ECP Community BOF Days

March 30 – April 1, 2021

Hosts: Ashley Barker (ORNL) and Osni Marques (LBNL)

Tiered Testing

Tim Haines (UW-Madison)
Jim Willenbring (Sandia)
Ryan Adamson (ORNL)

slides: github.com/hainest/TieredTesting

11AM EST

General Categories of Testing

Development Tests

- Tests run to protect stability while making changes to the code

Post-installation “smoke tests”

- A sanity test suite users can run after installing your software

Continuous Integration Testing

- High frequency, automated testing aimed at preventing changes from breaking key branches

Scalability Testing

- Running tests on very large systems (e.g., thousands of nodes)
- Not currently part of ST testing efforts

Continuous Deployment

- Combines testing and publishing software
- Not discussed here, see *Benefiting from ECP CI* on April 14th

Development Tests

These are the tests run prior to releasing a new version of your software

Examples:

- Unit
- Functional
- System
- Memory
- Acceptance

See these resources for more details:

https://bssw.io/items/what-is-cse-software-testing

https://ideas-productivity.org/wordpress/wp-content/uploads/2016/04/IDEAS-TestingWhatAreSoftwareTestingPractices-V0.2.pdf

The ST community policies only require that each project have some kind of testing.

Post-installation “Smoke Tests”

These tests are executed immediately after a successful build or installation to verify that your software can run in the current environment

Can be a subset of *development tests*

Should run in only a few minutes

- It’s just a **sanity check**!

Used by E4S teams to verify your software in their environments

- Making test results available through CDash is being worked on

Post-installation “Smoke Tests”

If you have smoke tests, please add them to your spack recipe so they will be run with `spack test`.

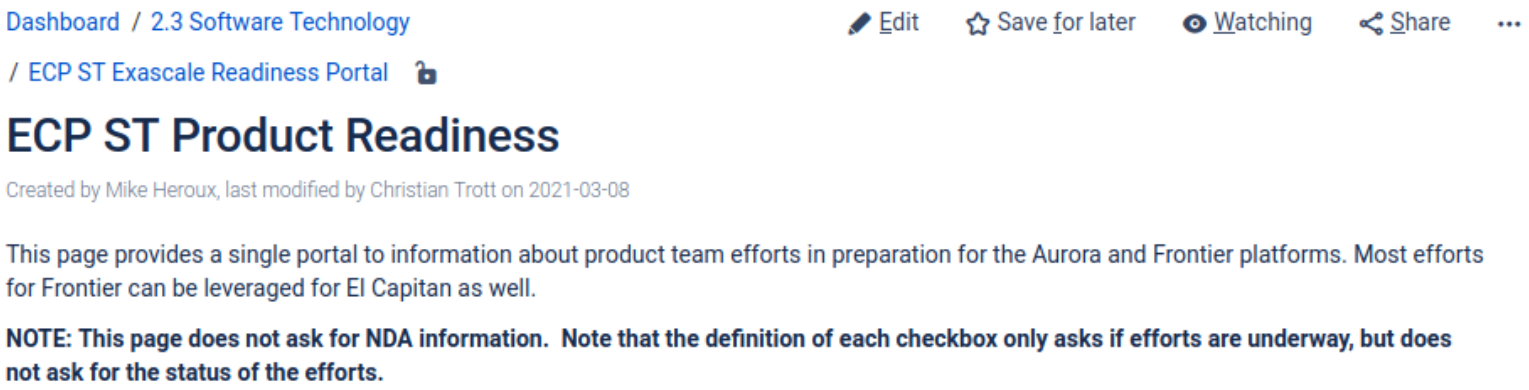
See **Checking an Installation** in the Spack docs for details

https://spack.readthedocs.io/en/latest/packaging_guide.html#checking-an-installation

If you have created validation tests in ECP-project/testsuite, migrate them to your spack package.

Post-installation “Smoke Tests”

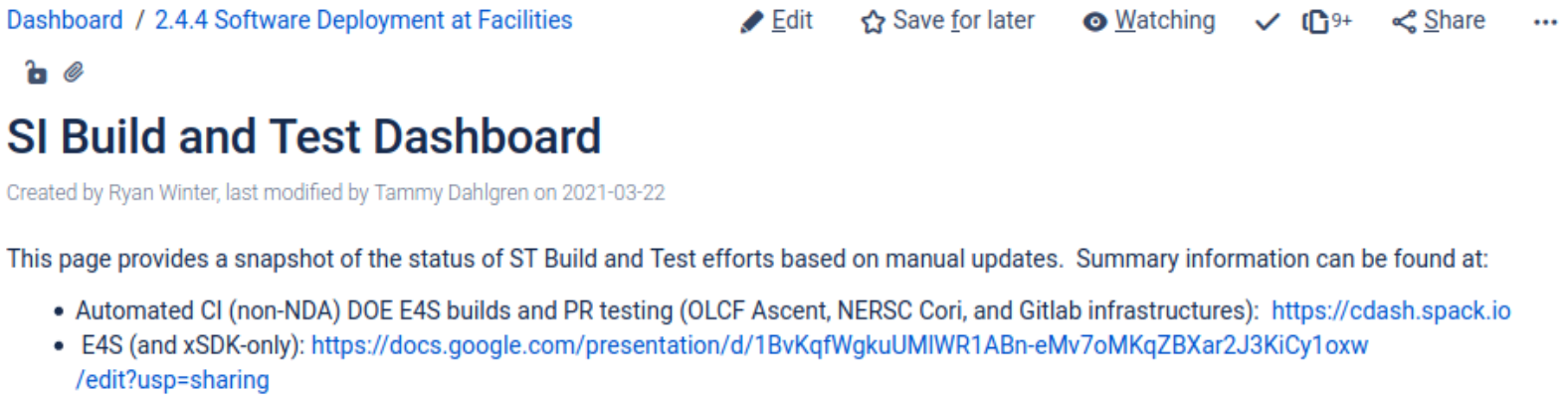
Also update the ST Product Readiness page in Confluence



https://confluence.exascaleproject.org/display/1ST/ECP+ST+Product+Readiness

Post-installation “Smoke Tests”

And the SI Build and Test Dashboard



https://confluence.exascaleproject.org/display/HISD/SI+Build+and+Test+Dashboard

Continuous Integration Testing

CI is the recommended method of running your tests often and automatically

The ECP ecosystem makes heavy use of CI

There are no hard-and-fast rules about what CI should be.

Each L4 team can develop their own practices.

Some information for getting started:

https://bssw.io/items/what-is-continuous-integration-testing

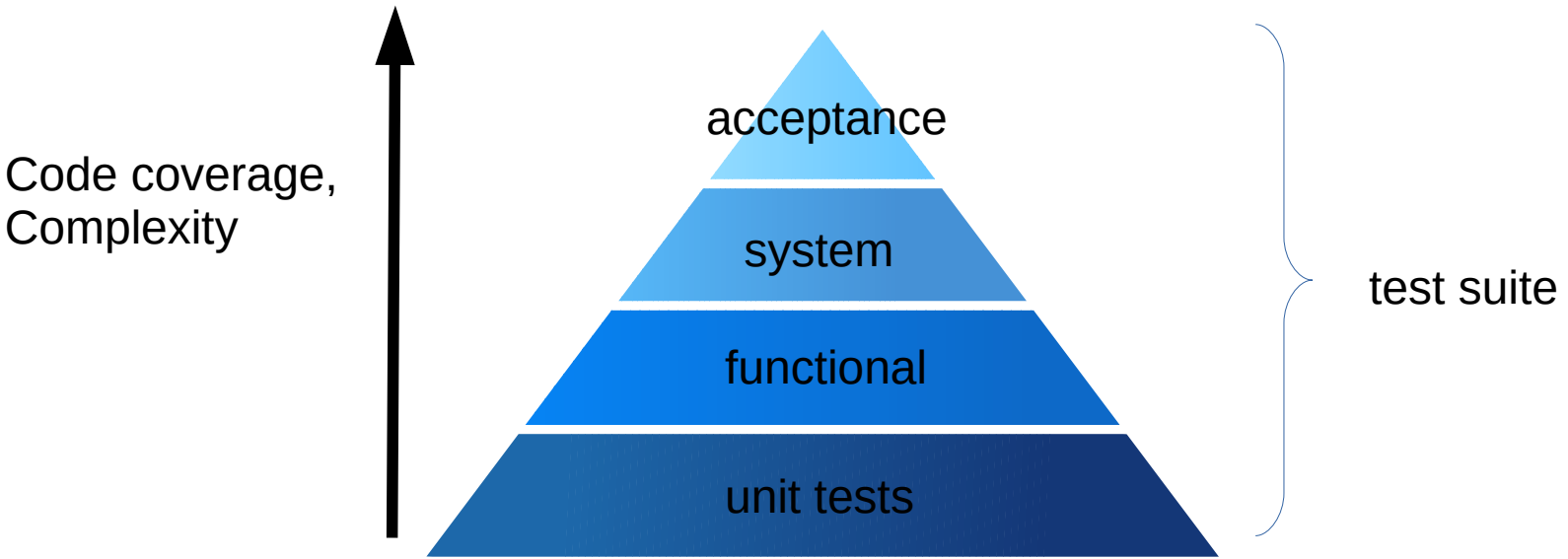
Most products have a CI Coordinator. Talk to him/her about CI for your project.

- CICs: If you would like more information about ECP's role in CI, please contact me

See also Benefiting from ECP CI on April 14th for a deep-dive

What is Tiered Testing?

1. Running different types of tests before creating a release of your software (aka your *test suite*)



What is Tiered Testing?

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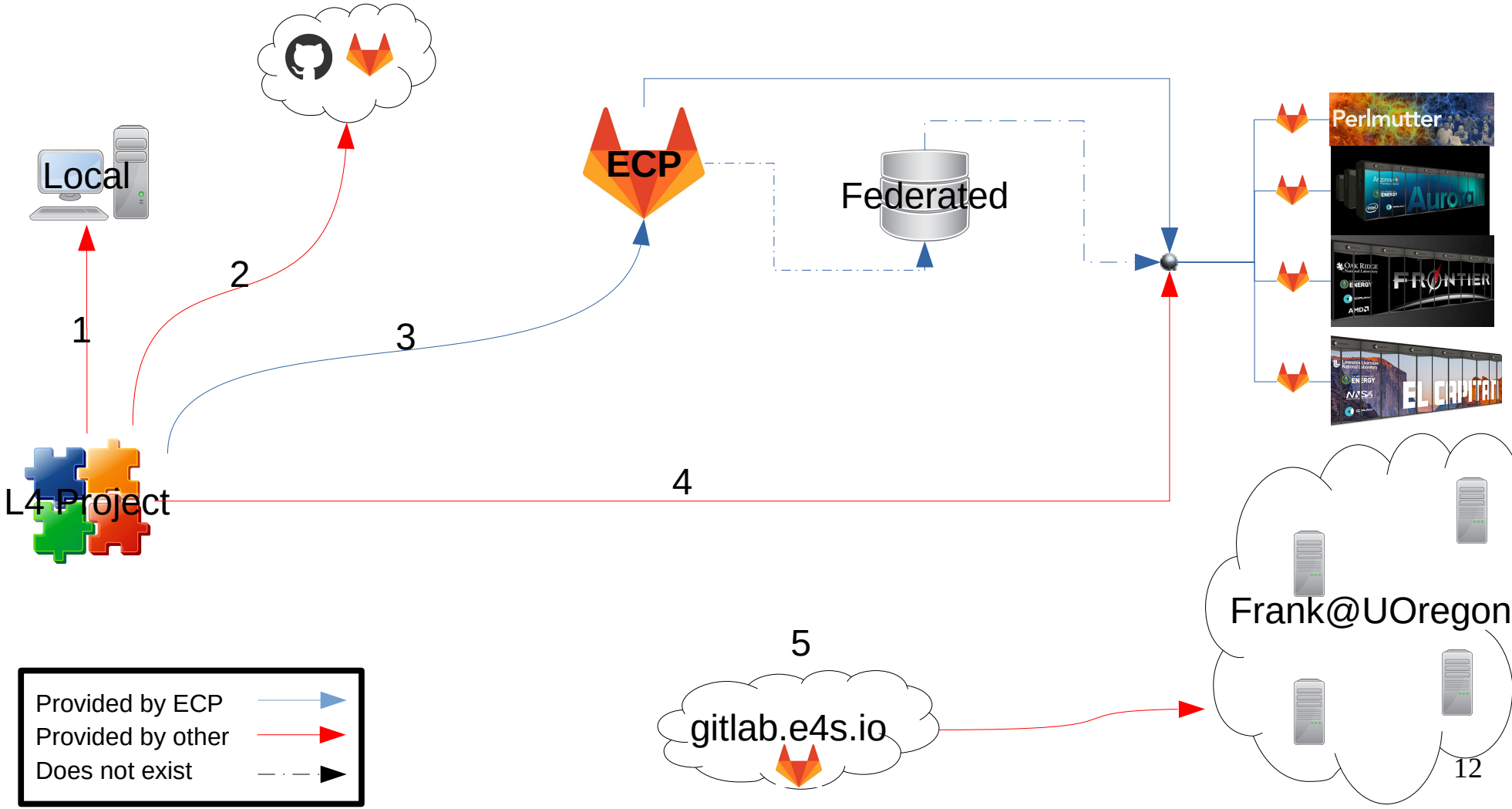
2. Mapping tests to available hardware platforms

What is Tiered Testing?

Where can you run your test suite?

System Access for L4 Testing



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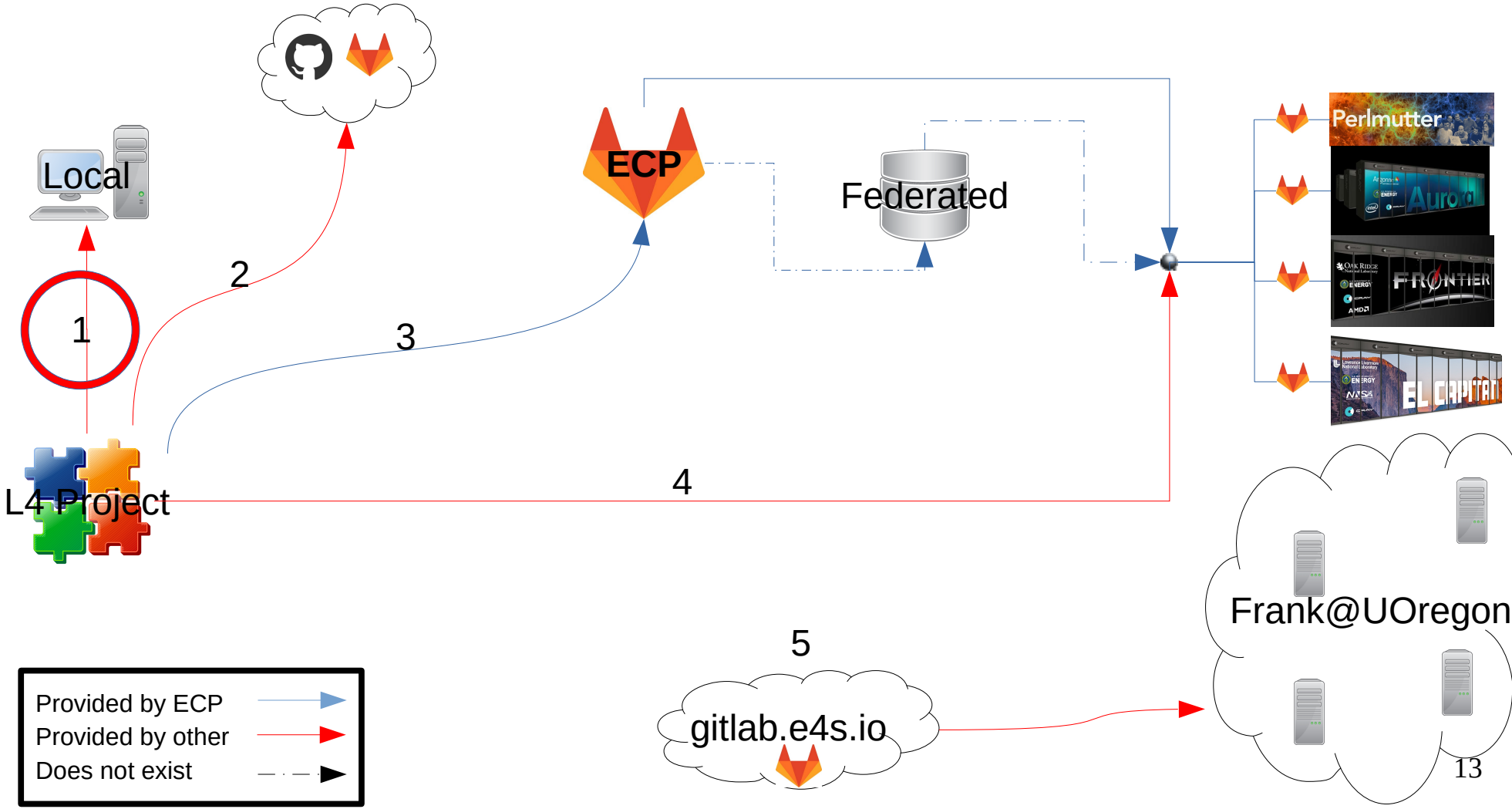

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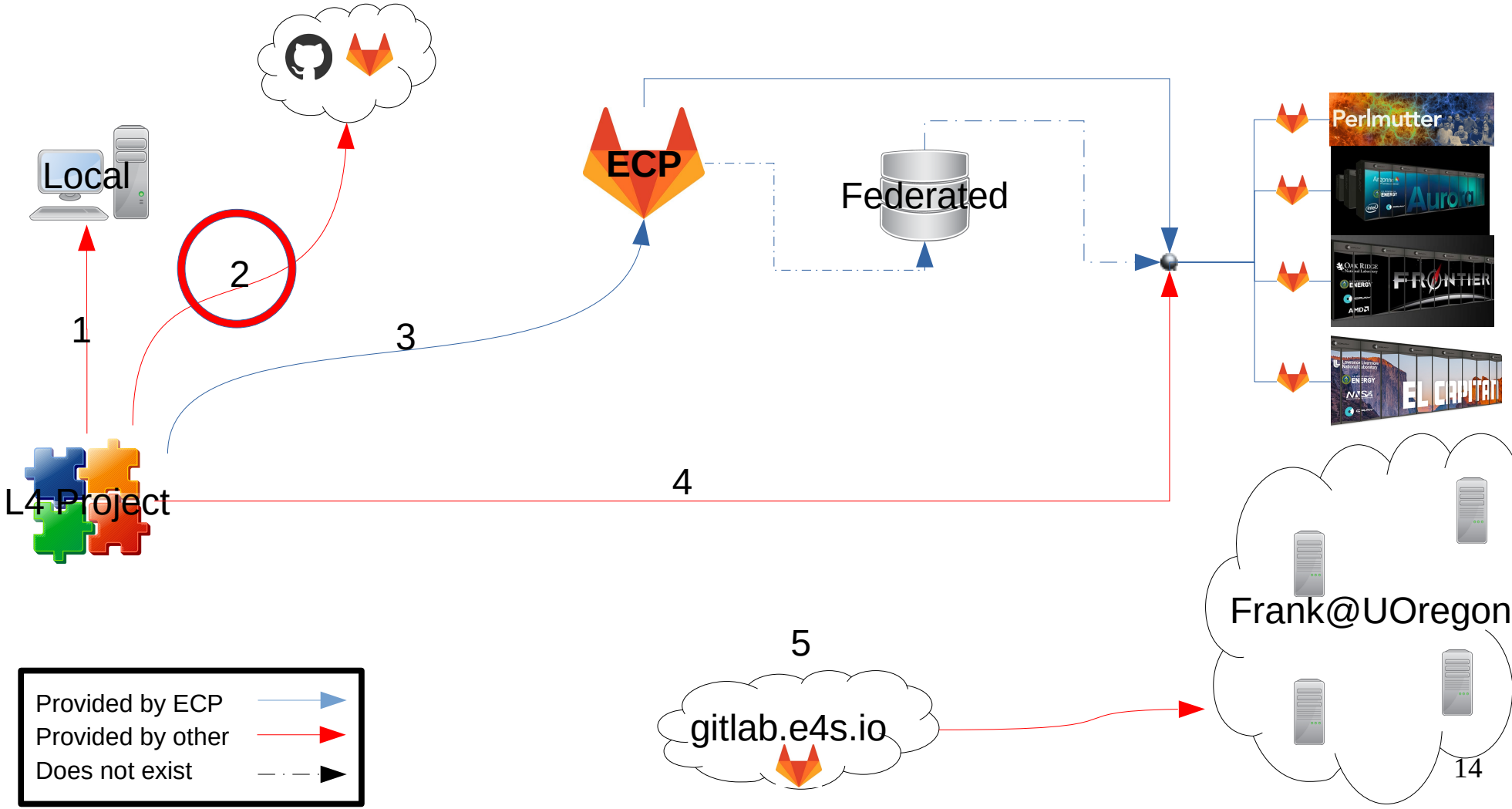

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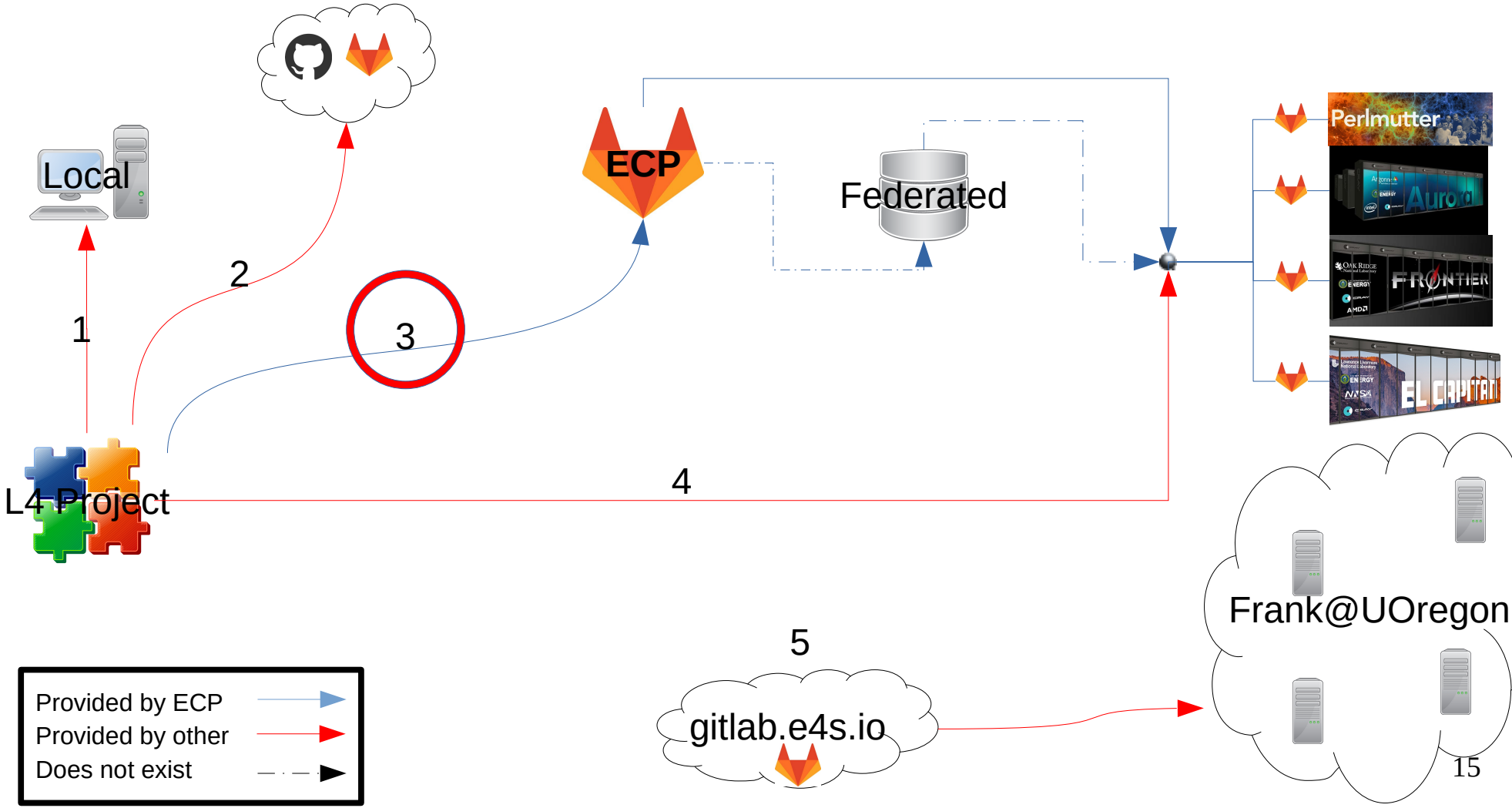

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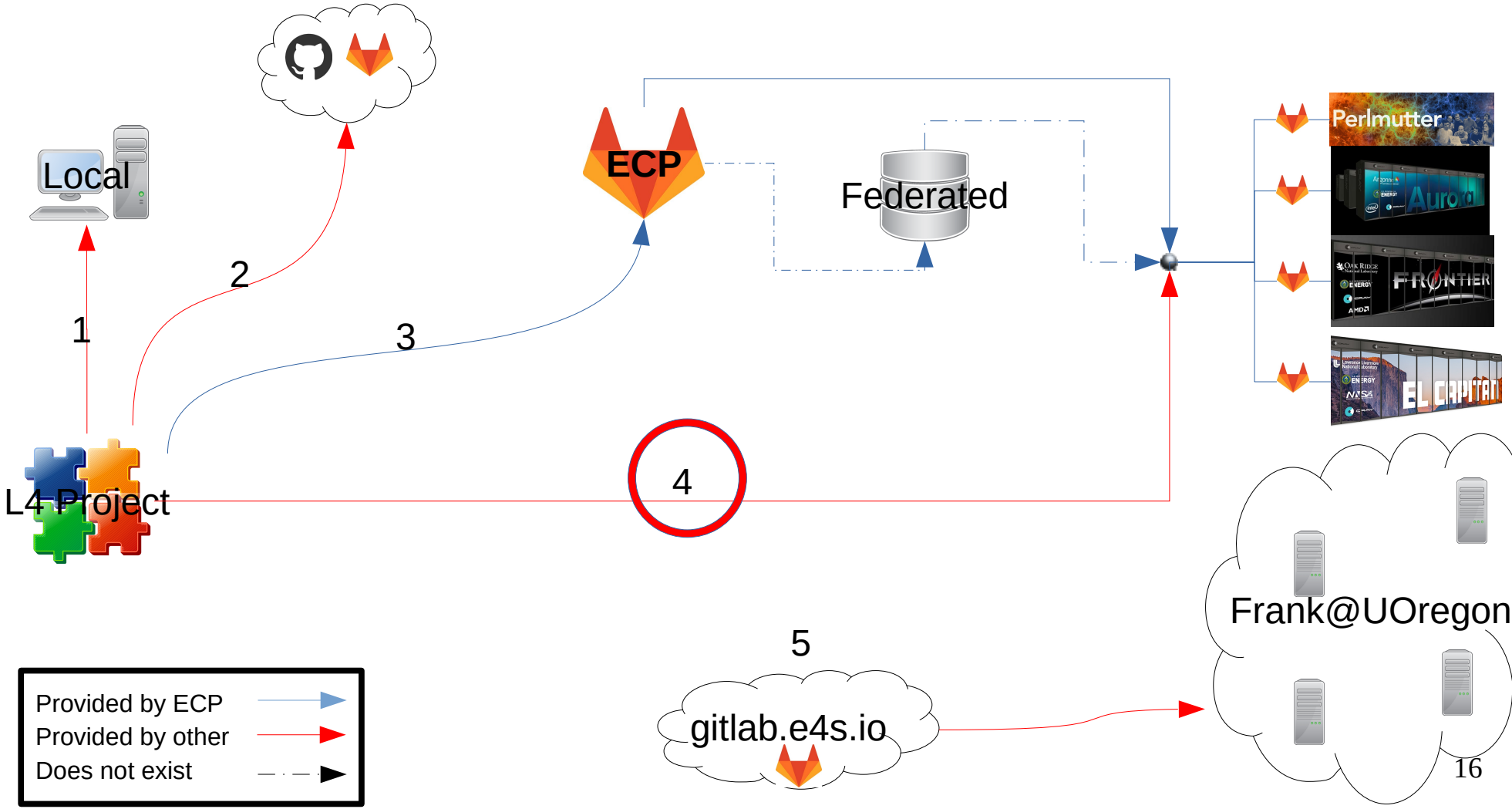

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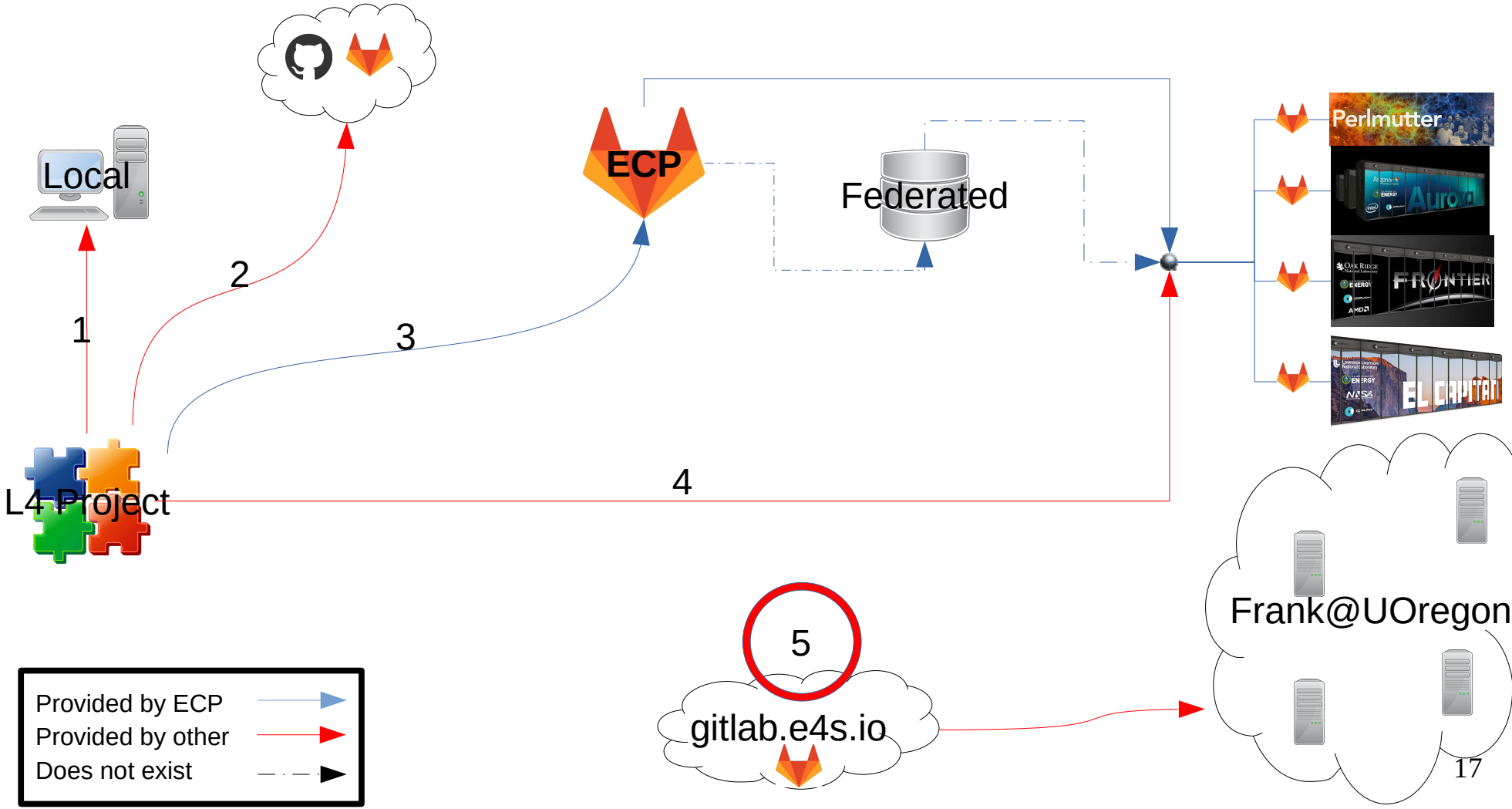

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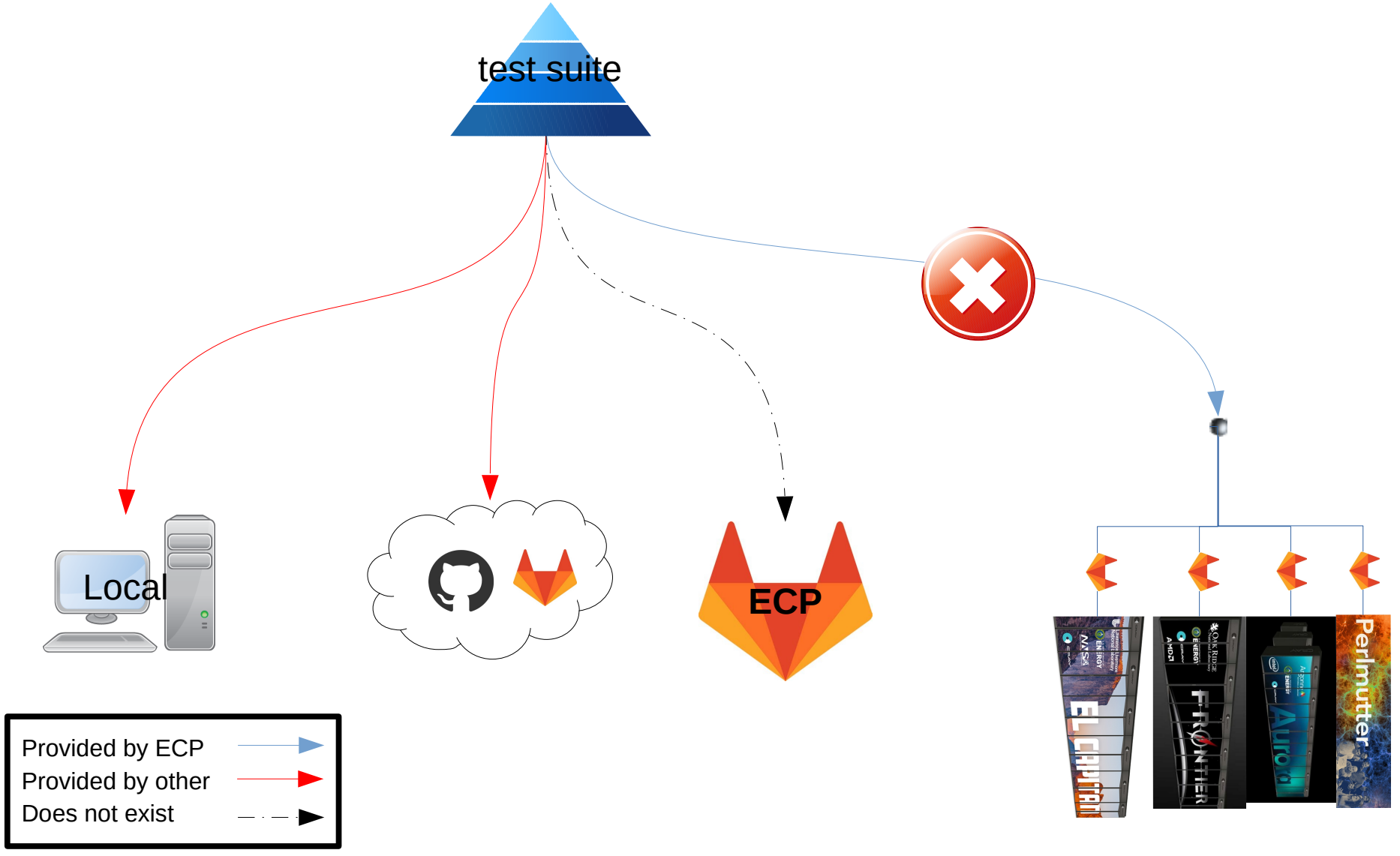
test suite
Local
ECP
Provided by ECP
Provided by other
Does not exist
Perlmutter

Help Center / ECP User Program

LCF Resource Sub-Allocation

The ECP, ALCF, and OLCF are instituting baseline awards of time, e.g., set amount of time, that will be granted to all subprojects that currently are running on the LCF resources through an ECP User Program award. NO PROPOSAL IS NEEDED if you are eligible.

Eligibility: Each subproject that has a current award through the ECP User Program will receive the baseline award for the upcoming quarter and does not need to complete the form below. However, the project WILL need to complete the proposal form if either of the following conditions are true:
* If their project does not have current allocation and/or
* If the project wants to request **more time** than will be given to them in the baseline award.

Subprojects will receive the following baseline awards of time.
* Theta: 1000 node-hours **per quarter** for Theta for AD and ST projects
* Summit: 3000 node-hours **per quarter** for AD projects, 1500 node-hours **per quarter** for ST projects

https://jira.exascaleproject.org/servicedesk/customer/portal/10/create/85

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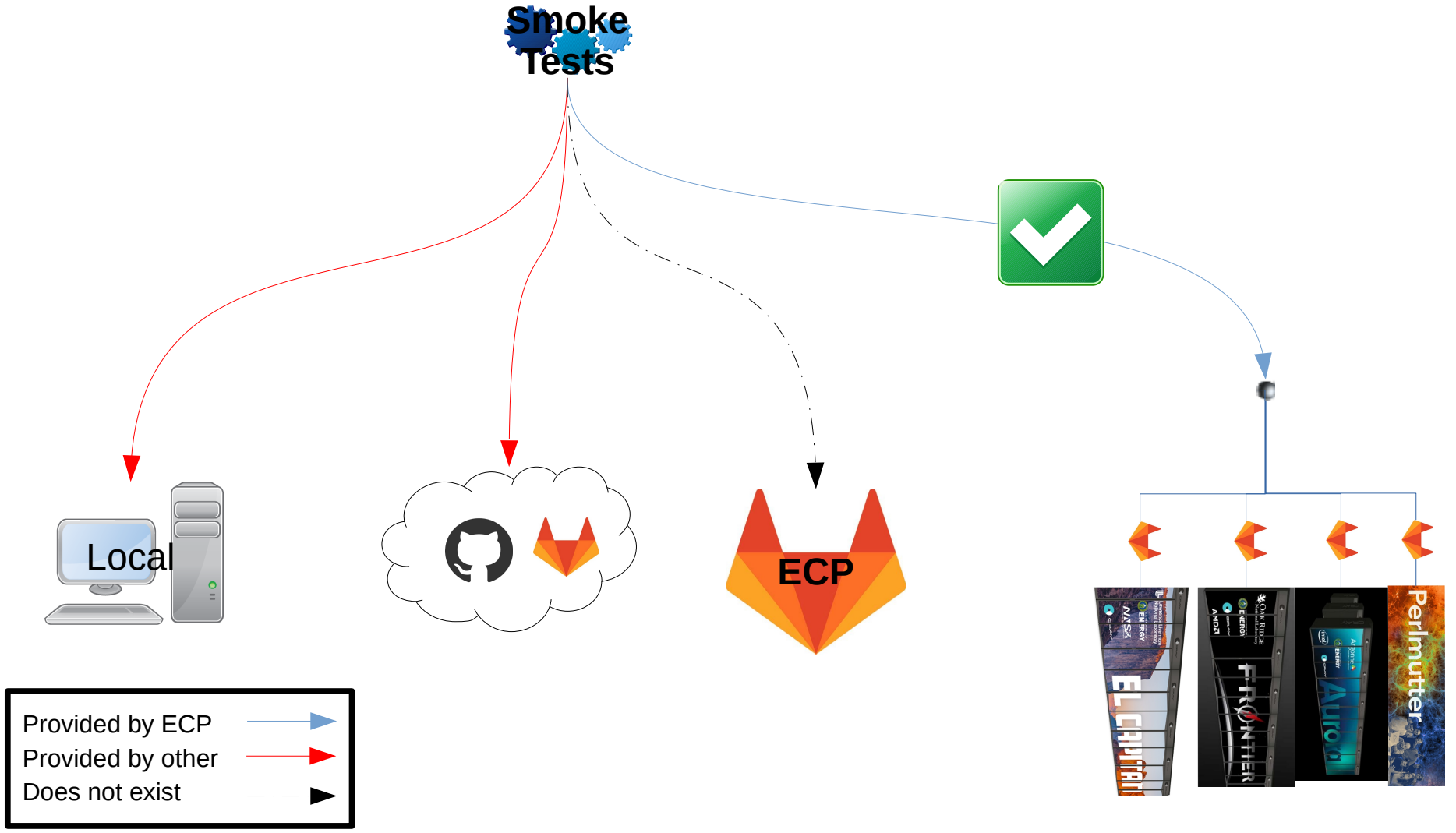
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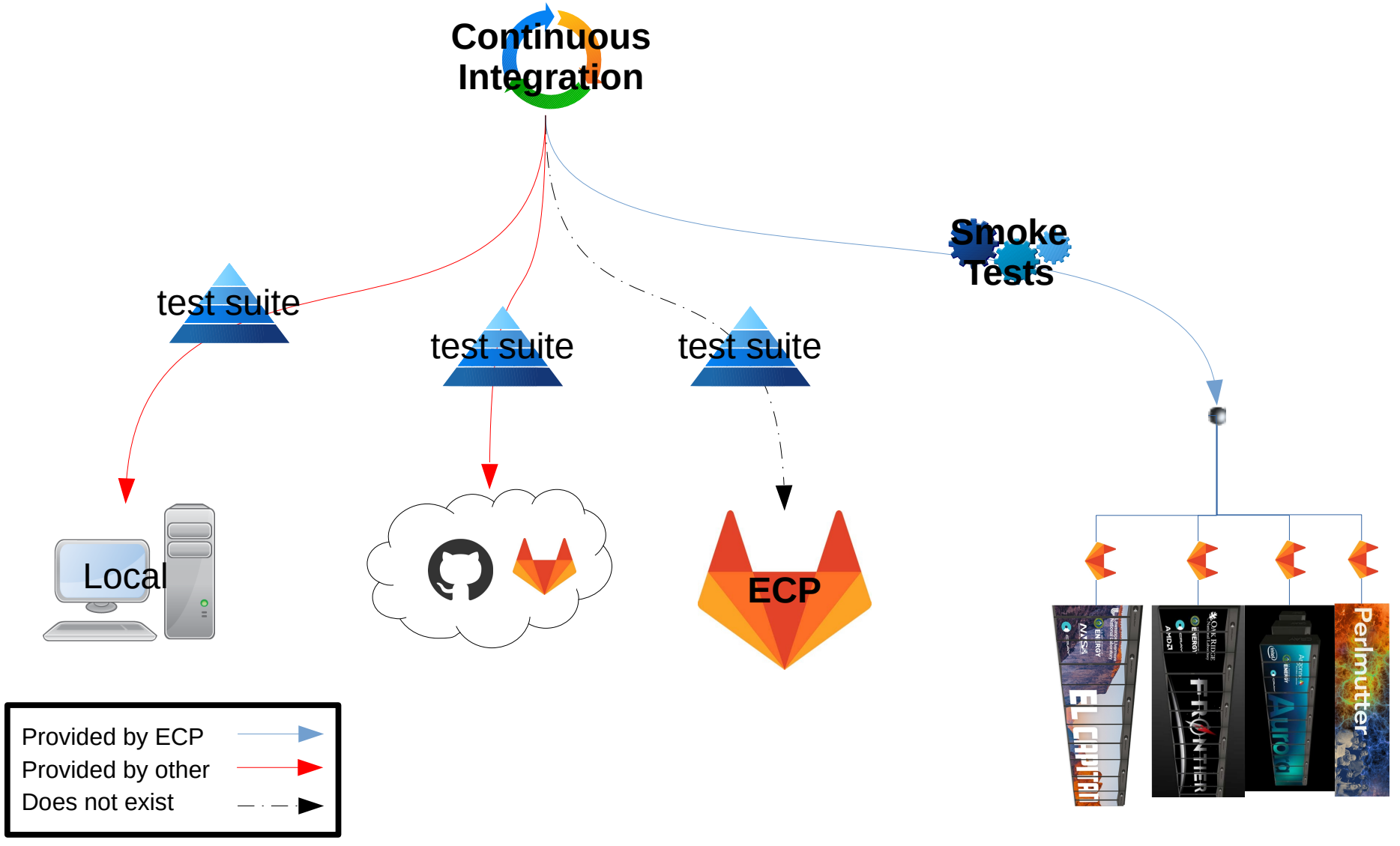
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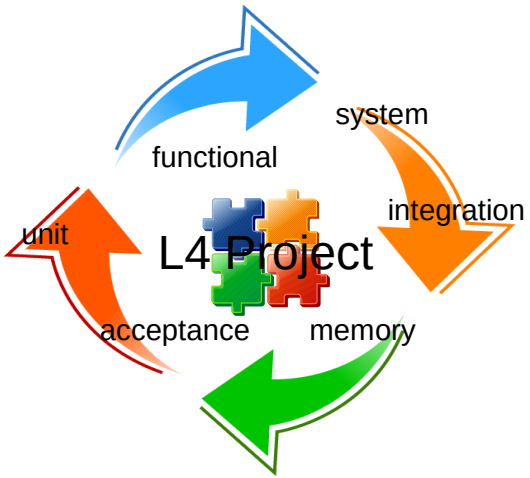
2. Mapping tests to available hardware platforms

3. Running tests at different points in the deployment process

Software Deployment in ECP



release

Spack

Software Deployment in ECP

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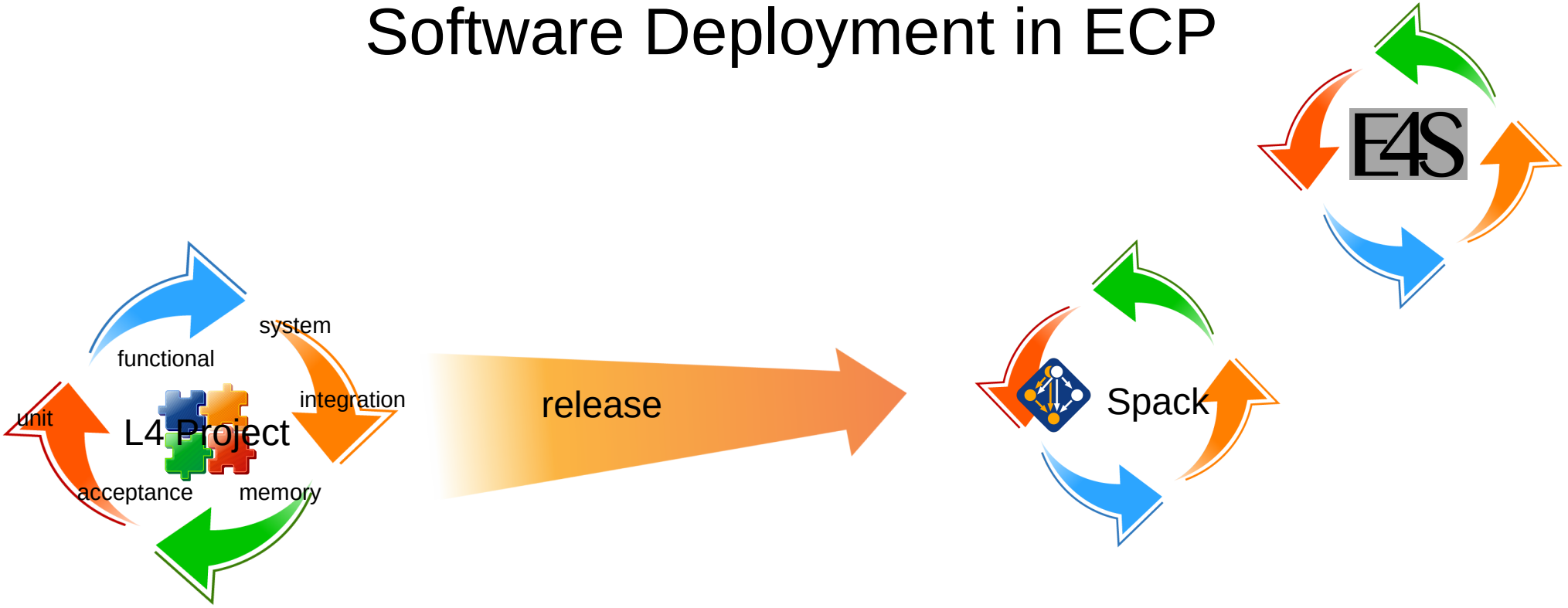

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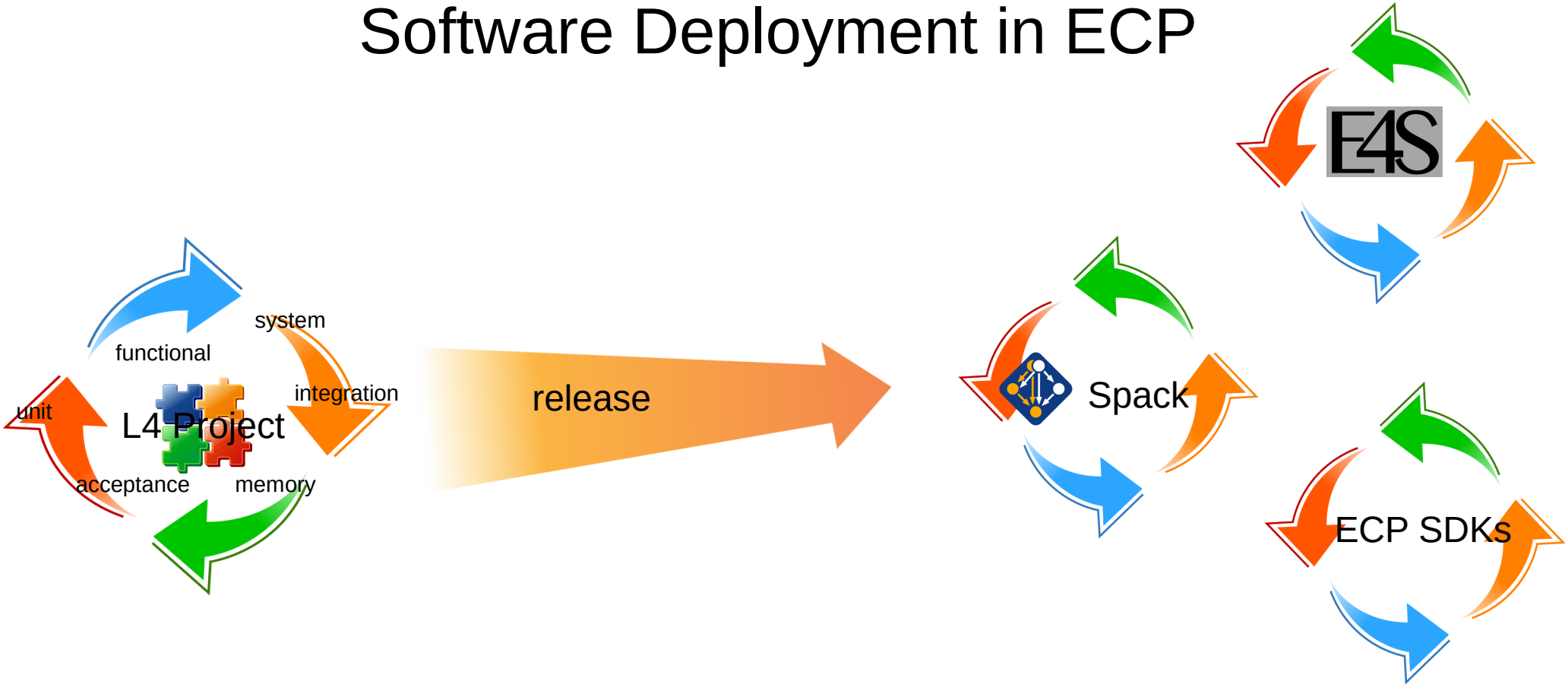

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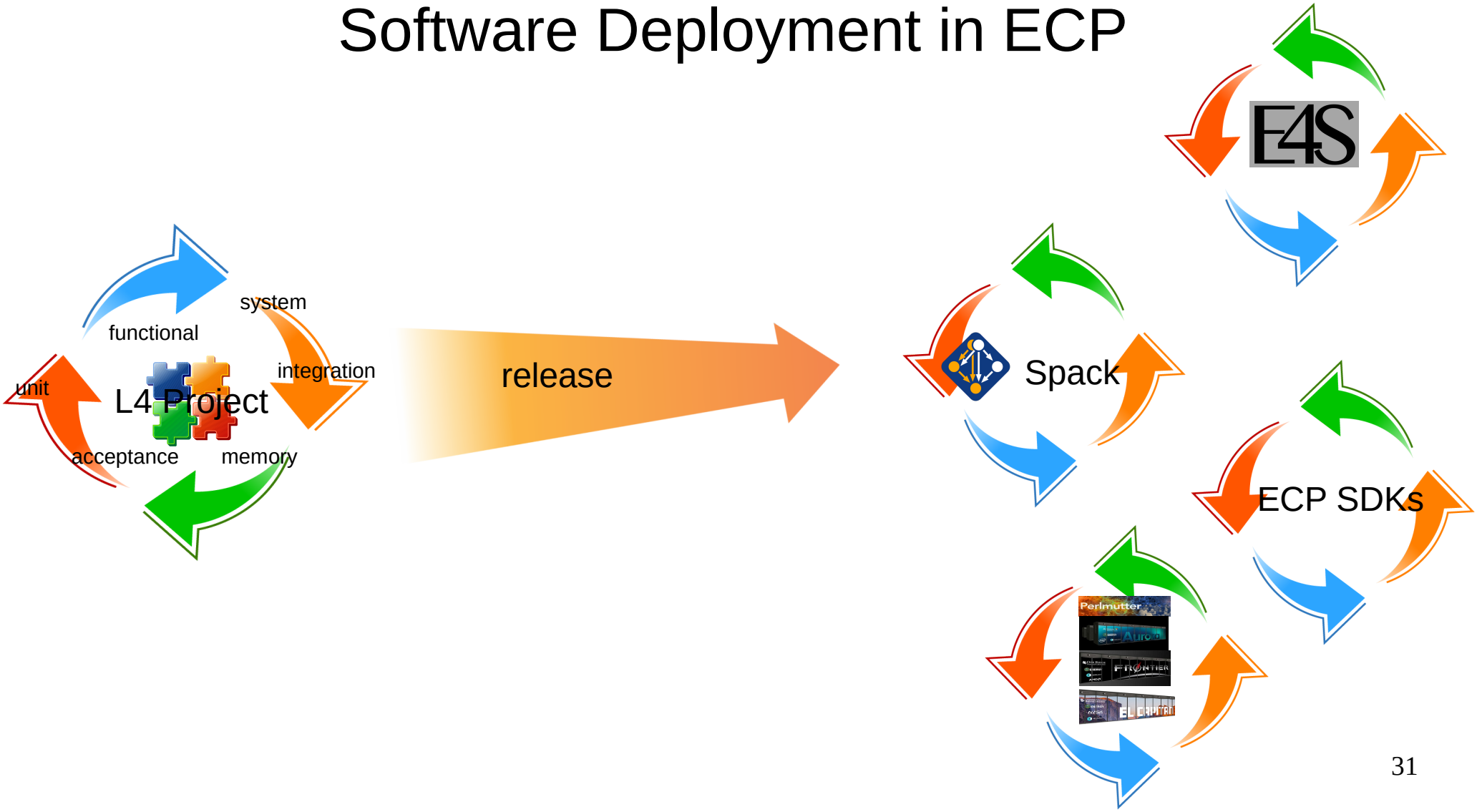
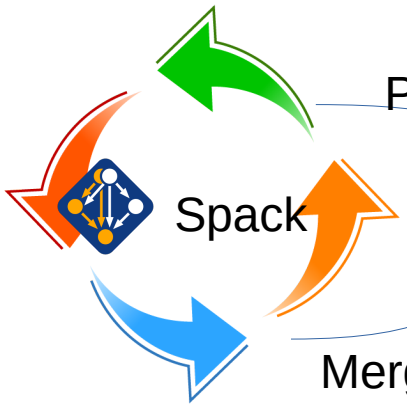


Simplified Spack CI workflow



Spack

Pull Request

Merge-to-develop

Travis CI

E4S

Ubuntu 18.04
x86_64
gcc

Rebuild packages affected by your spack Pull Request

No tests are run here (yet)

CDash

cdash.spack.io

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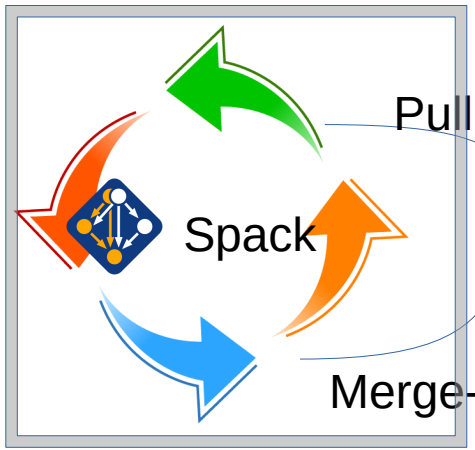

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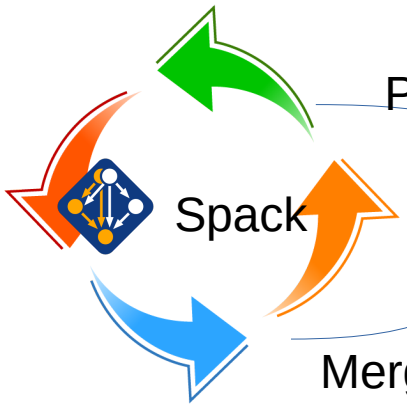

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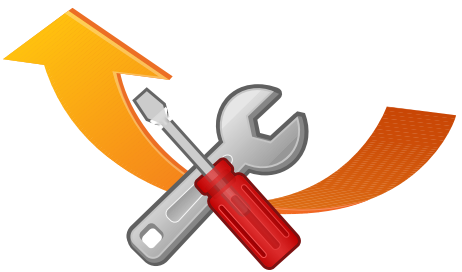

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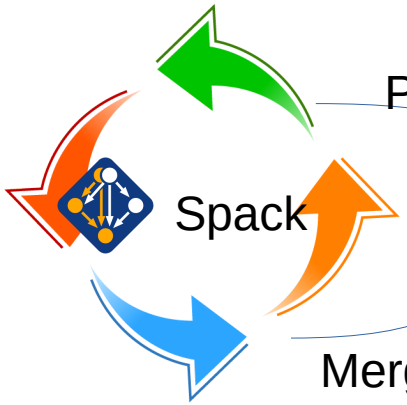

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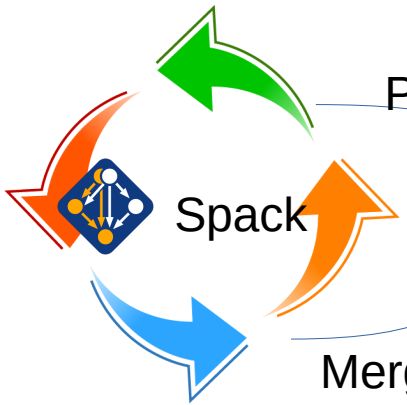

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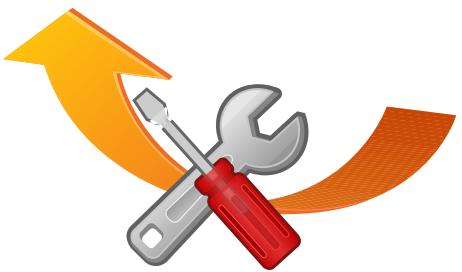

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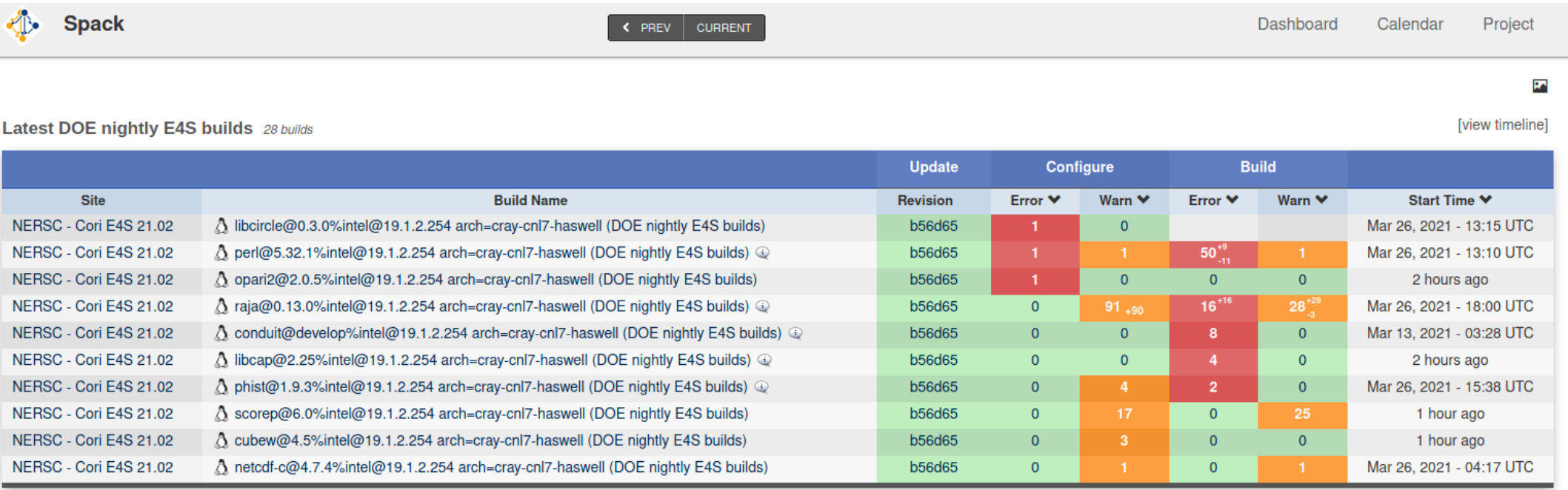

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Site	Build Name	Revision	Error	Warn	Error	Warn	Start Time
NERSC - Cori E4S 21.02	libcircle@0.3.0%intel@19.1.2.254 arch=cray-cnl7-haswell (DOE nightly E4S builds)	b56d65	1	0			Mar 26, 2021 - 13:15 UTC
NERSC - Cori E4S 21.02	perl@5.32.1%intel@19.1.2.254 arch=cray-cnl7-haswell (DOE nightly E4S builds)	b56d65	1	1	50^{+9}_{-11}	1	Mar 26, 2021 - 13:10 UTC
NERSC - Cori E4S 21.02	opari2@2.0.5%intel@19.1.2.254 arch=cray-cnl7-haswell (DOE nightly E4S builds)	b56d65	1	0	0	0	2 hours ago
NERSC - Cori E4S 21.02	raja@0.13.0%intel@19.1.2.254 arch=cray-cnl7-haswell (DOE nightly E4S builds)	b56d65	0	91_{+90}	16^{+16}	28^{+28}_{-3}	Mar 26, 2021 - 18:00 UTC
NERSC - Cori E4S 21.02	conduit@develop%intel@19.1.2.254 arch=cray-cnl7-haswell (DOE nightly E4S builds)	b56d65	0	0	8	0	Mar 13, 2021 - 03:28 UTC
NERSC - Cori E4S 21.02	libcap@2.25%intel@19.1.2.254 arch=cray-cnl7-haswell (DOE nightly E4S builds)	b56d65	0	0	4	0	2 hours ago
NERSC - Cori E4S 21.02	phist@1.9.3%intel@19.1.2.254 arch=cray-cnl7-haswell (DOE nightly E4S builds)	b56d65	0	4	2	0	Mar 26, 2021 - 15:38 UTC
NERSC - Cori E4S 21.02	scorep@6.0%intel@19.1.2.254 arch=cray-cnl7-haswell (DOE nightly E4S builds)	b56d65	0	17	0	25	1 hour ago
NERSC - Cori E4S 21.02	cubew@4.5%intel@19.1.2.254 arch=cray-cnl7-haswell (DOE nightly E4S builds)	b56d65	0	3	0	0	1 hour ago
NERSC - Cori E4S 21.02	netcdf-c@4.7.4%intel@19.1.2.254 arch=cray-cnl7-haswell (DOE nightly E4S builds)	b56d65	0	1	0	1	Mar 26, 2021 - 04:17 UTC

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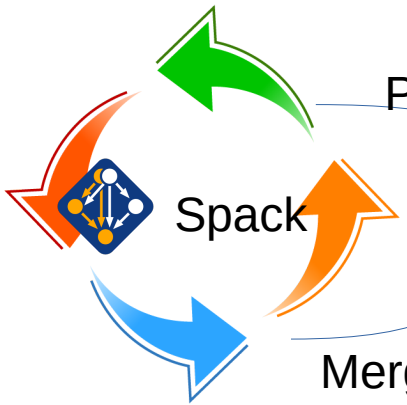

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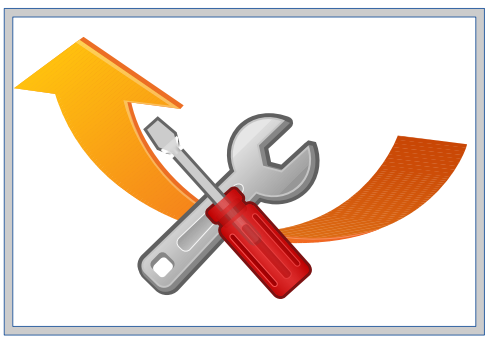


CDash

cdash.spack.io

E4S

E4S is a curated binary distribution of more than 80 ECP applications on multiple architectures, operating systems, and compilers

Visit e4s.io for details

<u>ECP Annual Meeting</u>

Tutorial: Mon, April 12 10AM

BoF: Tue, April 13 1pm

Breakout: Wed, April 14 4pm

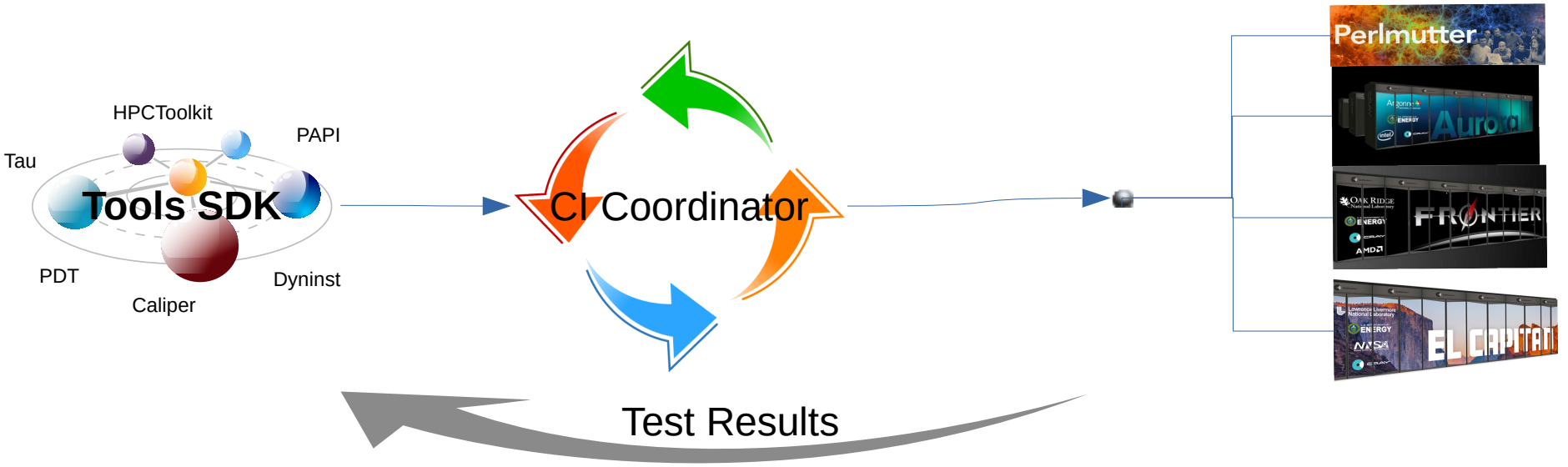
Breakout: Thur, April 15 2:30pm

SDK Testing

The ECP Software Development Kits (SDKs) are intended to be a cohesive set of closely-related applications that receive more intensive testing and validation.

There is currently no standard for testing in the SDKs.

Example: Tools SDK



E4S Testing

Release Builds

~4x/year

V21.02 supports all GPUs

CDash

cdash.e4s.io

Currently down for upgrades

spack test Smoke Tests

CDash

TBD

Luke@UOregon

Manual Builds

~1x/week

PPCle64

x86

Frank@UOregon

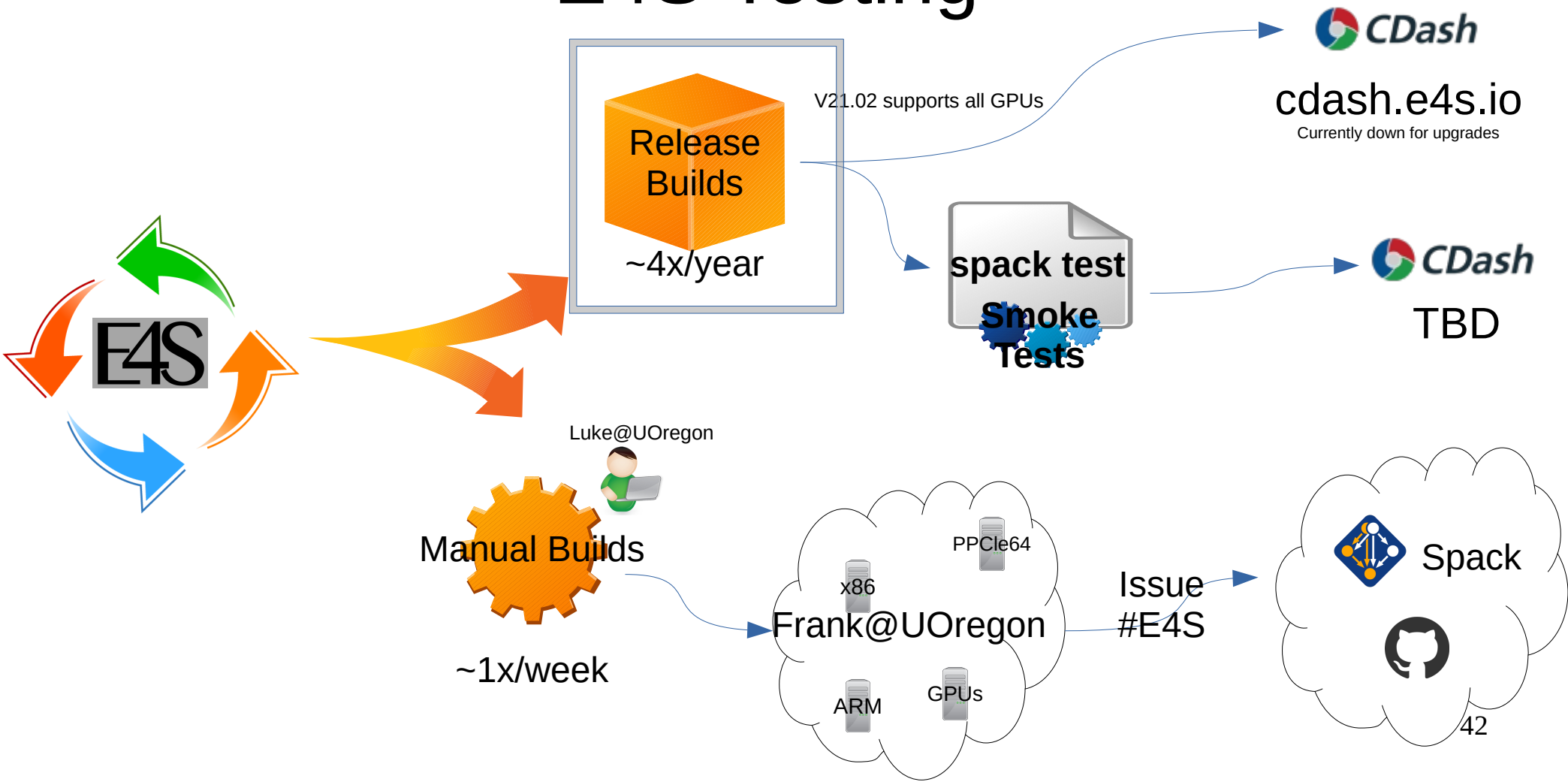
ARM

GPUs

Issue #E4S

Spack

E4S Testing


CDash
cdash.e4s.io
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~4x/year
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E4S
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Issue
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Frank@UOregon

ARM

GPUs

Issue #E4S

Spack

E4S Testing

Release Builds

~4x/year

V21.02 supports all GPUs

CDash

cdash.e4s.io

Currently down for upgrades

spack test Smoke Tests

CDash

TBD

Luke@UOregon

Manual Builds

~1x/week

PPCle64

x86

Frank@UOregon

ARM

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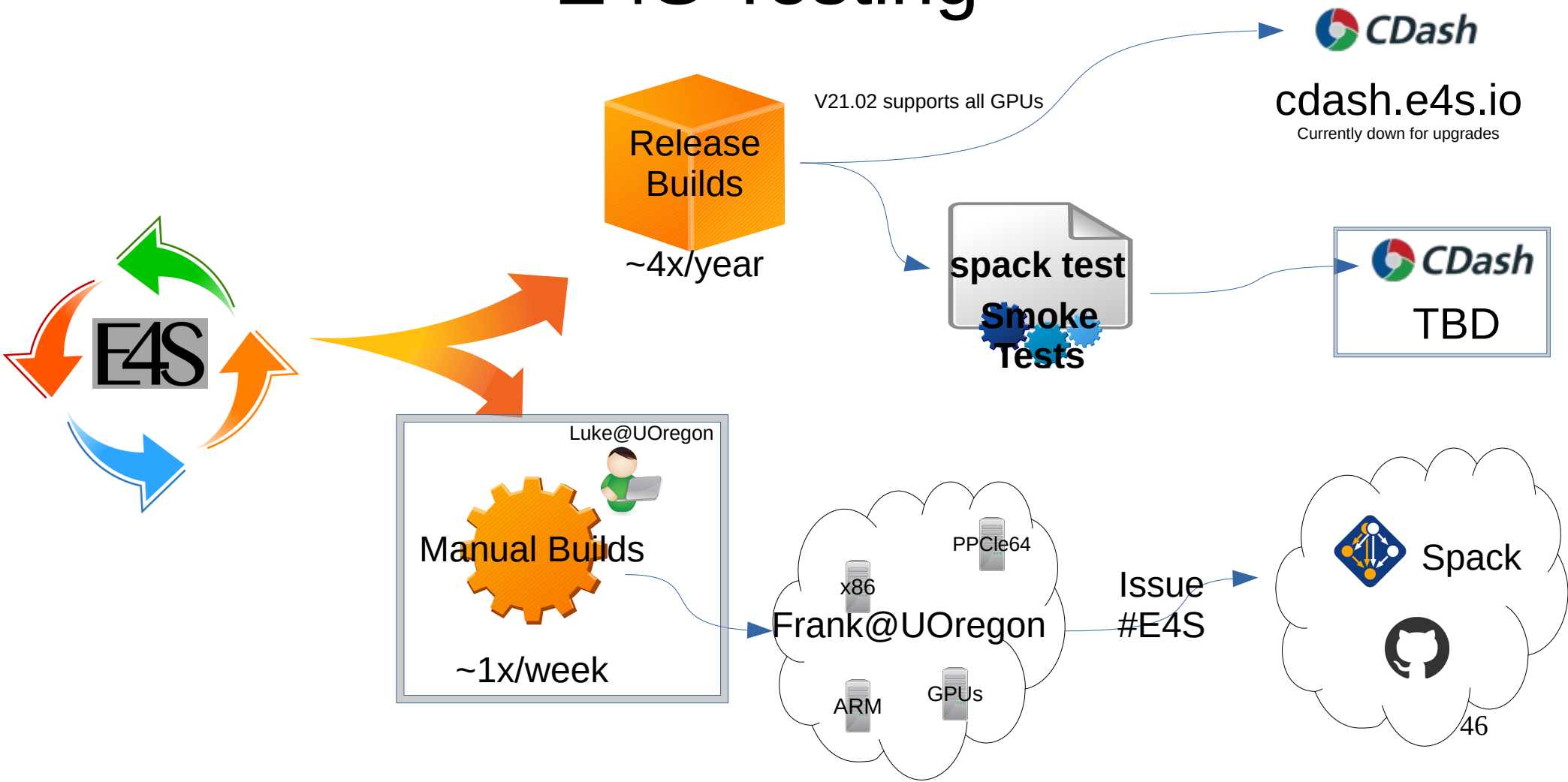
Spack

E4S Testing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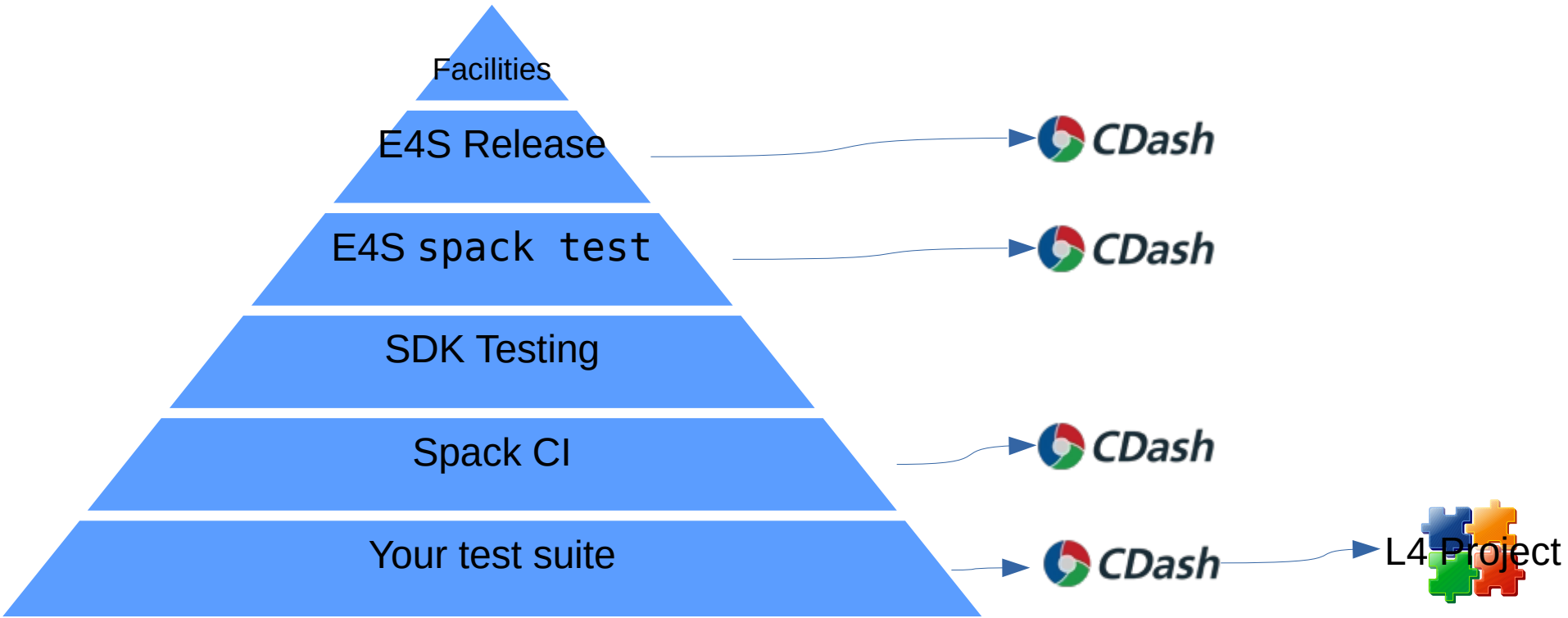
Facilities' Testing

Custom full-stack build, testing, and deployment

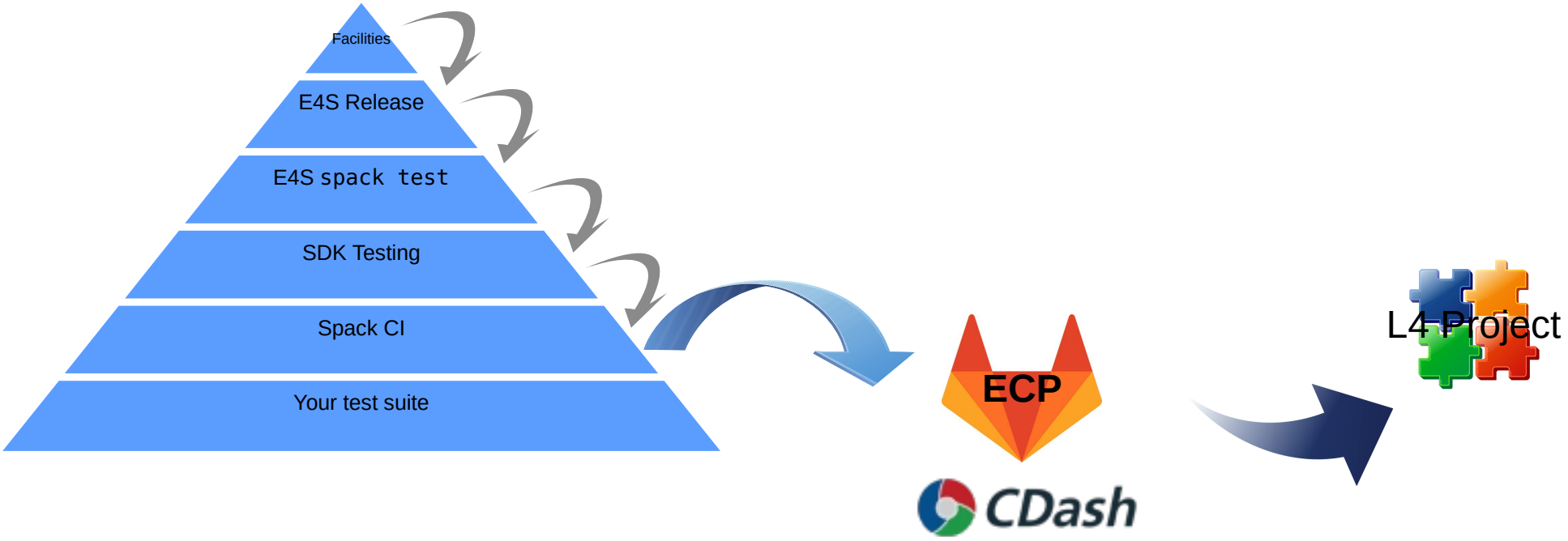
CDash

TBD

Tiered Testing Today



Tiered Testing in the Future



Thank You

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- The ECP SDK Pis
- The OACISS team at Uoregon

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- Luke Peyralans
- Wyatt Spear
- Tammy Dahlgren

slides: github.com/hainest/TieredTesting