

RHEL In-place Upgrade & Conversions Automation

Key Features to Succeed at Scale



Automate Everything

Make RHEL upgrades and third-party EL conversions a push-button service easily consumable by Ops and App teams



Snapshot/rollback

Eliminate application impact risk so there is never an excuse not to convert/upgrade



Custom Modules

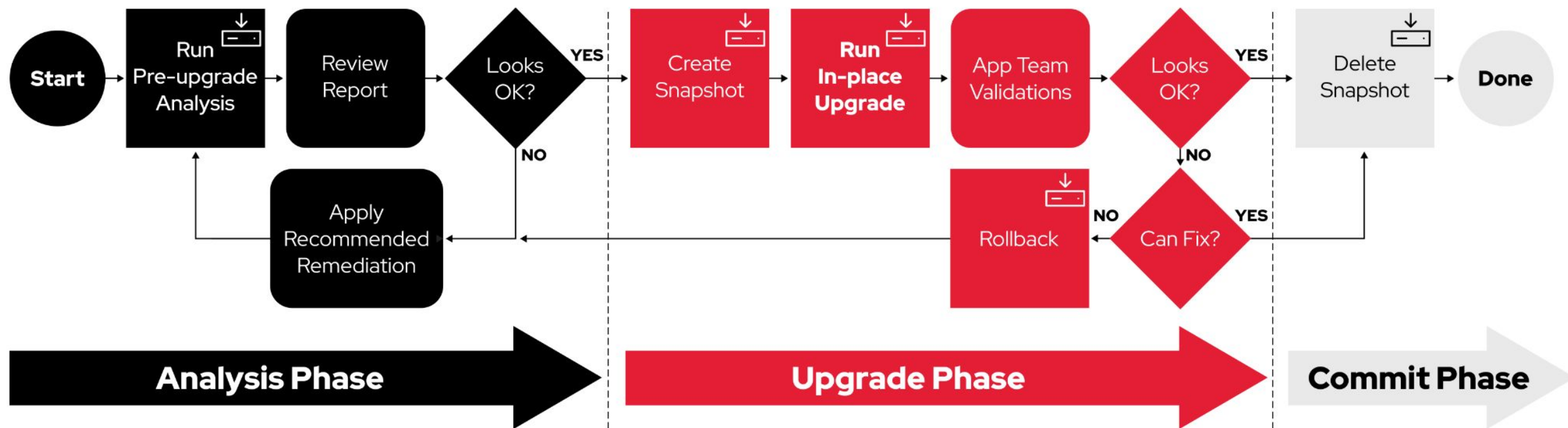
Automate remediations to deal with your standard tools, agents and middleware



Reporting Dashboard

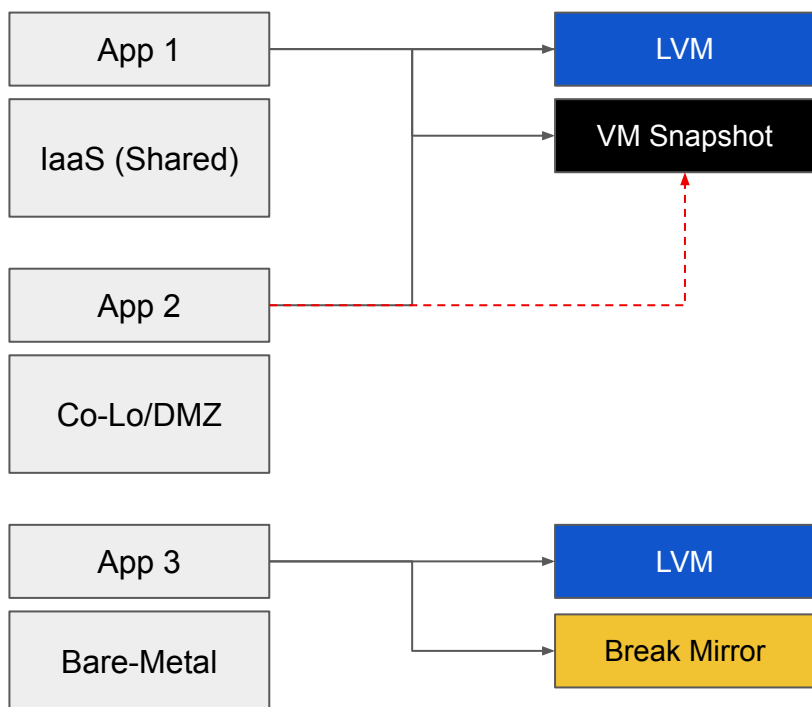
Visualize pre-upgrade/conversion results and track progress of upgrades/conversions completed across the estate

Upgrade/Conversion Workflow



Prepare for doomsday

Offer multiple backup offerings to allow application teams to revert back to a known state through self-service methods. Reducing the overall risk of a migration and increasing adoption.



LVM Snapshot

As part of the pre-upgrade step, an Ansible playbook will check for available disk space required for an LVM snapshot. In the event there is not enough disk space, an Ansible playbook will interface vCenter to make a modification or create a ServiceNow ticket to have the disk space manually modified.

Virtual Machine Snapshot

Customers that have the necessary APIs available can also use Ansible to create a VM snapshot on the specific hypervisor they may be using.

Break Mirror

For bare metal servers with hardware RAID, the Ansible playbook can break the mirror set where RHEL is installed. To rollback, the set is reactivated using the untouched mirror copy.

In-Place Upgrade Report

student@strong-hyena

Search

System

System

Logs

Networking

Accounts

Services

Tools

D diagnostic Reports

Kernel Dump

SELinux

Upgrade Report

Help

Session

Upgrade Report for: strong-hyena.example.com

Filters

Remediation plan (0) + Add all remediations to plan (1)

Title	Risk Factor	Description	Tags	Time
Packages available in excluded repositories will not be installed	High		repository	25.04.2023 15:36:45
Difference in Python versions and support in RHEL 8	High	Remediation hint Links	python	25.04.2023 15:36:45
Possible problems with remote login using root account	High	Inhibitor Remediation hint	authentication security network services	25.04.2023 15:36:48
GRUB core will be updated during upgrade	High		boot	25.04.2023 15:36:51
SELinux will be set to permissive mode	Low	Remediation hint	selinux security	25.04.2023 15:36:46
Postfix has incompatible changes in the next major version	Low		services email	25.04.2023 15:36:48
chrony using non-default configuration	Low		services time management	25.04.2023 15:36:50
Grep has incompatible changes in the next major version	Low	Remediation hint	tools	25.04.2023 15:36:51

Types of Report Findings

Risk factor:

- **High** - very likely to result in a deteriorated system state
- **Medium** - can impact both the system and applications
- **Low** - should not impact the system but can have an impact on applications
- **Info** - informational with no expected impact to the system or applications

Inhibitor - will inhibit (hard stop) the upgrade process. System will remain in the pre-upgraded state if attempted to upgrade with inhibitors and go no further.

Remediation - an actionable solution to a reported problem:

- Remediation command - can be executed directly through the web console
- Remediation hint - instructions on how to resolve the problem manually

Ref 1: Custom Modules

AppDynamics
Artifactory
Autosys
Avamar (Dell/EMC)
Bigfix Agents
BoKS
Centrify
Chef Client
CipherTrust
CrowdStrike
DBSmart
GPFS Spectrum Scale
Guardium
Hardware Agents
Illumio VEN

NetBackup Client
Oracle Database
Oracle RAC/Clusterware
Powerbroker
Puppet
QConverge (Tenable)
Qualys
Quest QAS/VAS
Splunk Agent
Tanium
Tectia SSH
Tivoli ITM Agents
uDeploy Agent
Veritas Infoscale
VMware Tools

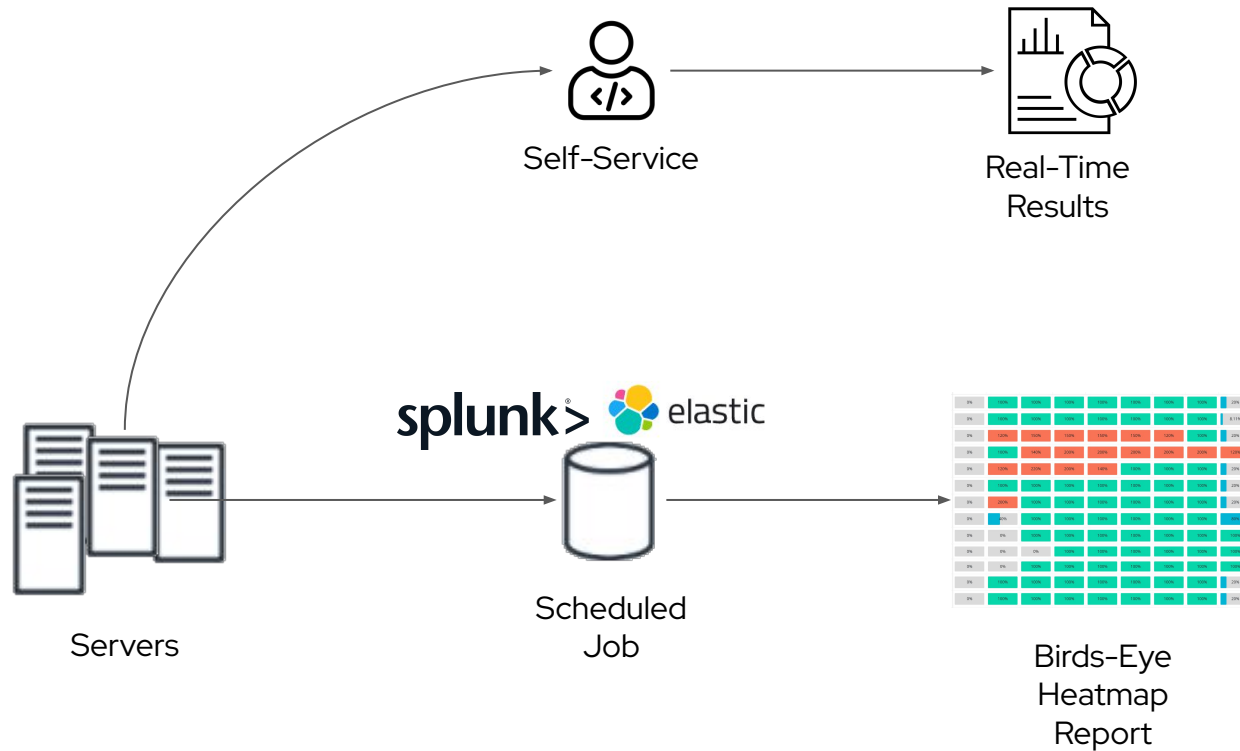
Ref 2: Recommendations & Fixes

Hostname	Date	Result	Group	Title	Description	Fix
	2019-12-30T14:33:17	Needs Action		Snapshot space checks	This module reports if there is enough free space in rootvg to make snapshots required for rollback capability.	This host has no free extents in the rootvg volume group. Based on the size of the filesystems, at least 7.87 GB is required to support rollback. To make more space available, consider temporarily removing logical volumes such as var_crash and swap or adding another physical volume to the rootvg volume group.
	2019-12-30T14:33:17	Failed		Uptime sanity check	This module fails in case of excessive uptime. Solution is to reboot before going further with the upgrade.	This host has not been rebooted for over one month. To reduce the risk of boot issues related to changes made since the last reboot, you must reboot now. Then rerun the Preupgrade Assistant.

- **Ref 1: Custom Modules**
 - Maintain a library of custom modules specific to customers. Allowing various OS, MW, DB, App, and Security teams to contribute new rules/fixes in a crowd-source manner.
- **Ref 2: Recommendations & Fixes**
 - As issues are found during testing and production usage, new hotfixes and checks will be continuously added to the upgrade.
 - Ansible playbooks will be developed over time to automatically fix these issues, removing manual steps.
 - Custom actors can also be used to issue custom warnings that will show up on the pre-upgrade report and/or json format so the reviewer can see the messages

Pre-Upgrade Report

Pre-Check Process



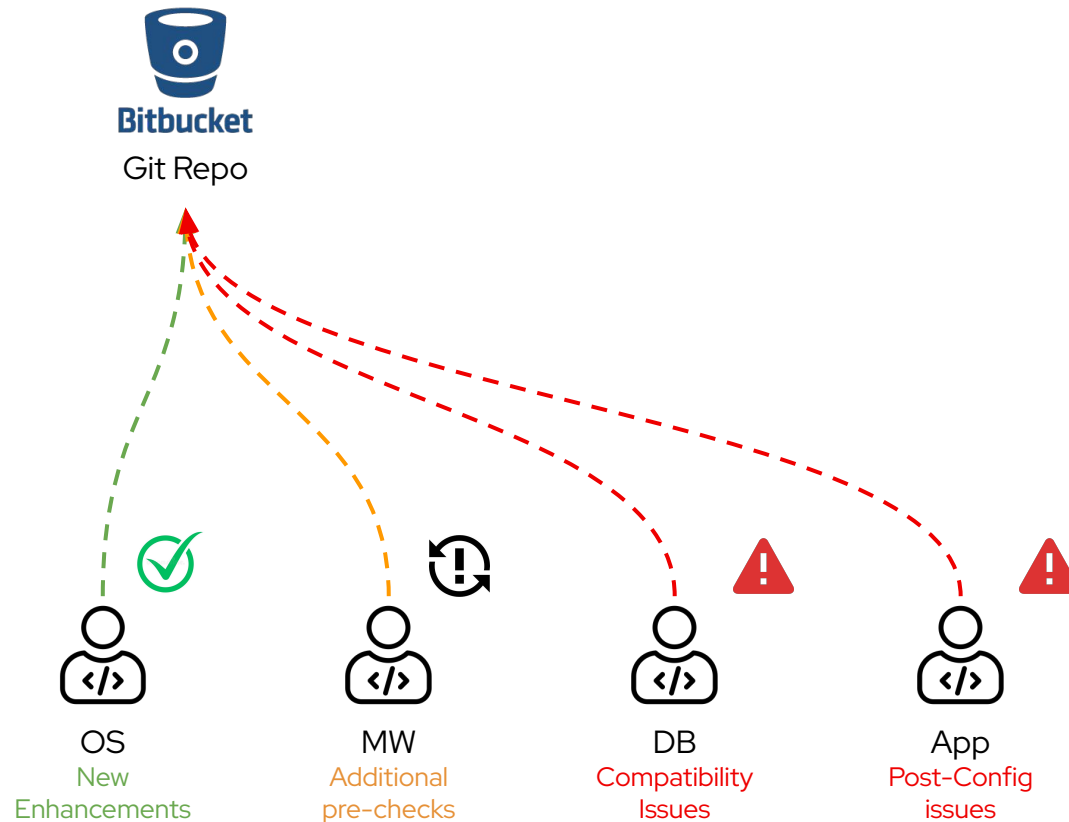
On-Demand

- Allows App/SA teams to dynamically run report to fix any outstanding issues.
- Report includes recommended fixes, customer specific checks, and Red Hat recommendations.

Batch Process

- A scheduled job is run across the estate to allow Production Operations and senior management to get an overall estate view.
- Assists in long term migration planning and can be integrated with existing CMDB data to separate by LoB, Environment, App ID, etc

Pre-Upgrade Report



Enhancements

Allow all enhancements to go through a standard git repo. Allowing automated integration tests to be built to accelerate testing and rolling out new features.

Issues

Partners/App teams can submit pull requests for bug fixes or adding new code for their specific domain. Eliminating emailing code back/forth and creating a standard way to review and approve code.

Break-Fix

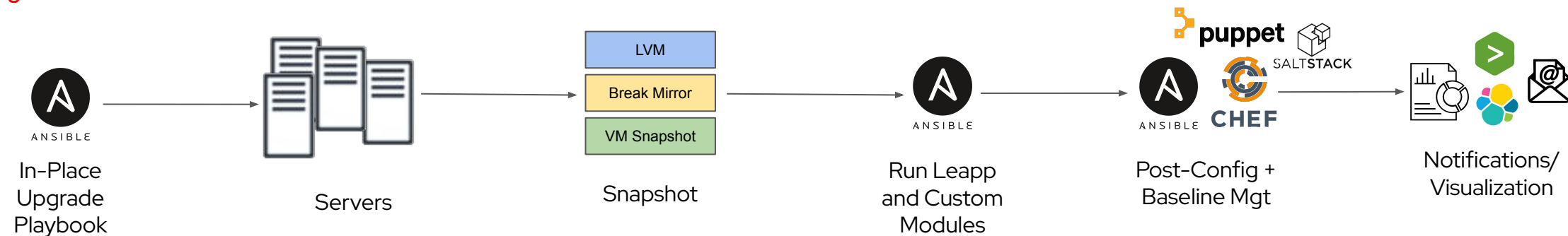
Single source of truth. Allowing all new break-fix/updates to be updated through source control. Eliminating teams from running outdated code in the environment.

Upgrade Process

Pre-Upgrade

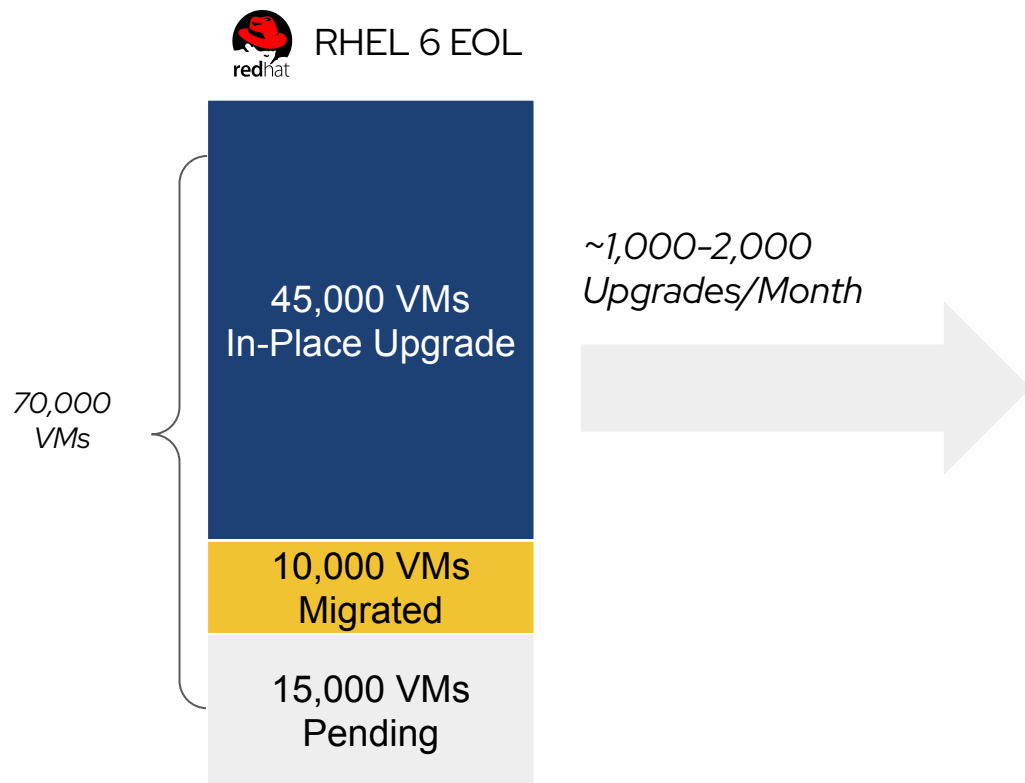


Upgrade



The RHEL Story and how it applies

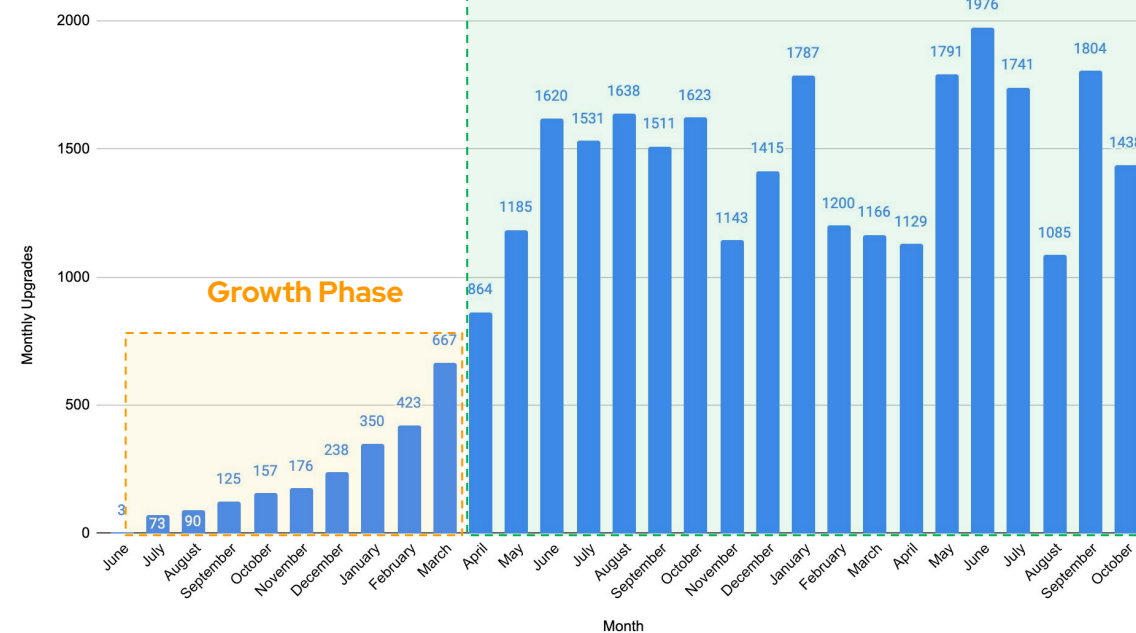
Previous behavior is indicative of future behavior



The same systemic issues that prevent a developer to migrate between OS Versions apply to moving to Cloud Platforms

Previous Customer Upgrades

Monthly Upgrades



~30,000 upgrades to October 2021.
~35,000 upgrades as of Jan 2022.
~45,000 upgrades as of Feb 2022



Supporting Projects

infra.leapp – Ansible Validated Content collection

<https://github.com/redhat-cop/infra.leapp>

redhat-cop / infra.leapp

Type to search

<> Code

Issues 5

Pull requests 3

Actions

Projects

Wiki

Security

Insights

infra.leapp

Public

Edit Pins

Unwatch 25

Fork 15

Star 23

main 2 branches 6 tags

Go to file

Add file

<> Code

About

swapdisk add supported versions info (#139) f8bfbc9 last week 131 commits

.github/workflows	exclude devel+py2.7 and devel+py3.6 (#141)	2 weeks ago
changelogs	Update changelog 1.1.3 (#132)	3 months ago
docs/docsite	fix links (#96)	6 months ago
meta	init commit	9 months ago
playbooks	change playbook examples, add small piece in docs (#...	5 months ago
plugins	init commit	9 months ago
roles	fix minor typos (#133)	3 months ago
tests	Add stable-2.15 to CI workflow (#100)	5 months ago
.ansible-lint.yml	Fix sanity failures (#72)	6 months ago
.gitattributes	adding in . files	9 months ago
.gitignore	adding in . files	9 months ago

Collection of Ansible roles for automating RHEL in-place upgrades using Leapp.

Readme

MIT license

Code of conduct

Activity

23 stars

25 watching

15 forks

Report repository

Releases 6

1.1.3 Latest on Sep 26

+ 5 releases

infra.lvm_snapshots – Ansible Validated Content collection

https://github.com/redhat-cop/infra.lvm_snapshots

The screenshot shows the GitHub repository page for `infra.lvm_snapshots` by `redhat-cop`. The repository is public and has 3 stars, 5 forks, and 3 watchers. The main branch is selected. The repository description is "Ansible roles for LVM snapshot management". The file list shows various directories and files, including workflows, changelogs, meta, roles, tests, and configuration files. The right sidebar shows the repository's activity, including the latest release (1.1.2) and a list of releases.

redhat-cop / **infra.lvm_snapshots**

Code Issues 2 Pull requests Actions Projects Wiki Security Insights Settings

infra.lvm_snapshots Public Unwatch 3 Fork 5 Star 3

main 3 branches 7 tags Go to file Add file Code

github-actions[bot] and swapdisk Update changelog ... 739c261 1 hour ago 48 commits

.github/workflows	Update links (#35)	1 hour ago
changelogs	Update changelog 1.1.2 (#36)	1 hour ago
meta	Implement LVM Snapshot role	6 months ago
roles	fix dracut path (#33)	last week
tests	Move ansible.cfg to tests (#20)	2 months ago
.ansible-lint	Implement LVM Snapshot role	6 months ago
.gitignore	Implement LVM Snapshot role	6 months ago
.pylintrc	Implement LVM Snapshot role	6 months ago
.yamllint	Implement LVM Snapshot role	6 months ago
CHANGELOG.rst	Update changelog 1.1.2 (#36)	1 hour ago
CODEOWNERS	add per ansible/validated-content-discussion#20	2 weeks ago

About

Ansible roles for LVM snapshot management

Readme MIT license Activity 3 stars 3 watching 5 forks Report repository

Releases 7

1.1.2 Latest 1 hour ago

+ 6 releases

infra.convert2rhel – Ansible Validated Content collection

<https://github.com/redhat-cop/infra.convert2rhel>

oamg / infra.convert2rhel

Type to search

Code

Issues

Pull requests 1

Actions

Projects

Security

Insights

infra.convert2rhel

Public

Watch 1

Fork 6


Star 0

main 1 branch 0 tags

Go to file

Add file

Code

 r0x0d Merge pull request #15 from r0x0d/fix-leftovers

✓ e71eaa3 3 hours ago 50 commits

github/workflows	Update tests	yesterday
changelogs	Generate changelogs	2 weeks ago
extensions/molecule	Fix leftovers and include ansible molecule	2 days ago
meta	some linting	last month
playbooks	Create config file	2 weeks ago
plugins	First commit	2 months ago
roles	Fix ansible-lint	yesterday
tests	Update tests	yesterday
.ansible-lint.yml	Fix ansible-lint	yesterday
.gitattributes	First commit	2 months ago
.gitignore	Fix leftovers and include ansible molecule	2 days ago

About

No description, website, or topics provided.

Readme

MIT license

Activity

0 stars

1 watching

6 forks

Report repository

Releases

No releases published

Packages

No packages published

leapp-project – reference IPU Ansible automation project

<https://github.com/redhat-partner-tech/leapp-project>

redhat-partner-tech / leapp-project

Type to search

Code

Issues

Pull requests 2

Actions

Projects

Wiki

Security

Insights

leapp-project Public

Unwatch 5

Fork 5

Star 0

main 5 branches 0 tags

Go to file

Add file

Code

heatmiser Merge pull request #24 from heatmiser/vdo-... 1f47474 3 weeks ago 211 commits

collections	git+https	2 months ago
group_vars/control	Add pets clinic install for testing	4 months ago
.ansible-lint.yml	Initial revision.	9 months ago
.gitattributes	Initial revision.	9 months ago
.gitignore	Ignore specific files	6 months ago
.pre-commit-config.yaml	Initial revision.	9 months ago
.yamllint.yml	Initial revision.	9 months ago
LICENSE	Initial version.	9 months ago
README.md	Create README.md	9 months ago
analysis.yml	Add vdo package and answerfile check	3 weeks ago
ansible.cfg	Remove show_per_host_start	7 months ago

About

No description, website, or topics provided.

Readme

MIT license

Activity

0 stars

5 watching

5 forks

Report repository

Releases

No releases published

[Create a new release](#)

Packages