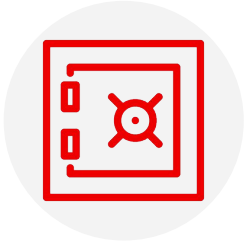
RHEL In-place Upgrade & Conversions Automation

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

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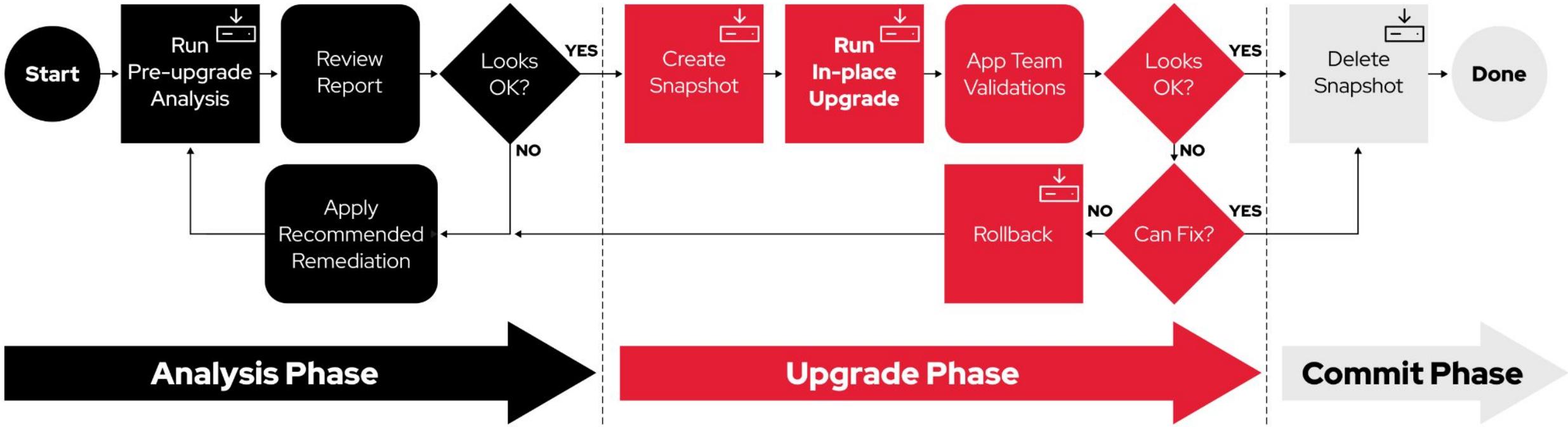
Upgrade/Conversion Workflow



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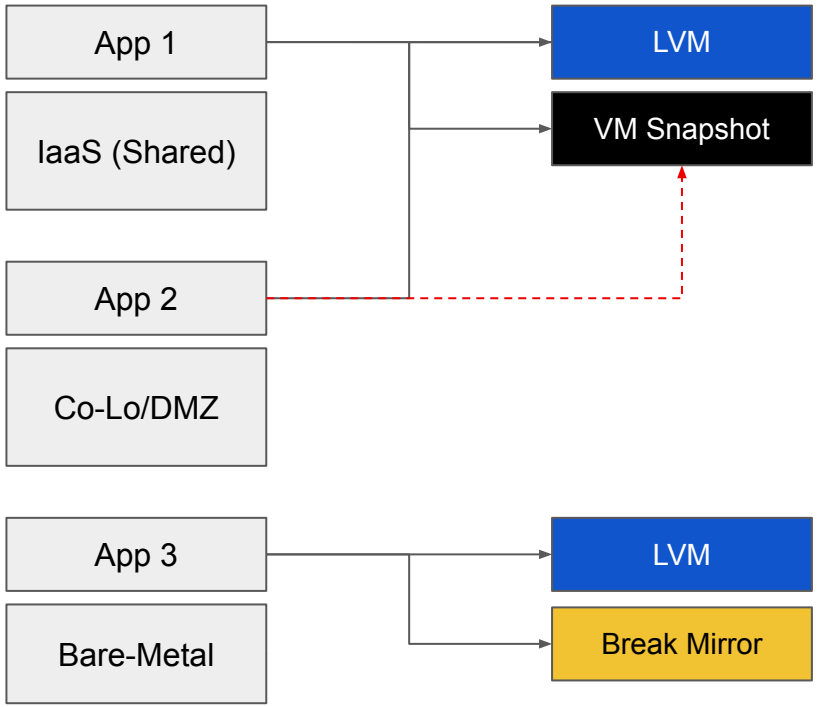
Prepare for doomsday

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.

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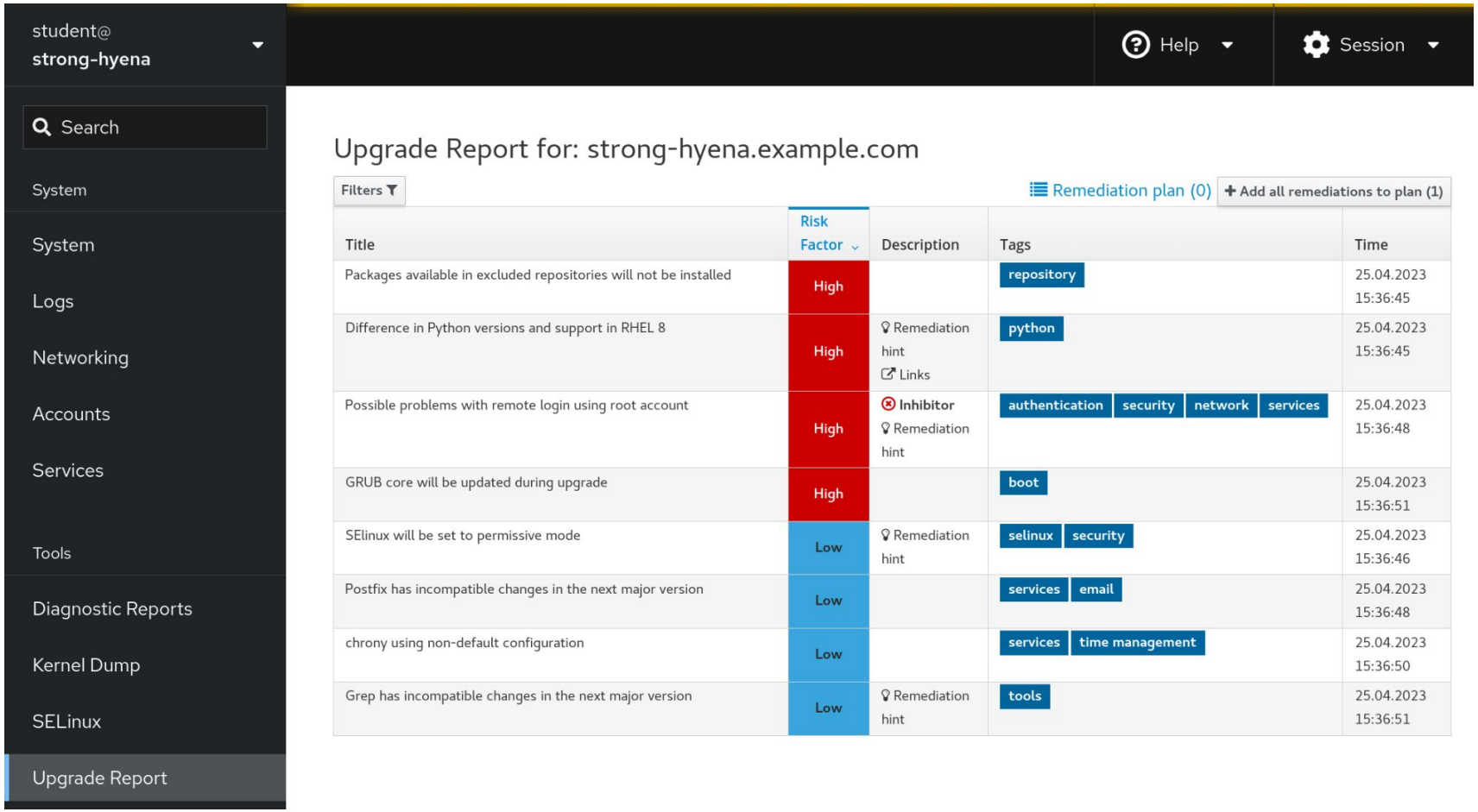
In-Place Upgrade Report



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

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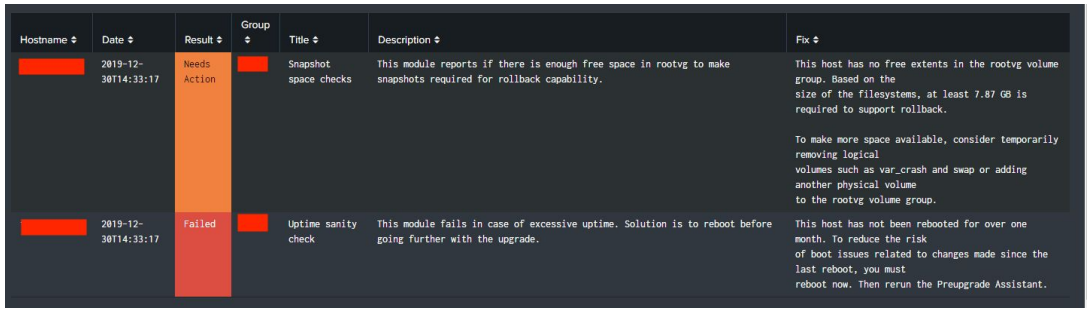
Ref 1: Custom Modules

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
[redacted]	2019-12-30T14:33:17	Needs Action	[redacted]	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.
[redacted]	2019-12-30T14:33:17	failed	[redacted]	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

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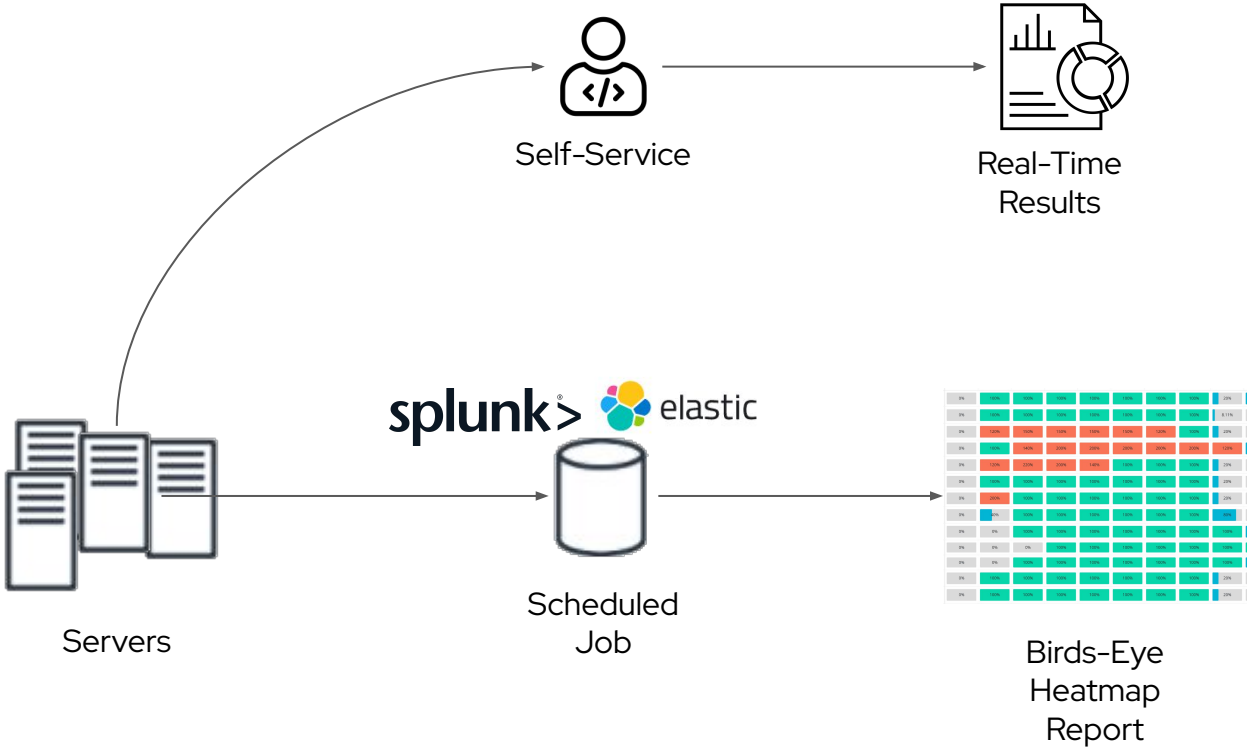
Pre-Upgrade Report

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

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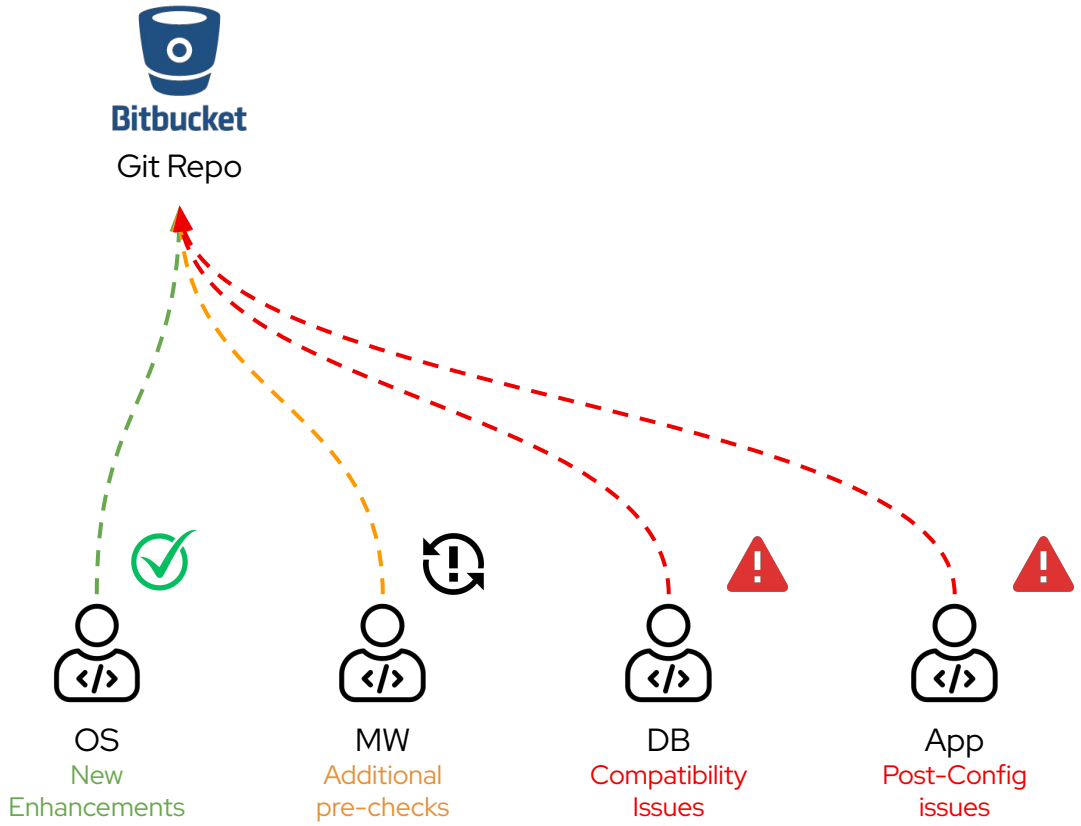
Pre-Upgrade Report



Enhancements

Allow all enhancements to go through a standard git repo. Allowing automated integration tests to 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.

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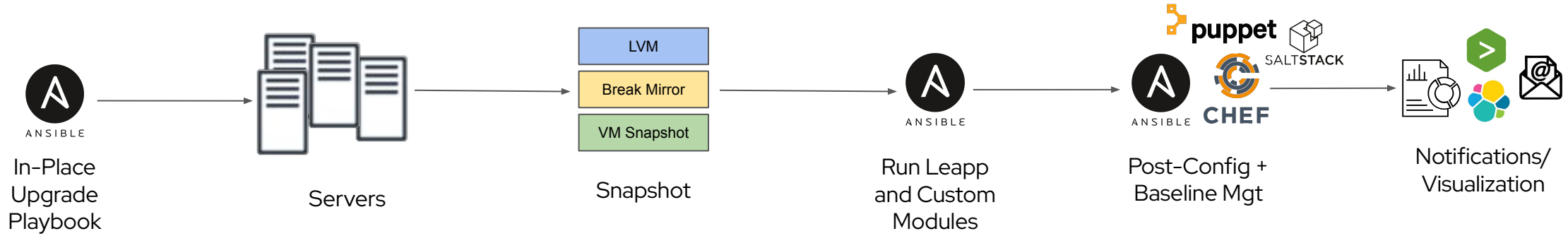
Upgrade Process

Pre-Upgrade

Upgrade



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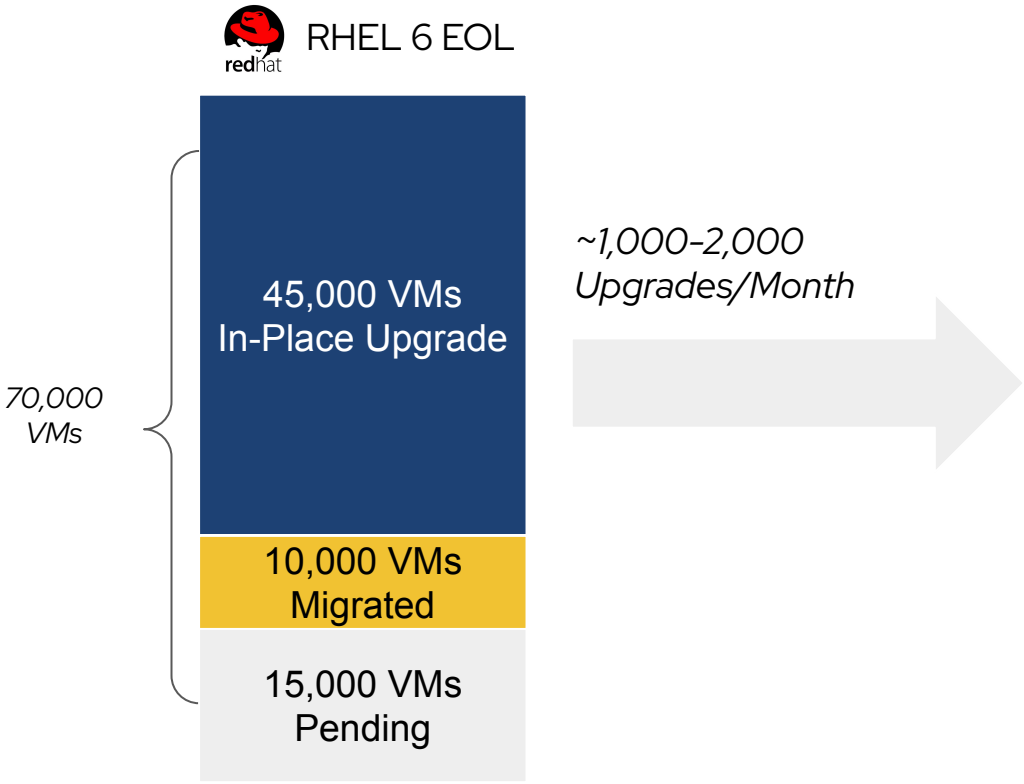
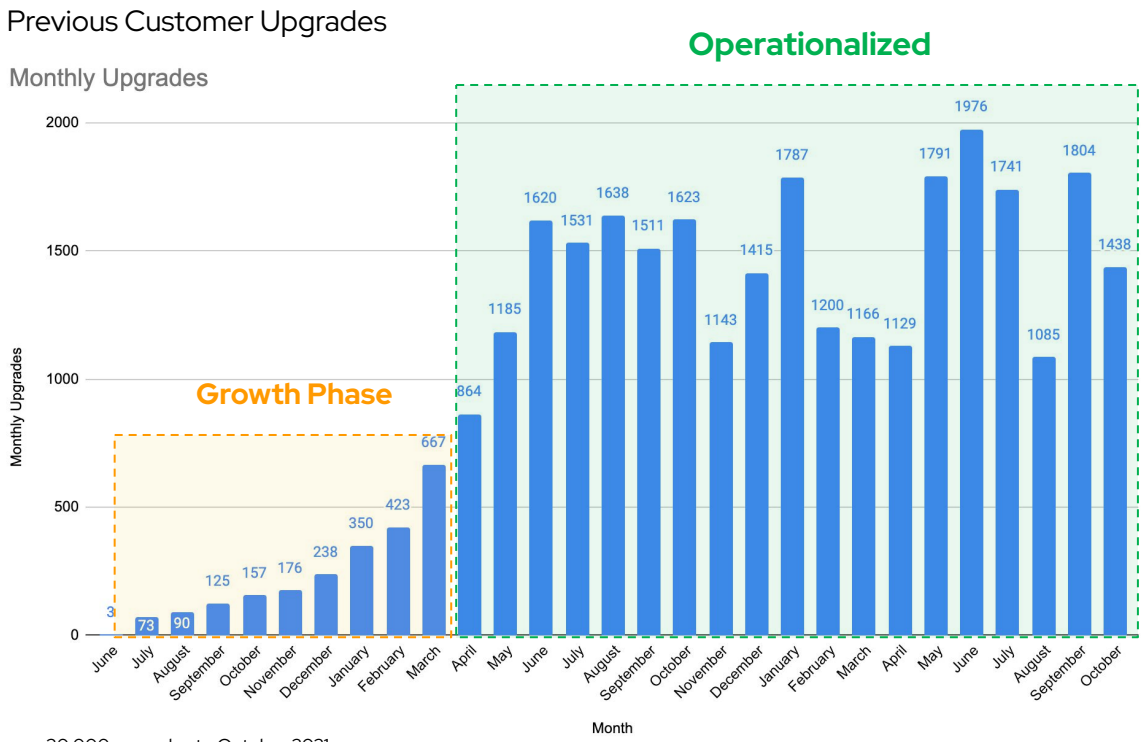
The RHEL Story and how it applies

Previous behavior is indicative of future behavior



~1,000-2,000 Upgrades/Month

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



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

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Supporting Projects

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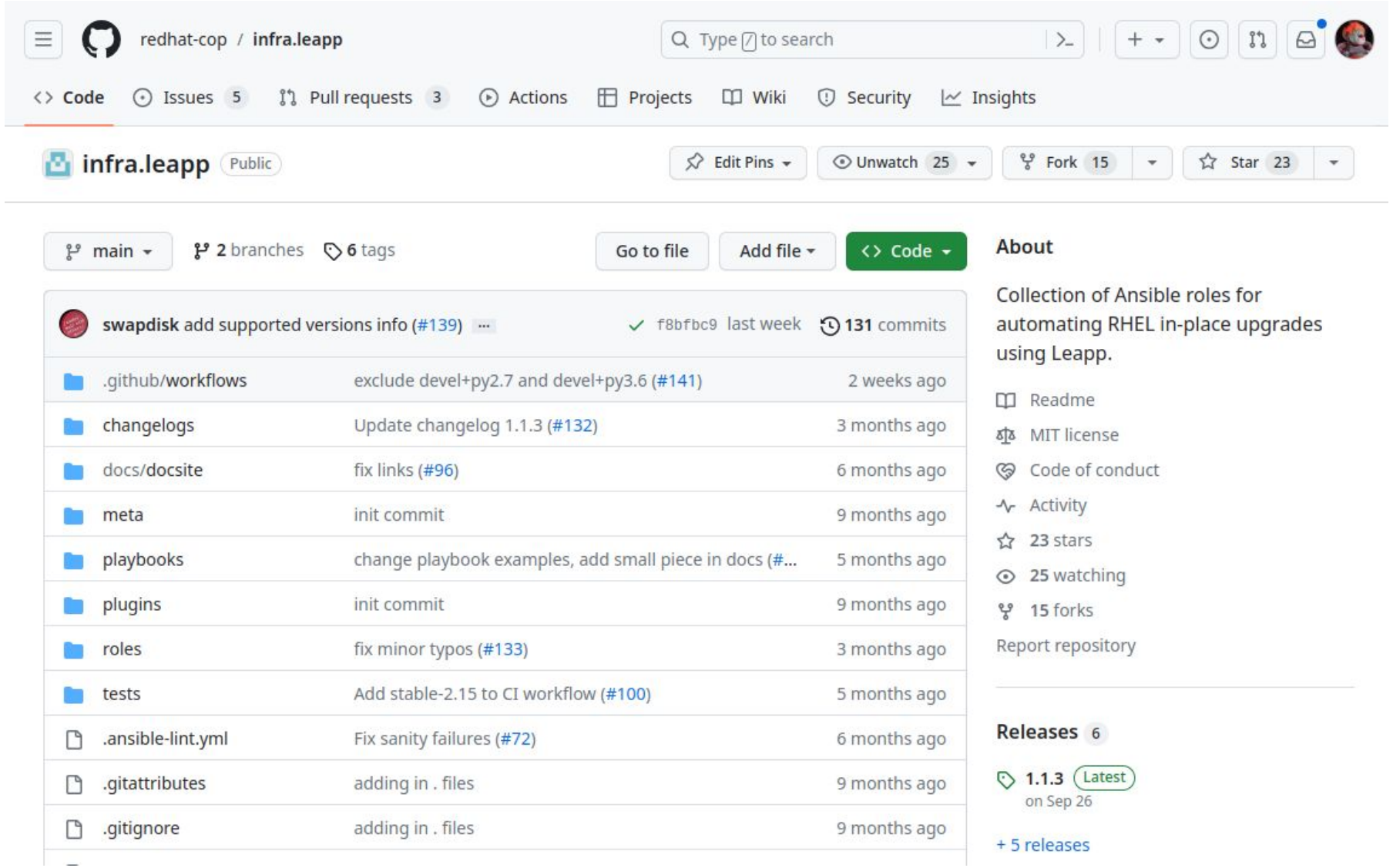
infra.leapp – Ansible Validated Content collection

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



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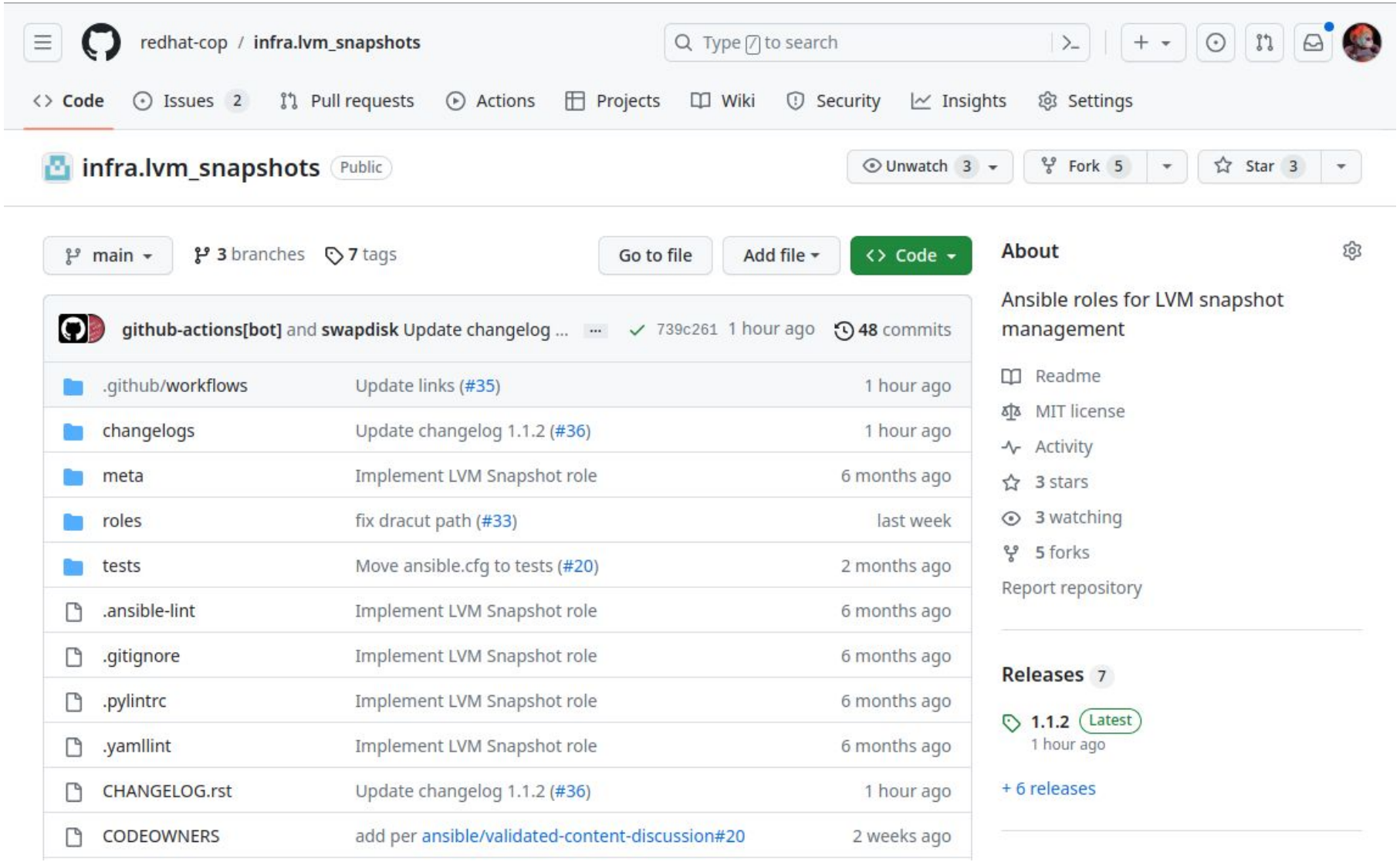
infra.lvm_snaphots - Ansible Validated Content collection

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



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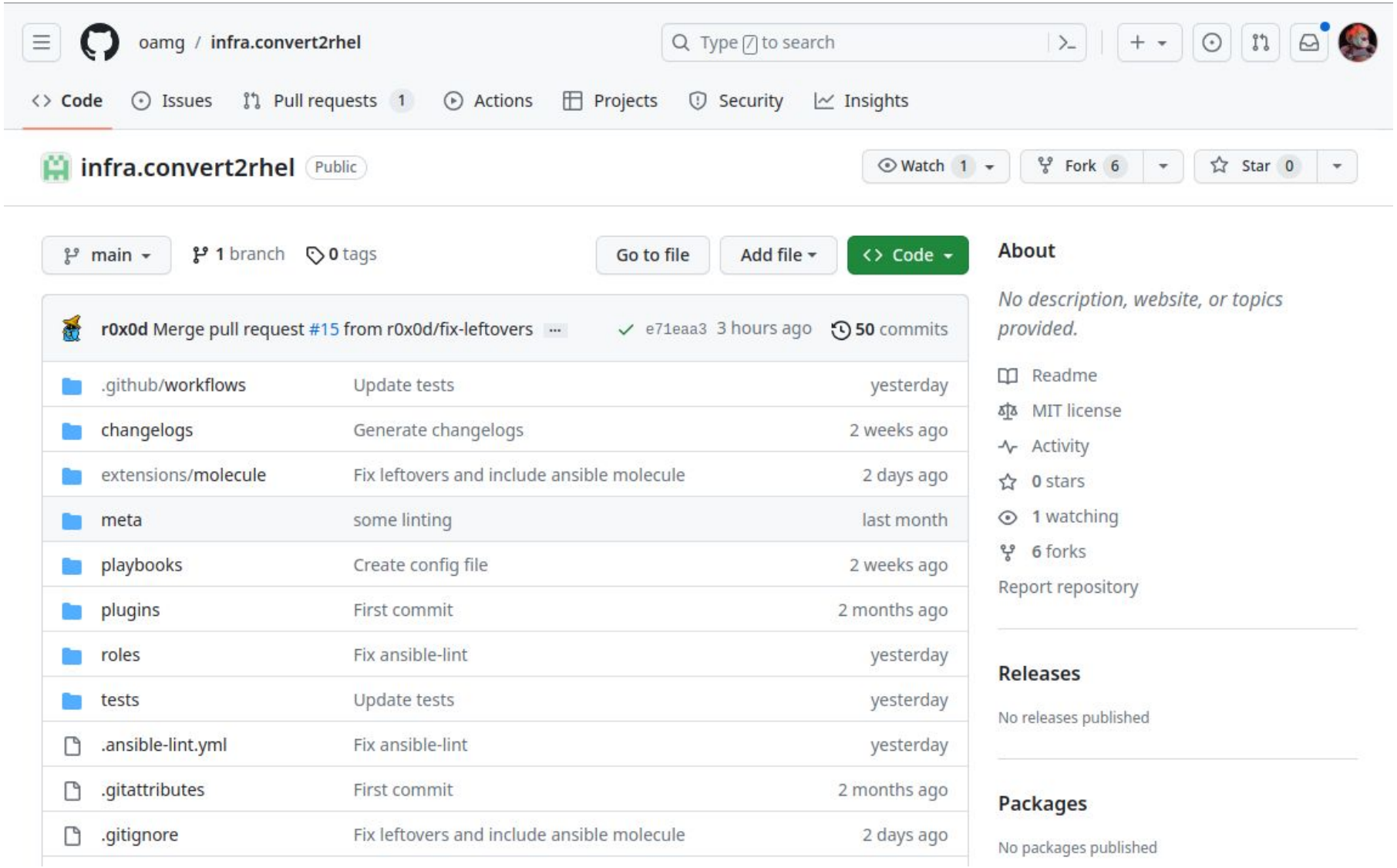
infra.convert2rhel - Ansible Validated Content collection

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



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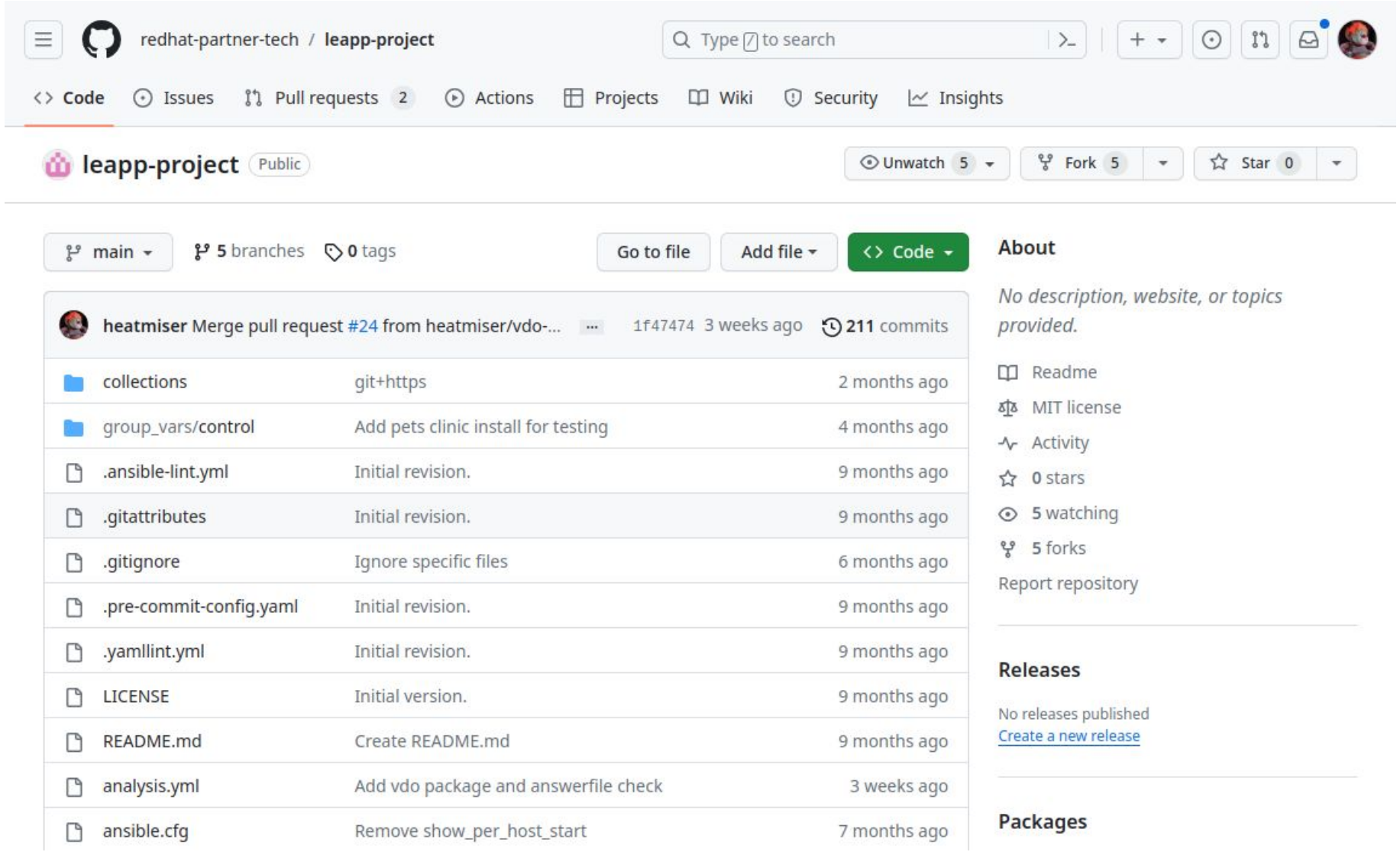
leapp-project - reference IPU Ansible automation project

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



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