

STARLINGX

Plataforma de nuvem privada baseada em Debian

\$ cat agenda.txt

- whoami
- introduction
- platform overview
- distributed cloud overview
- questions

\$ whoami

- desenvolvedor desde 2015
- {github,linkedin}/@wasnio
- desenvolvedor de plataforma
 - sistemas distribuídos
 - open source
 - kubernetes
 - linux
 - bash/go/python
- previously backend web developer

\$ cat disclaimer.txt

Statements and opinions are mine, do not express
what my employer thinks.

\$ cat introduction/what-is-starlingx.txt

"StarlingX is a complete cloud infrastructure software stack for the edge used by the most demanding applications in industrial IOT, telecom, video delivery and other ultra-low latency use cases."

\$ cat introduction/what-is-not-starlingx.txt

- nothing to do with X/starlink/Elon Musk
- not a desktop focused distribution

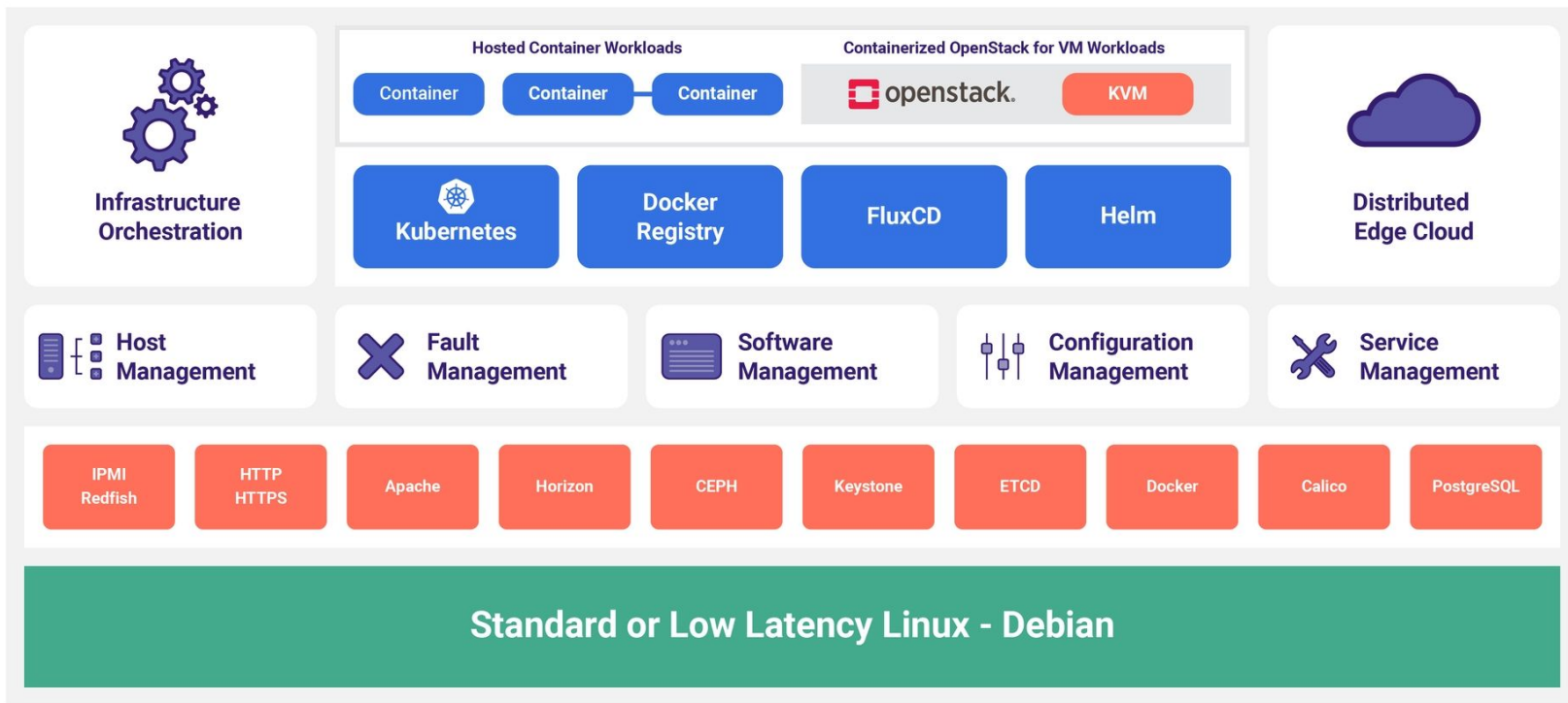
\$ cat introduction/nerd-notes-no-one-cares-about.txt

- default kernel is built on top of Yocto: <https://www.yoctoproject.org/>
- OSTree provides versioning, packaging and upgrading of the Linux - read-only, by default
- built on top of debian bullseye (11)
- migration to trixie (13) in progress

\$ cat introduction/deployments-models.txt

- AIO Simplex (1 node, all-in-one)
- AIO Duplex (2 nodes, second standby for high availability)
- Standard (1 or 2 controllers, workers between 1 and 99)
- Standard with dedicated storage
- Distributed clouds

Distributed Edge Cloud Native Platform



\$ cat introduction/why-starlingx-and-not-y?

- vendor lock-in
- high infra costs
- more control over the infra

\$ cat introduction/system-overview.txt

- system command
- fm command (fault command)

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

id	hostname	personality	administrative	operational	availability
1	controller-0	controller	unlocked	enabled	available

```
[sysadmin@controller-0 ~(keystone_admin)]$ system host-add --hostname controller-1 \  
  --personality controller \  
  --subfunctions controller,worker \  
  --m <mgmt mac address> \  
  --bm_ip <bm ip> \  
  --bm_password <bm password> --bm_username admin \  
  --install_output text
```

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

id	hostname	personality	administrative	operational	availability
1	controller-0	controller	unlocked	enabled	available
2	controller-1	controller	unlocked	enabled	available

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

Property	Value
action	none
administrative	unlocked
apparmor	disabled
availability	available
bm_ip	None
bm_type	None
bm_username	None
boot_device	/dev/sda
capabilities	{'mgmt_ipsec': 'enabled', 'is_max_cpu_configurable': 'not-configurable', 'stor_function': 'monitor', 'Personality': 'Controller-Standby'}
clock_synchronization	ntp
config_applied	0671178a-e72d-4ea5-8e90-a806ad2f9fa6
config_status	None
config_target	0671178a-e72d-4ea5-8e90-a806ad2f9fa6
console	ttyS0,115200
created_at	2025-08-14T17:51:31.640204+00:00
cstates_available	None
device_image_update	None
hostname	controller-1
hw_settle	0
id	2
install_output	text
install_state	None
install_state_info	None
inv_state	inventoried
invprovision	provisioned
iscsi_initiator_name	iqn.2018-05.io.starlingx:ee6b157b2ae2
location	{}
max_cpu_mhz_allowed	None
max_cpu_mhz_configured	None
mgmt_mac	52:54:00:49:4d:d1
min_cpu_mhz_allowed	None
nvme_host_id	c760c6eb-d208-4d20-8c4f-fc48a3a3766e
nvme_host_nqn	nqn.2014-08.org.nvmexpress:uuid:5627f7d7-7c6f-48cf-b991-53cba665d7c8
operational	enabled
personality	controller
reboot_needed	False
reserved	False
rootfs_device	/dev/sda
serialid	None
subfunction_avail	available
subfunction_oper	enabled
subfunctions	controller,worker
sw_version	24.09
task	
tboot	
ttys_dcd	False
updated_at	2025-08-16T03:10:18.883267+00:00
uptime	2459
uuid	1704e410-0f6c-4247-800c-e8741aee4a8f
vim_progress_status	services-enabled

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

Property	Value
action	none
administrative	unlocked
apparmor	disabled
availability	available
bm_ip	None
bm_type	None
bm_username	None
boot_device	/dev/sda
capabilities	{'mgmt_ipsec': 'enabled', 'is_max_cpu_configurable': 'not-configurable', 'stor_function': 'monitor'}
clock_synchronization	ntp
config_applied	0671178a-e72d-4ea5-8e90-a806ad2f9fa6
config_status	None
config_target	0671178a-e72d-4ea5-8e90-a806ad2f9fa6
console	ttyS0,115200
created_at	2025-08-14T17:51:31.640204+00:00
cstates_available	None
device_image_update	None
hostname	controller-1
hw_settle	0
id	3
install_output	text
install_state	None
install_state_info	None
inv_state	inventoried
invprovision	provisioned
iscsi_initiator_name	iqn.2018-05.io.starlingx:ee6b157b2ae2
location	{}
max_cpu_mhz_allowed	None
max_cpu_mhz_configured	None
mgmt_mac	52:54:00:49:4d:d1
min_cpu_mhz_allowed	None
nvme_host_id	c760c6eb-d208-4d20-8c4f-fc48a3a3766e
nvme_host_nqn	nqn.2014-08.org.nvmexpress:uuid:5627f7d7-7c6f-48cf-b991-53cba665d7c8
operational	enabled
personality	controller
reboot_needed	False
reserved	False
rootfs_device	/dev/sda
serialid	None
subfunction_avail	available
subfunction_oper	enabled
subfunctions	controller, worker
sw_version	24.09
task	Locking
tboot	
ttys_dcd	False
updated_at	2025-08-16T03:28:35.841817+00:00
uptime	3552
uuid	1704e410-0f6c-4247-800c-e8741aee4a8f
vim_progress_status	services-enabled

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

id	hostname	personality	administrative	operational	availability
1	controller-0	controller	unlocked	enabled	available
3	controller-1	controller	locked	disabled	online

```
[sysadmin@controller-0 ~(keystone_admin)]$ fm alarm-list
```

Alarm ID	Reason Text	Entity ID	Severity	Time Stamp
800.001	Storage Alarm Condition: HEALTH_WARN [PGs are degraded/stuck or undersized]. Please check 'ceph -s' for more details.	cluster=172666e3-a62a-47c8-a70f-82ebd036a3a8	warning	2025-08-16T03:33:25.337901
800.011	Loss of replication in replication group group-0: OSDs are down	cluster=172666e3-a62a-47c8-a70f-82ebd036a3a8.peergroup=group-0.host=controller-1	major	2025-08-16T03:32:25.141345
400.005	Communication failure detected with peer over port enp2s2 on host controller-0	host=controller-0.network=mgmt	major	2025-08-16T03:31:37.145245
400.005	Communication failure detected with peer over port enp2s1 on host controller-0	host=controller-0.network=oam	major	2025-08-16T03:31:36.985075
	members available	service_group=controller-services		34.515099
400.002	Service group cloud-services loss of redundancy; expected 1 standby member but no standby members available	service_domain=controller. service_group=cloud-services	major	2025-08-16T03:31:34.346111
400.002	Service group vim-services loss of redundancy; expected 1 standby member but no standby members available	service_domain=controller. service_group=vim-services	major	2025-08-16T03:31:34.178110
400.002	Service group patching-services loss of redundancy; expected 1 standby member but no standby members available	service_domain=controller. service_group=patching-services	major	2025-08-16T03:31:34.001332
400.002	Service group directory-services loss of redundancy; expected 2 active members but only 1 active member available	service_domain=controller. service_group=directory-services	major	2025-08-16T03:31:33.827253
400.002	Service group web-services loss of redundancy; expected 2 active members but only 1 active member available	service_domain=controller. service_group=web-services	major	2025-08-16T03:31:33.658155
750.006	A configuration change requires a reapply of the platform-integ-apps application.	k8s_application=platform-integ-apps	warning	2025-08-16T03:31:33.484152
400.002	Service group storage-services loss of redundancy; expected 2 active members but only 1 active member available	service_domain=controller. service_group=storage-services	major	2025-08-16T03:31:33.477235
400.002	Service group storage-monitoring-services loss of redundancy; expected 1 standby member but no standby members available	service_domain=controller. service_group=storage-monitoring-services	major	2025-08-16T03:31:33.306096
400.002	Service group distributed-cloud-services loss of redundancy; expected 1 standby member but no standby members available	service_domain=controller. service_group=distributed-cloud-services	major	2025-08-16T03:31:33.138081

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

```
...
```

Command-line interface for System Inventory and Maintenance

Positional arguments:

<subcommand>

modify	Modify system attributes.
show	Show system attributes.
dns-modify	Modify DNS attributes.
dns-show	Show DNS (Domain Name Server) attributes.
ntp-modify	Modify NTP attributes.
ntp-show	Show NTP (Network Time Protocol) attributes.
ptp-apply	Apply the PTP config.
ptp-modify	Modify PTP attributes.
ptp-show	Show PTP (Precision Time Protocol) attributes.
phc2sys-ha-disable-lock	
phc2sys-ha-disable-source	
phc2sys-ha-enable-source	
phc2sys-ha-force-lock	
phc2sys-ha-query	
host-ptp-instance-assign	Associate PTP instance(s) to host.
host-ptp-instance-list	List PTP instances on host.
host-ptp-instance-remove	Disassociate PTP instance(s) from host.
ptp-instance-add	Add a PTP instance.
ptp-instance-apply	Apply the PTP Instance config.
ptp-instance-delete	Delete a PTP instance.
ptp-instance-list	List all PTP instances.
ptp-instance-parameter-add	

\$ cat distributed-cloud.txt

- Onde entra o edge computing
- Milhares de nodes (subclouds), que podem estar em diferentes regiões
- Controle remoto do System Controller (Cloud Central)
 - Se a cloud central morrer, os nodes da borda continuam operantes
- As subclouds podem ter diferentes configurações
- Cloud para milhares (5k ou mais clusters), milhares de milhares de nós nos clusters

```
[sysadmin@controller-0 ~(keystone_admin)]$ dcmanager subcloud list
```

[illegible]

```
[sysadmin@controller-0 ~(keystone_admin)]$ software \
  --os-region-name SystemController \
  upload starlingx-intel-x86-64-cd.iso starlingx-intel-x86-64-cd.sig

[sysadmin@controller-0 ~(keystone_admin)]$ cat install-values-subcloud1.yml
software_version: 24.09
bootstrap_interface: enp2s1

bootstrap_address: 10.10.20.12
bootstrap_address_prefix: 23

bmc_address: 192.168.122.101
bmc_username: admin

# 2 - AI0, Serial Console
install_type: 2
console_type: tty0
rootfs_device: /dev/sda
boot_device: /dev/sda
wait_for_timeout: 3600
no_check_certificate: True
persistent_size: 30000
```

```
[sysadmin@controller-0 ~(keystone_admin)]$ head -n 21 localhost.yml
```

```
system_mode: duplex  
distributed_cloud_role: systemcontroller
```

```
dns_servers:  
- 128.224.144.130  
- 147.11.57.128  
- 147.11.57.133
```

```
external_oam_subnet: 10.10.20.0/24  
external_oam_gateway_address: 10.10.20.1  
external_oam_floating_address: 10.10.20.2  
external_oam_node_0_address: 10.10.20.3  
external_oam_node_1_address: 10.10.20.4
```

```
pxeboot_subnet: 169.254.210.0/24  
management_start_address: 192.168.204.2  
management_end_address: 192.168.204.50  
management_subnet: 192.168.204.0/24
```

```
admin_username: admin
```

```
[sysadmin@controller-0 ~(keystone_admin)]$ head -n 25 bootstrap-values-subcloud1.yml
```

```
system_mode: simplex
name: subcloud1
description: "Ottawa Site"
location: "YOW"
```

```
management_subnet: 192.168.101.0/24
management_start_address: 192.168.101.2
management_end_address: 192.168.101.50
management_gateway_address: 192.168.101.1
external_oam_subnet: 10.10.20.0/24
external_oam_gateway_address: 10.10.20.1
external_oam_floating_address: 10.10.20.12
systemcontroller_gateway_address: 192.168.204.101
```

```
dns_servers:
- 128.224.144.130
- 8.8.8.8
- 8.8.4.4
```

```
system_mode: simplex
name: subcloud1
description: "Ottawa Site"
location: "YOW"
```

```
management_subnet: 192.168.101.0/24
management_start_address: 192.168.101.2
management_end_address: 192.168.101.50
management_gateway_address: 192.168.101.1
external_oam_subnet: 10.10.20.0/24
external_oam_gateway_address: 10.10.20.1
external_oam_floating_address: 10.10.20.12
systemcontroller_gateway_address: 192.168.204.101
```

```
...
```

```
[sysadmin@controller-0 ~(keystone_admin)]$ dcmanager subcloud add \  
  --install-values install-values-subcloud1.yml \  
  --bootstrap-values --bmc-password <bmc-password> \  
  --deploy-config deployment-config-subcloud1.yaml \  
  --sysadmin-password <linux password> \  
  --bootstrap-address 10.10.20.12
```

\$ cat distributed-cloud/other-features.txt

- enrollment
- rehome
- prestage
- phased deployment (install -> bootstrap -> configuration)
- remote patching

Obrigado!