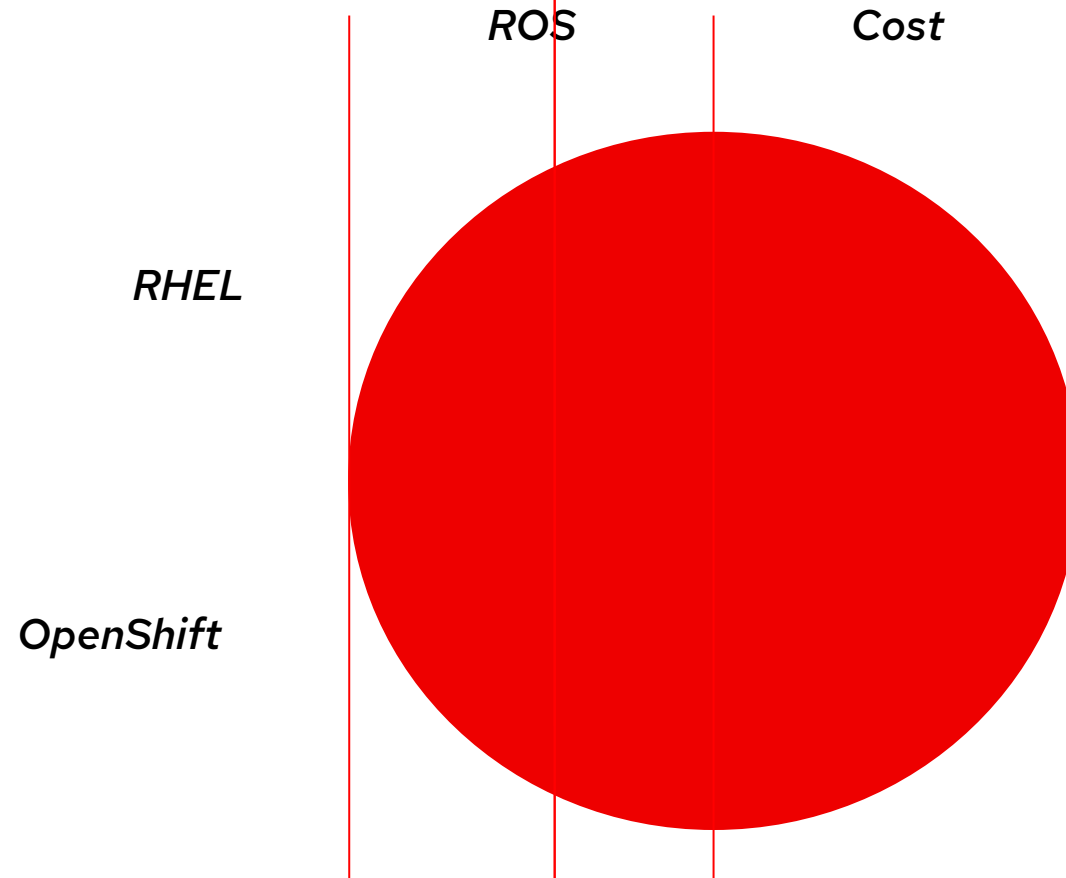Started as two independent applications targeting two different platforms

ROS   *Cost*

RHEL

OpenShift
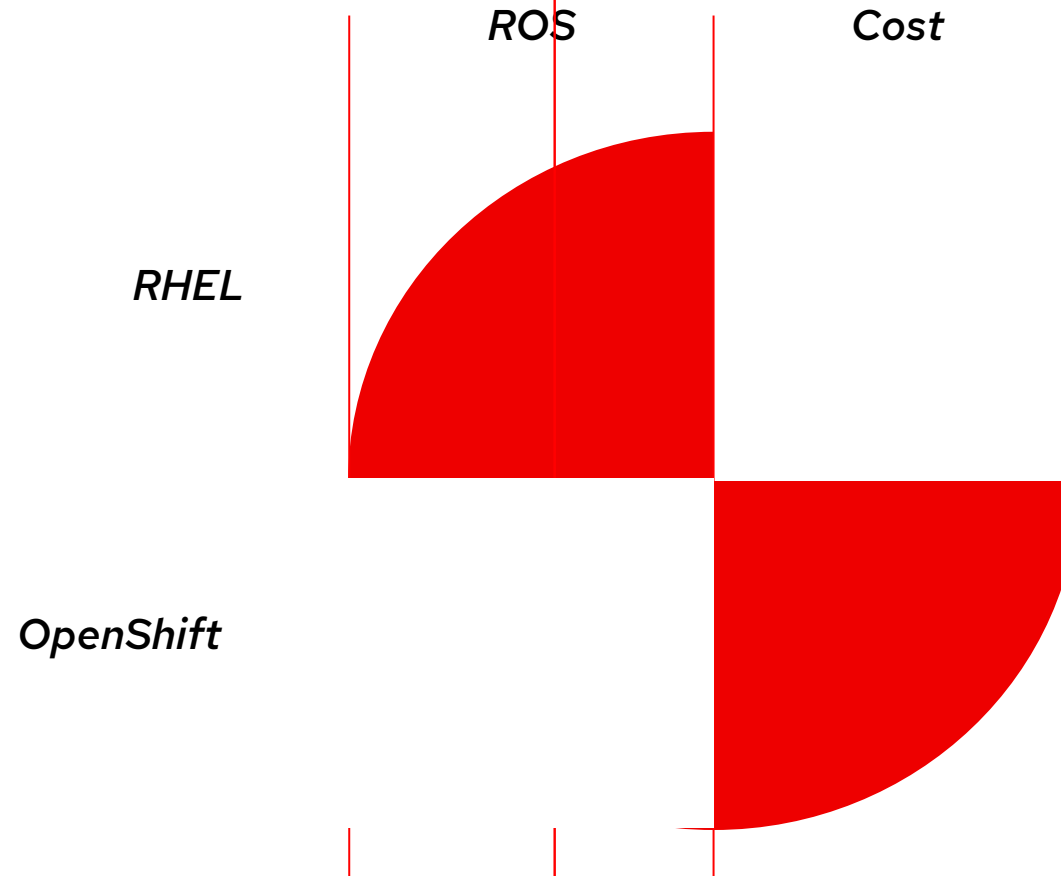
Resource Optimization and Cost Management Q2'23

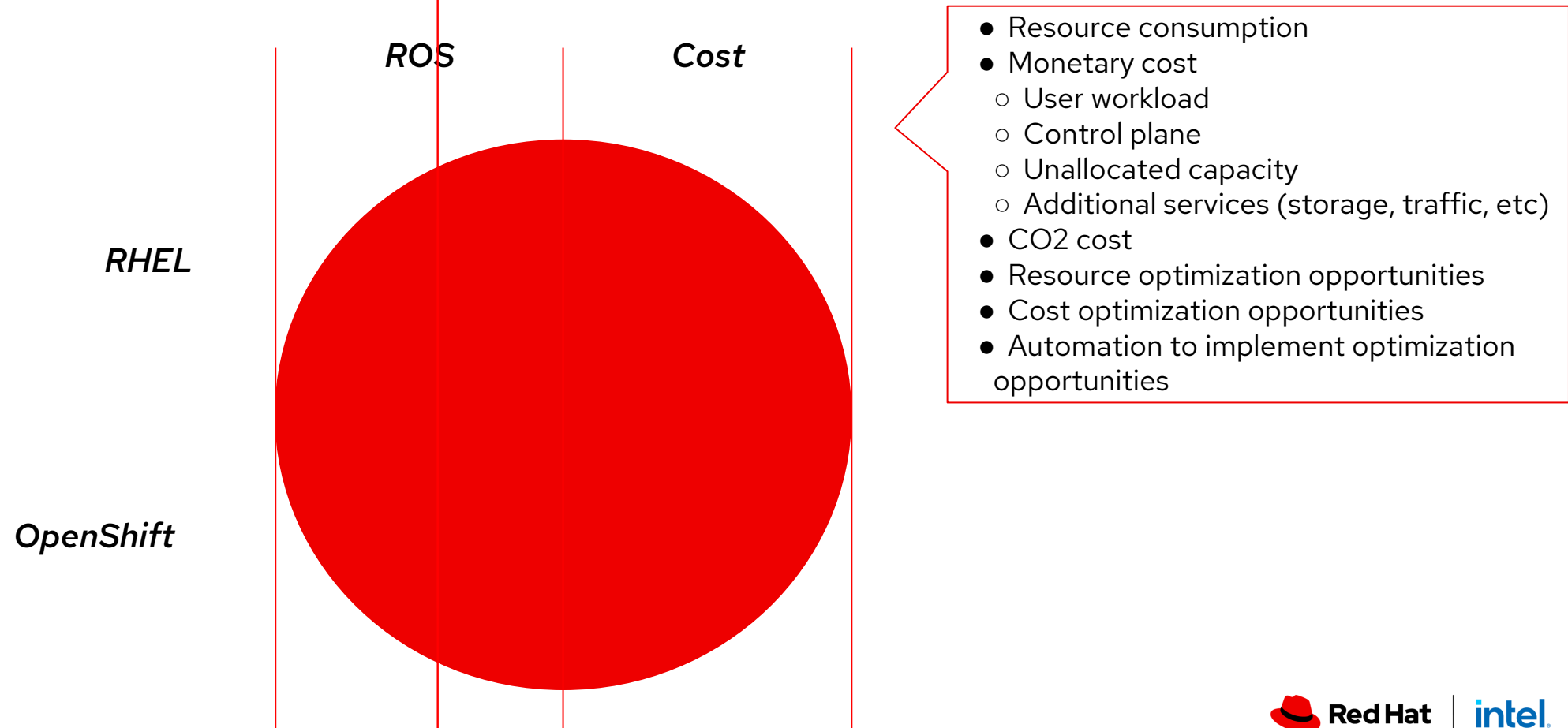## Resource Optimization recommendations integrated in Cost Management: FINsights

ROS

Cost

RHEL

OpenShift

Resource Optimization and Cost Management to-be

Give a round solution to customers: ROS and Cost for RHEL and OCP

ROS   Cost

RHEL

OpenShift

Resource Optimization and Cost Management to-be

Give a round solution to customers: FINsights

ROS *Cost*

RHEL

OpenShift

- Resource consumption
- Monetary cost
  - User workload
  - Control plane
  - Unallocated capacity
  - Additional services (storage, traffic, etc)
- CO_2 cost
- Resource optimization opportunities
- Cost optimization opportunities
- Automation to implement optimization opportunities

Muchas gracias

Red Hat es el principal proveedor mundial de soluciones empresariales de código abierto con un enfoque impulsado por la comunidad que permite ofrecer tecnologías de alto rendimiento de Linux, nube, contenedor y Kubernetes. Le ayudamos a estandarizar en todos los entornos, a desarrollar aplicaciones nativas de la nube, a integrar, automatizar, asegurar y gestionar entornos complejos gracias al soporte, training y servicios de consultoría galardonados.

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