



Vera C. Rubin Observatory
Rubin Observatory Project Office

Computing Infrastructure

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Abstract

The Vera Rubin Observatory Computer Infrastructure is formed by four sites: La Serena, Cerro Pachon, Tucson and Cloud, each composed of several server's clusters. This document details each Cluster's amount of Nodes, Processing Capacity (CPU), Network Interfaces Information and Memory (RAM) Infrastructure per site.

The Physical Storage information from each cluster will be divided into three:

- **System Storage:** Represents the Disk Storage capacity that the OS has control of - /, /etc, /usr, /lib, /home, /var, /root, /opt-.
- **Data Storage:** Disk unit space dedicated for data storage or common pool contribution.
- **Docker Storage:** Storage Unit dedicated for running docker images - /var/lib/docker/-.
- **Usable Kubernetes Storage:** All Rubin Clusters are provisioned with rook-ceph. Rook orchestrates ceph storage between the distributed nodes, allowing self-managing, self-scaling, and self healing storage services. The Usable Kubernetes Storage is then the total amount of usable space for the PV's (over kubernetes).

Change Record

Version	Date	Description	Owner name
1	2020-04-30	LSST RST Version	Ivan Gonzalez
2	2021-05-11	Isstdoc LaTeX Version	Ivan Gonzalez
3	2021-06-04	First Revision Concluded	Ivan Gonzalez
4	2021-09-23	Disk Storage added	Ivan Gonzalez
5	2021-10-18	Corrections to Disk Storage Information	Ivan Gonzalez
6	2021-11-22	Yagan Cluster Added	Ivan Gonzalez
7	2022-02-25	General Update and add Luan Cluster	Heinrich Reinking
8	2022-05-5	Add Lukay and Gaw Cluster	Heinrich Reinking
9	2022-09-8	Add Chonchon Cluster	Heinrich Reinking

Document source location: <https://github.com/lsst-it/ittn-014>

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Computing Infrastructure

1 Chile

1.1 La Serena

1.1.1 Antu

- **Name:** Commissioning Cluster
- **Platform:** Kubernetes
- **Multicast:** Yes
- **Apps:** RKE, Nublado
- **Nodes:** 15
- **CPU:** 832
- **Memory:** 3.2TB
- **Usable Storage:** 26TB

Node	CPU	Memory	Network	System Storage	Docker Storage	Data Storage
antu01.ls.lsst.org	72	376GB	2x10GB	1.1TB	447GB	8.7TB
antu02.ls.lsst.org	72	376GB	2x10GB	1.1TB	447GB	8.7TB
antu03.ls.lsst.org	72	376GB	2x10GB	1.1TB	447GB	8.7TB
antu04.ls.lsst.org	64	187GB	2x10GB	447GB	1.8TB	N/A
antu05.ls.lsst.org	64	187GB	2x10GB	447GB	1.8TB	N/A
antu06.ls.lsst.org	64	187GB	2x10GB	447GB	1.8TB	N/A
antu07.ls.lsst.org	64	187GB	2x10GB	447GB	1.8TB	N/A
antu08.ls.lsst.org	64	187GB	2x10GB	447GB	1.8TB	N/A
antu09.ls.lsst.org	64	187GB	2x10GB	447GB	1.8TB	N/A
ls-dtn01.ls.lsst.org	48	187GB	2x10GB	32.3TB	223.5GB	N/A
ls-dtn02.ls.lsst.org	48	187GB	2x10GB	32.3TB	223.5GB	N/A
ls-efdetl01.ls.lsst.org	40	187GB	2x10GB	5.8TB	223.5	N/A
ls-fwdr02.ls.lsst.org	48	92GB	2x10GB	50GB	221.8GB	N/A

1.1.2 Core LS

- **Name:** IT Services
- **Platform:** Libvirt
- **Multicast:** No
- **Apps:** Foreman, DHCP and DNS
- **Nodes:** 3
- **CPU:** 96
- **RAM Memory:** 231GB

Node	CPU	Memory	Network	System Storage
core01.ls.sst.org	32	77GB	2x1GB	500GB
core02.ls.sst.org	32	77GB	2x1GB	932GB
core03.ls.sst.org	32	77GB	2x1GB	932GB

1.1.3 Luan

- **Name:** IT Production Kubernetes Cluster
- **Platform:** Kubernetes
- **Multicast:** No
- **Apps:** RKE
- **Nodes:** 5
- **CPU:** 160
- **RAM Memory:** 1280GB
- **Usable Kubernetes Storage:** 36TB

Node	CPU	Memory	Network	System Storage	Docker Storage
luan01.ls.sst.org	32	256GB	2x10GB	500GB	500GB
luan02.ls.sst.org	32	256GB	2x10GB	500GB	500GB
luan03.ls.sst.org	32	256GB	2x10GB	500GB	500GB
luan04.ls.sst.org	32	256GB	2x10GB	500GB	500GB
luan05.ls.sst.org	32	256GB	2x10GB	500GB	500GB

1.1.4 Gaw

- **Name:** IT Kubernetes Cluster - Base Backup
- **Platform:** Kubernetes, NFS/CephFS
- **Multicast:** No
- **Apps:** RKE
- **Nodes:** 5
- **CPU:** 160
- **RAM Memory:** 1280GB
- **Usable Kubernetes Storage:** 364TB

Node	CPU	Memory	Network	System Storage	Docker Storage
gaw01.ls.lsst.org	32	256GB	2x10GB	500GB	500GB
gaw02.ls.lsst.org	32	256GB	2x10GB	500GB	500GB
gaw03.ls.lsst.org	32	256GB	2x10GB	500GB	500GB
gaw04.ls.lsst.org	32	256GB	2x10GB	500GB	500GB
gaw05.ls.lsst.org	32	256GB	2x10GB	500GB	500GB

1.1.5 Kueyen

- **Name:** Kueyen Cluster
- **Platform:** Kubernetes
- **Multicast:** Yes
- **Apps:** CSC and EFD
- **Nodes:** 3
- **CPU:** 96
- **RAM Memory:** 231GB
- **Usable Kubernetes Storage:** 29TB

Node	CPU	Memory	Network	System Storage	Docker Storage	Data Storage
kueyen02.ls.lsst.org	32	77GB	2x10GB	3.7TB	631.5GB	10.9TB
kueyen03.ls.lsst.org	32	77GB	2x10GB	3.7TB	631.5GB	7.3TB
kueyen04.ls.lsst.org	32	77GB	2x10GB	3.7TB	631.5GB	10.9TB

1.1.6 Ruka

- **Name:** IT Development Kubernetes Cluster
- **Platform:** Kubernetes
- **Multicast:** No
- **Apps:** RKE
- **Nodes:** 6
- **CPU:** 192
- **RAM Memory:** 606GB
- **Usable Kubernetes Storage:** 9.1TB

Node	CPU	Memory	Network	System Storage	Docker Storage
ruka01.dev.lsst.org	32	77GB	2x10GB	2TB	1TB
ruka02.dev.lsst.org	32	77GB	2x10GB	2TB	1TB
ruka03.dev.lsst.org	32	77GB	2x10GB	2TB	1TB
ruka04.dev.lsst.org	32	125GB	2x10GB	2TB	1TB
ruka05.dev.lsst.org	32	125GB	2x10GB	2TB	1TB
ruka06.dev.lsst.org	32	125GB	2x10GB	2TB	1TB

1.1.7 Rancher LS

- **Name:** Rancher LS
- **Platform:** Kubernetes
- **Multicast:** No
- **Apps:** Rancher WUI
- **Nodes:** 3
- **CPU:** 12
- **RAM Memory:** 21GB
- **Usable Storage:** 120GB

Node	CPU	Memory	Network	Host	System Storage
rancher01.ls.lsst.org	4	7GB	1x1GB	core01.ls.lsst.org	40GB
rancher02.ls.lsst.org	4	7GB	1x1GB	core02.ls.lsst.org	40GB
rancher03.ls.lsst.org	4	7GB	1x1GB	core03.ls.lsst.org	40GB

1.2 Cerro Pachon

1.2.1 Yagan

- **Name:** Yagan Cluster
- **Platform:** Kubernetes
- **Multicast:** Yes
- **Apps:** RKE, Nublado
- **Nodes:** 7
- **CPU:** 448
- **RAM Memory:** 1.792GB
- **Usable Kubernetes Storage:** 24TB

Node	CPU	Memory	Network	System Storage	Docker Storage	Data Storage
yagan01.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	3.6TB
yagan02.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	3.6TB
yagan03.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	3.6TB
yagan04.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	3.6TB
yagan05.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	3.6TB
yagan06.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	3.6TB
yagan07.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	3.6TB
yagan08 (Cold Spare)	64	256GB	2x10GB	465.8GB	1.8TB	N/A

1.2.2 Yepun

- **Name:** IT Production Kubernetes Cluster
- **Platform:** Kubernetes
- **Multicast:** Yes
- **Apps:** RKE
- **Nodes:** 5
- **CPU:** 160
- **RAM Memory:** 1.280GB
- **Usable Kubernetes Storage:** 36TB

Node	CPU	Memory	Network	System Storage	Docker Storage	Data Storage
yepun01.cp.lsst.org	32	256GB	2x10GB	465.8GB	465.8G	7.4TB
yepun02.cp.lsst.org	32	256GB	2x10GB	465.8GB	465.8G	7.4TB
yepun03.cp.lsst.org	32	256GB	2x10GB	465.8GB	465.8G	7.4TB
yepun04.cp.lsst.org	32	256GB	2x10GB	465.8GB	465.8G	7.4TB
yepun05.cp.lsst.org	32	256GB	2x10GB	465.8GB	465.8G	7.4TB

1.2.3 Lukay

- **Name:** IT Kubernetes Cluster - Summit Backup
- **Platform:** Kubernetes, NFS/CephFS
- **Multicast:** No
- **Apps:** RKE
- **Nodes:** 5
- **CPU:** 160
- **RAM Memory:** 1280GB
- **Usable Kubernetes Storage:** 364TB

Node	CPU	Memory	Network	System Storage	Docker Storage
lukay01.ls.sst.org	32	256GB	2x10GB	500GB	500GB
lukay02.ls.sst.org	32	256GB	2x10GB	500GB	500GB
lukay03.ls.sst.org	32	256GB	2x10GB	500GB	500GB
lukay04.ls.sst.org	32	256GB	2x10GB	500GB	500GB
lukay05.ls.sst.org	32	256GB	2x10GB	500GB	500GB

1.2.4 Chonchon

- **Name:** Summit S3 Object Storage
- **Platform:** Kubernetes, NFS/CephFS
- **Multicast:** No
- **Apps:** RKE
- **Nodes:** 3
- **CPU:** 84
- **RAM Memory:** 753GB
- **Usable Kubernetes Storage:** 26TB

Node	CPU	Memory	Network	System Storage
chonchon01.ls.lsst.org	28	251GB	2x10GB+2x1GB	1.1TB
chonchon02.ls.lsst.org	28	251GB	2x10GB+2x1GB	1.1TB
chonchon03.ls.lsst.org	28	251GB	2x10GB+2x1GB	1.1TB

1.2.5 Amor

- **Name:** Amor Cluster
- **Multicast:** Yes
- **Apps:** Docker
- **Nodes:** 2
- **CPU:** 32
- **RAM Memory:** 124GB
- **Usable Storage:** 862GB

Node	CPU	Memory	Network	Disk Storage
amor01.cp.lsst.org	16	62GB	2x10GB	893GB
amor02.cp.lsst.org	16	62GB	2x10GB	893GB

1.2.6 Azar

- **Name:** Azar Cluster
- **Multicast:** Yes
- **Apps:** Docker
- **Nodes:** 2
- **CPU:** 112
- **RAM Memory:** 752GB
- **Usable Storage:** 11TB

Node	CPU	Memory	Network	Disk Storage
azar1.cp.lsst.org	56	376GB	2x10GB	11TB
azar2.cp.lsst.org	56	376GB	2x10GB	11TB

1.2.7 Core CP

- **Name:** Summit Core Cluster
- **Platform:** Libvirt
- **Multicast:** No
- **Apps:** Foreman, DHCP, DNS
- **Nodes:** 3
- **CPU:** 96
- **RAM Memory:** 231GB

Node	CPU	Memory	Network	Disk Storage
core01.cp.lsst.org	32	77GB	2x10GB	500GB
core02.cp.lsst.org	32	77GB	2x10GB	500GB
core03.cp.lsst.org	32	77GB	2x10GB	500GB

1.2.8 Rancher CP

- **Name:** Rancher CP
- **Platform:** Kubernetes
- **Multicast:** No
- **Apps:** Rancher WUI
- **Nodes:** 3
- **CPU:** 12
- **RAM Memory:** 21GB
- **Usable Storage:** 35GB

Node	CPU	Memory	Network	Host	Disk Storage
rancher01.cp.lsst.org	4	7GB	1x1GB	core1.cp.lsst.org	40GB
rancher02.cp.lsst.org	4	7GB	1x1GB	core2.cp.lsst.org	40GB
rancher03.cp.lsst.org	4	7GB	1x1GB	core3.cp.lsst.org	40GB

2 United States

Tucson site is undergoing a rebuilding process, therefore information may not be up to date.

2.1 Tucson Lab

2.1.1 Pillan

- **Name:** IT Production Kubernetes Cluster
- **Platform:** Kubernetes
- **Multicast:** Yes
- **Apps:** RKE
- **Nodes:** 6
- **CPU:** 384
- **RAM Memory:** 1.536GB
- **Usable Kubernetes Storage:** 21TB

Node	CPU	Memory	Network	System Storage	Docker Storage	Data Storage
pillan01.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	7.4TB
pillan02.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	7.4TB
pillan03.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	7.4TB
pillan04.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	7.4TB
pillan05.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	7.4TB
pillan06.cp.lsst.org	64	256GB	2x10GB	465.8GB	1.8TB	7.4TB

2.1.2 Core TU

- **Name:** Tucson Core Cluster
- **Platform:** Libvirt
- **Multicast:** No
- **Apps:** Foreman, DHCP, DNS
- **Nodes:** 3
- **CPU:** 96
- **RAM Memory:** 231GB
- **Usable Storage:** X.XTB

Node	CPU	Memory	Network	System Storage	VM Storage
core1.tu.lsst.org	32	77GB	2x10GB	931GB	10.9TB + 477GB
core2.tu.lsst.org	32	77GB	2x10GB	931GB	500GB
core3.tu.lsst.org	32	77GB	2x10GB	931GB	500GB

3 Cloud

3.1 Google Cloud Platform

IT uses Google Cloud services to deploy development pods

- **Name:** Cloud Core Cluster
- **Platform:** GKE
- **Multicast:** No
- **Apps:** Graylog
- **Nodes:** 3
- **CPU:** 6
- **RAM Memory:** 17.7GB
- **Usable Kubernetes Storage:** 200TB

Node	CPU	Memory	Network	Storage
node1	2	5.9GB	1x10GB	100GB
node2	2	5.9GB	1x10GB	100GB
node3	2	5.9GB	1x10GB	100GB

A Acronyms

Acronym	Description
CP	Cerro Pachon
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
GCP	Google Cloud Platform
GKE	Google Kubernetes Engine
IT	Information Technology
ITTN	IT Technical Note
LS	La Serena
RKE	Rancher Kubernetes Engine
RST	reStructuredTex
TU	Tucson
WUI	Web User Interface