



**STARLINGX**

EdgeWorker  
Management  
(Hummingbird)

# Objectives



**OS** - To onboard the pre-installed on-premise nodes for StarlingX



**Network** - To extend the STX management network over L3 network or private tunnel



**Storage** - To enable multiple storage backends for the EdgeWorkers

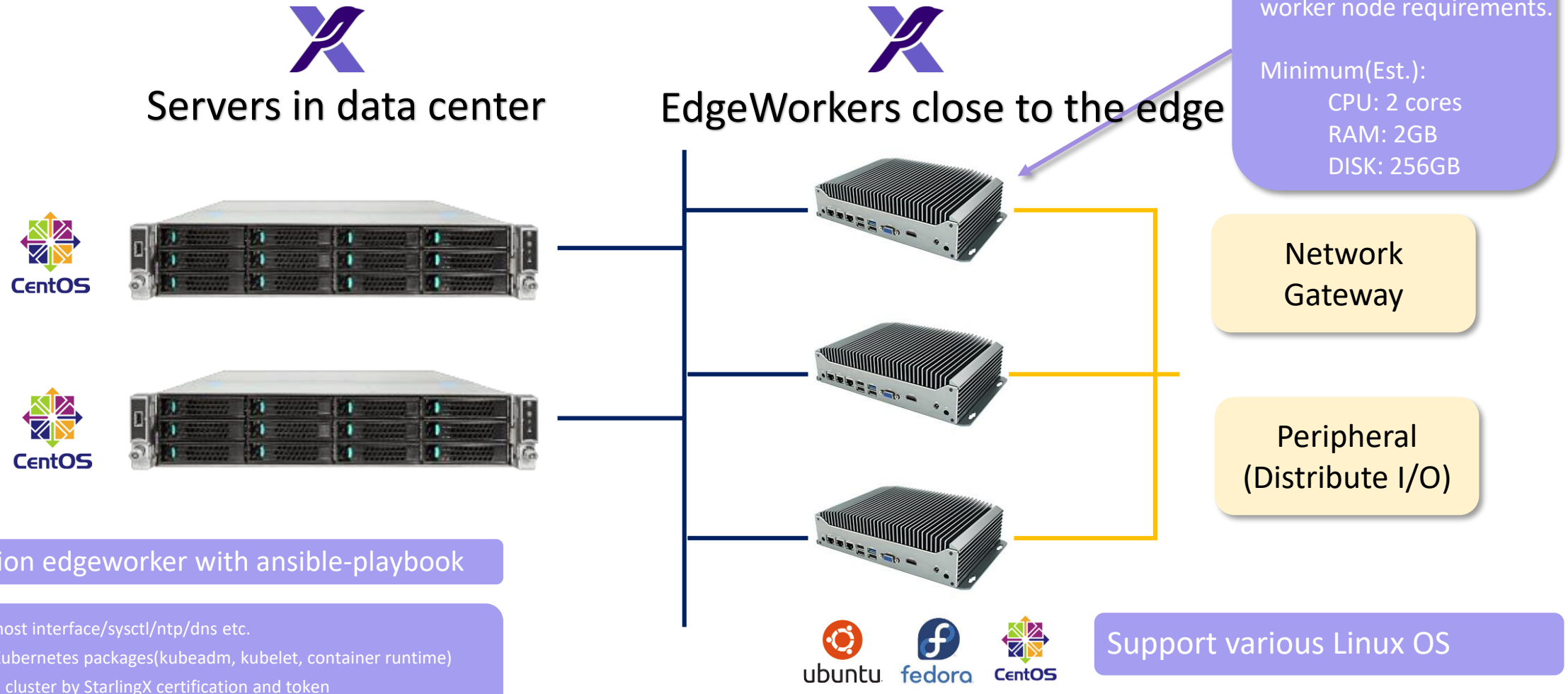


**Workload** - To orchestrate container/VM workloads to the EdgeWorkers

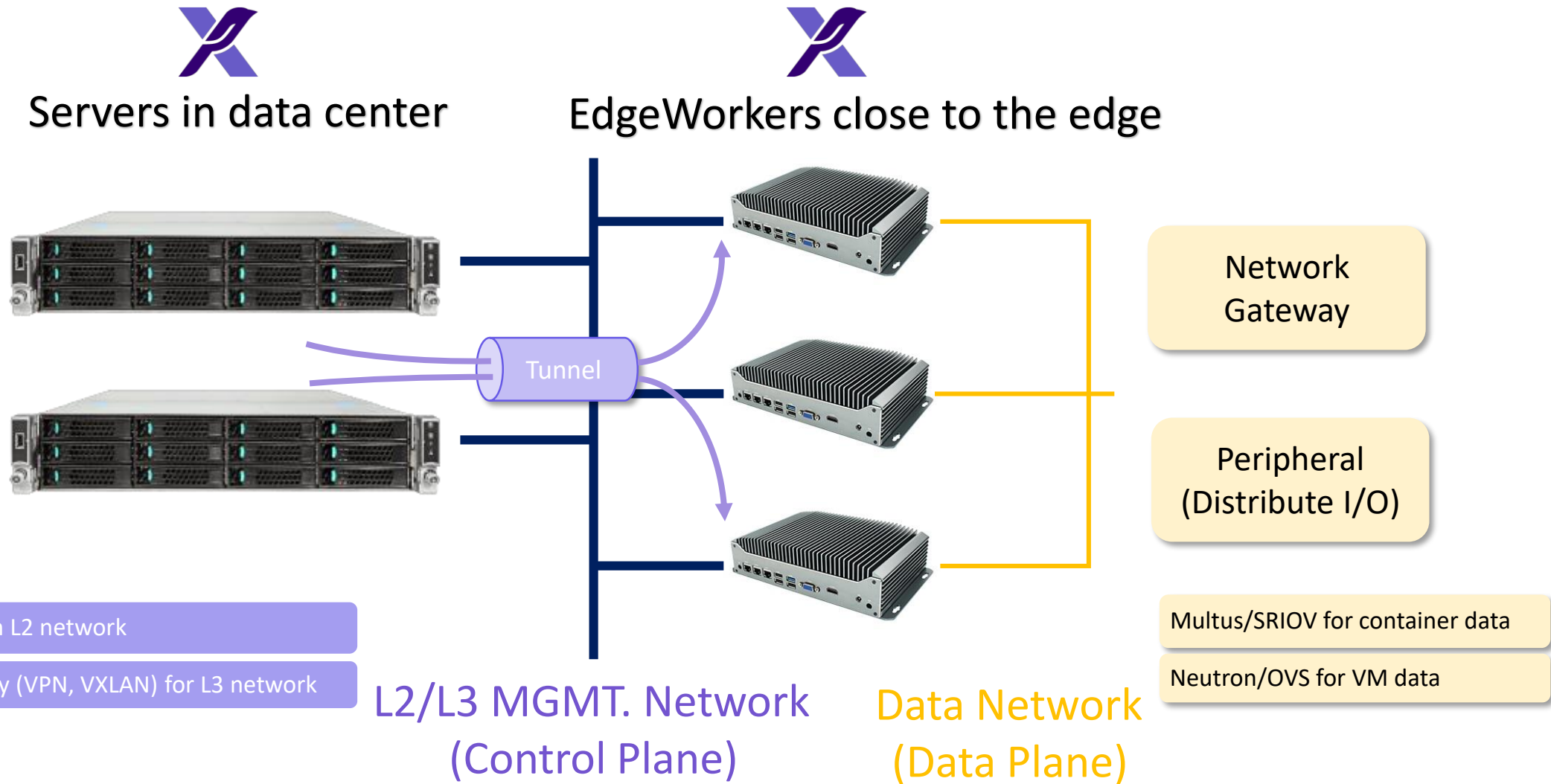


**Manageability** - To manage/configure EdgeWorker platform resources

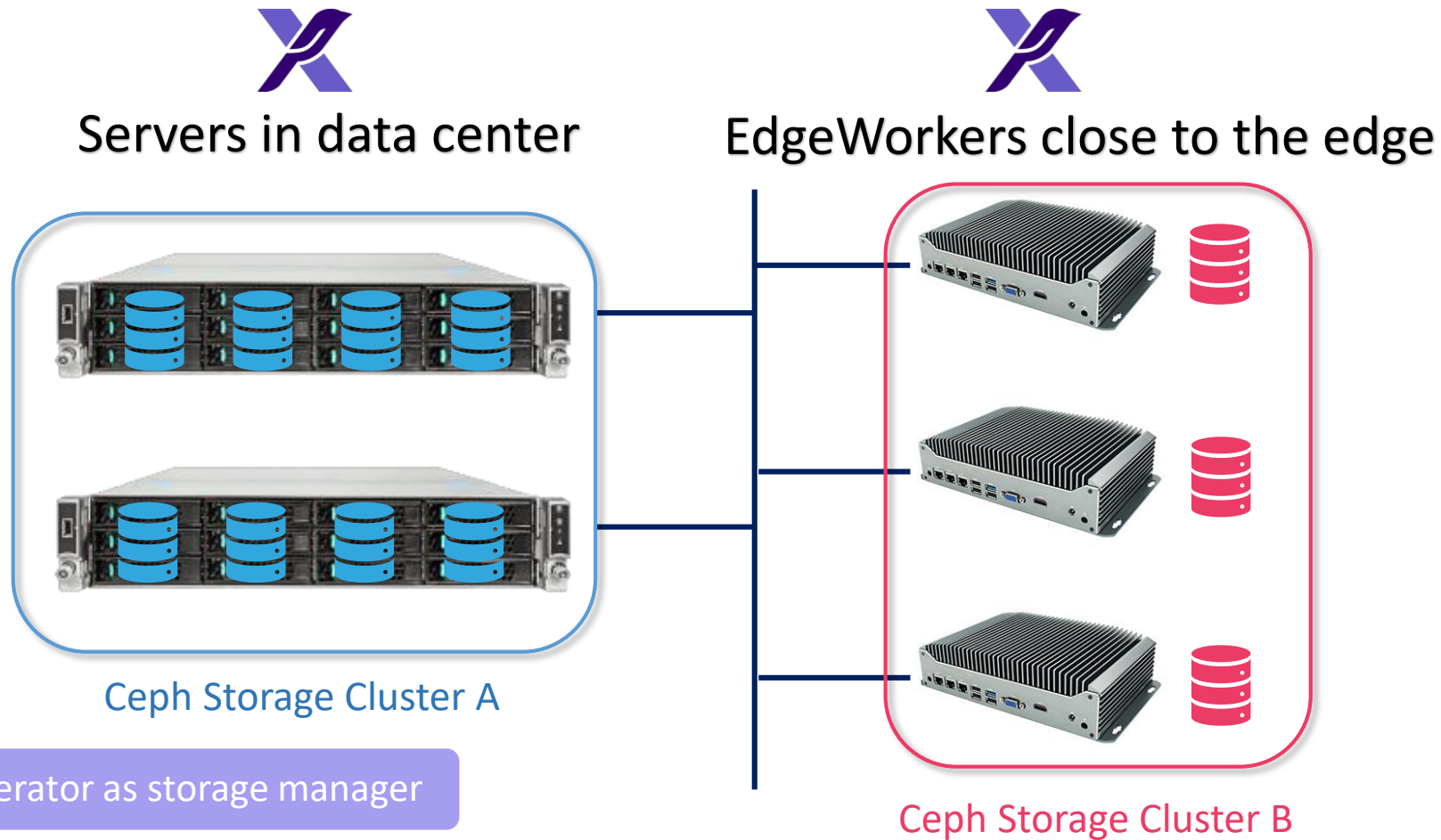
# Onboard On-premise Nodes



# Network Topology



# Multiple Storage Backend

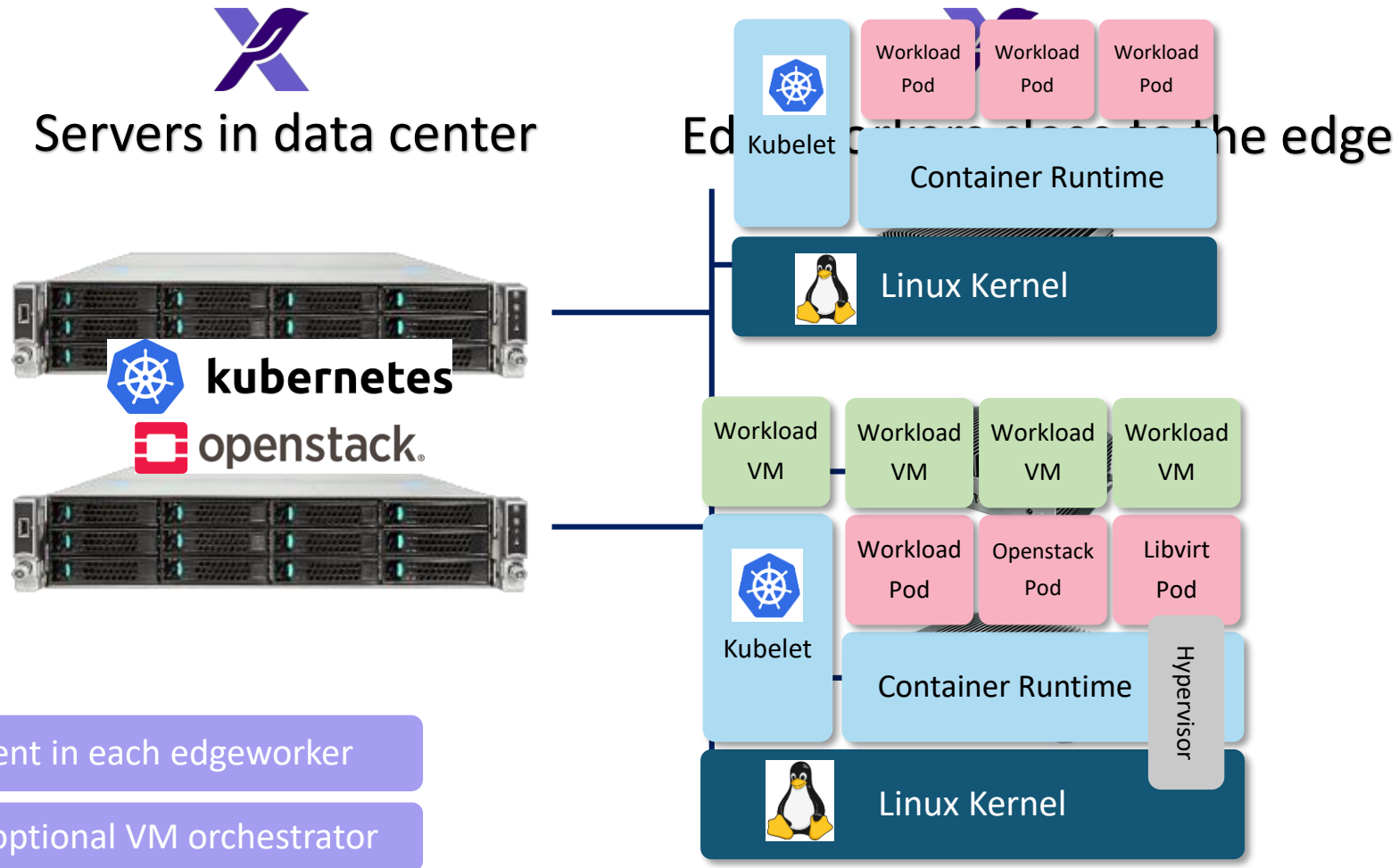


Rook-ceph operator as storage manager

On demand storage clusters deployment



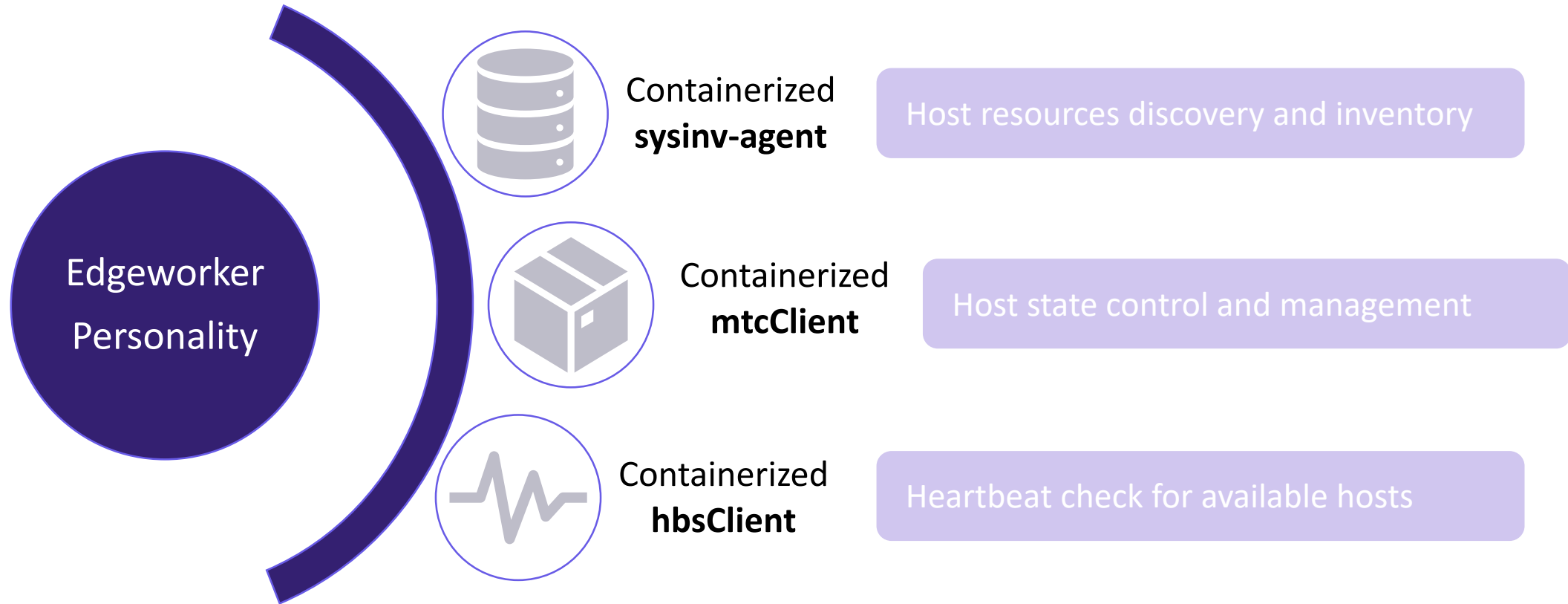
# Workload Orchestration




Kubelet deployment in each edgeworker

Openstack as an optional VM orchestrator

# Manageability



# Prototype Demo (STX-Dashboard)


admin ▾

C: 0 M: 3 m: 3 W: 0
admin ▾

- Project >
- Admin ▾
- Platform ▾
- Software Management
- Host Inventory
- Data Networks
- Data Network Topology
- Storage Overview
- System Configuration
- Fault Management >
- Identity >

Admin / Platform / Host Inventory

## Host Inventory

Hosts
Cpu Profiles
Interface Profiles
Storage Profiles
Memory Profiles
Device Usage

Controller: 2 Worker: 1 EdgeWorker: 2 Degraded: 0 Failed: 0

+ Add Host

### Controller Hosts

Displaying 2 items

Host Name	Personality	Admin State	Operational State	Availability State	Uptime	Status	Actions
controller-0	Controller-Active	Unlocked	Enabled	Available	1 week, 5 days		Edit Host ▾
controller-1	Controller-Standby	Unlocked	Enabled	Available	3 minutes		Edit Host ▾

Displaying 2 items

### Worker Hosts

Q
Lock Hosts
Unlock Hosts
Install Patches

Displaying 1 item

<input type="checkbox"/> Host Name	Personality	Admin State	Operational State	Availability State	Uptime	Status	Actions
<input type="checkbox"/> worker01	Worker	Unlocked	Enabled	Available	2 weeks, 5 days	Not Patch Current	Edit Host ▾

Displaying 1 item

### Edge Worker Hosts

Lock Hosts
Unlock Hosts

Displaying 2 items

<input type="checkbox"/> Host Name	Personality	Admin State	Operational State	Availability State	Uptime	Status	Actions
<input type="checkbox"/> edgeworker-1	EdgeWorker	Unlocked	Enabled	Available	1 week		Edit Host ▾
<input type="checkbox"/> edgeworker-2	EdgeWorker	Unlocked	Enabled	Available	1 week		Edit Host ▾

Displaying 2 items



# Prototype Demo (Terminal)

```
[sysadmin@controller-0 ~(keystone_admin)]$ system host-list
```

id	hostname	personality	administrative	operational	availability
1	controller-0	controller	unlocked	enabled	available
4	controller-1	controller	unlocked	enabled	degraded
5	worker01	worker	unlocked	enabled	available
6	edgeworker-1	edgeworker	unlocked	enabled	available
7	edgeworker-2	edgeworker	unlocked	enabled	available

```
[sysadmin@controller-0 ~(keystone_admin)]$ system host-if-list edgeworker-1
```

uuid	name	class	type	vlan id	ports	uses i/f	used by i/f	attributes
356ec17d-970f-4ba6-bff4-42ffc04b24ec	mgmt0	platform	ethernet	None	[u'ensp3s0']	[]	[]	MTU=1500
c6e7b64f-cea2-41e1-8681-ce860c647ab8	data	data	ethernet	None	[u'emp2s0']	[]	[]	MTU=1500,accelerated=False

```
[sysadmin@controller-0 ~(keystone_admin)]$ system host-cpu-list edgeworker-1
```

uuid	log_core	processor	phy_core	thread	processor_model	assigned_function
a570ab0d-30ec-43dd-add6-7663dcc034fe	0	0	0	0	Intel(R) Core(TM) i7-8665U CPU @ 1.90GHz	Platform
2b70be6b-c9a5-475c-bee4-912b124ff181	1	0	1	0	Intel(R) Core(TM) i7-8665U CPU @ 1.90GHz	Application
6183fb29-19b0-4d3c-b3d8-982f327c1752	2	0	2	0	Intel(R) Core(TM) i7-8665U CPU @ 1.90GHz	Application
0b03d249-d717-4f40-b9a4-ee615b04b630	3	0	3	0	Intel(R) Core(TM) i7-8665U CPU @ 1.90GHz	Application

```
[sysadmin@controller-0 ~(keystone_admin)]$ system host-lvg-list edgeworker-1
```

UUID	LVG Name	State	Access	Total Size (GiB)	Avail Size (GiB)	Current PVs	Current LVs
43cb3262-1274-4ec1-a163-ce7946bc3dbf	nova-local	provisioned	wz--n-	50.457	50.457	1	0
4c80d03b-45db-4eae-bce0-3c42a497a51f	ceph-4334f401-9b04-48e5-8df9-01e18c628fd0	provisioned	wz--n-	238.472	0.0	1	1
85506c4e-c203-41c1-85fa-5d1058152500	ceph-4334f401-9b04-48e5-8df9-01e18c628fd0	provisioned	wz--n-	238.472	0.0	1	1

# Prototype Demo (Storage)

```
[root@rook-ceph-tools-5778d7f6c-srrkg /]# ceph -s
cluster:
  id: bc805e2a-869c-4367-820a-91783b8fb7f3
  health: HEALTH_WARN
        1 pools have many more objects per pg than average
        4 daemons have recently crashed

services:
  mon: 3 daemons, quorum a,b,d (age 24h)
  mgr: a(active, since 31m)
  osd: 2 osds: 2 up (since 2m), 2 in (since 2m)

data:
  pools: 5 pools, 600 pgs
  objects: 28.87k objects, 112 GiB
  usage: 223 GiB used, 720 GiB / 943 GiB avail
  pgs: 600 active+clean

io:
  client: 16 KiB/s rd, 285 KiB/s wr, 20 op/s rd, 30 op/s wr
```

```
[root@rook-ceph-tools-5778d7f6c-srrkg /]# ceph osd tree
ID CLASS WEIGHT TYPE NAME STATUS REWEIGHT PRI-AFF
-1 0.92058 root default
-5 0.45479 host controller-0
0 ssd 0.45479 osd.0 up 1.00000 1.00000
-3 0.46579 host controller-1
1 ssd 0.46579 osd.1 up 1.00000 1.00000
```

```
[root@rook-ceph-tools-5999689bdd-7dg8x /]# ceph -s
cluster:
  id: 5e836128-3ff9-4965-9d28-23ac65bdef7b
  health: HEALTH_WARN
        OSD count 2 < osd_pool_default_size 3
        too few PGs per OSD (4 < min 30)

services:
  mon: 3 daemons, quorum a,b,c (age 8d)
  mgr: a(active, since 24h)
  osd: 2 osds: 2 up (since 8d), 2 in (since 2w)

data:
  pools: 1 pools, 8 pgs
  objects: 13.60k objects, 39 GiB
  usage: 40 GiB used, 437 GiB / 477 GiB avail
  pgs: 8 active+clean

io:
  client: 26 KiB/s wr, 0 op/s rd, 1 op/s wr
```

```
[root@rook-ceph-tools-5999689bdd-7dg8x /]# ceph osd tree
ID CLASS WEIGHT TYPE NAME STATUS REWEIGHT PRI-AFF
-1 0.46579 root default
-3 0.23289 host edgeworker-1
0 ssd 0.23289 osd.0 up 1.00000 1.00000
-5 0.23289 host edgeworker-2
1 ssd 0.23289 osd.1 up 1.00000 1.00000
```

# Prototype Demo (Openstack)

openstack. admin

Admin / Compute / Instances

## Instances

Status = Active Filter [Delete Instances](#)

Displaying 5 items

<input type="checkbox"/>	Project	Host	Name	Image Name	IP Address	Flavor	Status	Task	Power State	Age	Actions	
<input type="checkbox"/>	admin	worker01	<a href="#">test-centos</a>	-	192.168.20.221	<a href="#">m1.small</a>	Active		None	Running	1 week, 5 days	<a href="#">Rescue Instance</a>
<input type="checkbox"/>	admin	edgeworker-1	<a href="#">win10</a>	-	192.168.10.11	<a href="#">m1.large</a>	Active		None	Running	1 week, 6 days	<a href="#">Rescue Instance</a>
<input type="checkbox"/>	admin	edgeworker-2	<a href="#">centos2-cell1</a>	-	192.168.100.10	<a href="#">m1.small</a>	Active		None	Running	2 weeks	<a href="#">Rescue Instance</a>
<input type="checkbox"/>	admin	edgeworker-1	<a href="#">centos-cell1</a>	-	192.168.10.10	<a href="#">m1.small</a>	Active		None	Running	2 weeks	<a href="#">Rescue Instance</a>
<input type="checkbox"/>	admin	worker01	<a href="#">centos</a>	-	192.168.100.65	<a href="#">m1.medium</a>	Active		None	Running	2 weeks, 1 day	<a href="#">Rescue Instance</a>

Displaying 5 items

# Executive Plan

## Phase 1 (stx.5.0)

- Make EdgeWorkers recognized as one of the StarlingX nodes with a new personality
  - ✓ Pre-installed OS  
(Match long term goal: Install STX on top of any OS)
  - ✓ Low minimum hardware resource requirements
- Onboard EdgeWorkers as StarlingX Kubernetes nodes by ansible playbook
  - ✓ Extending STX Kubernetes cluster
  - ✓ Ability to run containerized agents/clients  
(Match long term goal: Containerize flock services)

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# Executive Plan (Cont.d)

## Phase 2 or Future (stx.6.0+)

- Containerization of flock services/agents/clients for EdgeWorker
- Support L3 network or tunneling over L3 network
- Enhancement of multiple storage backend support by Rook
- Manage software on EdgeWorkers by additional plugins of SW management.
  - Turtle Creek