

Installation of Flux

2022 HPC Academy Project

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The Flux Project Interns



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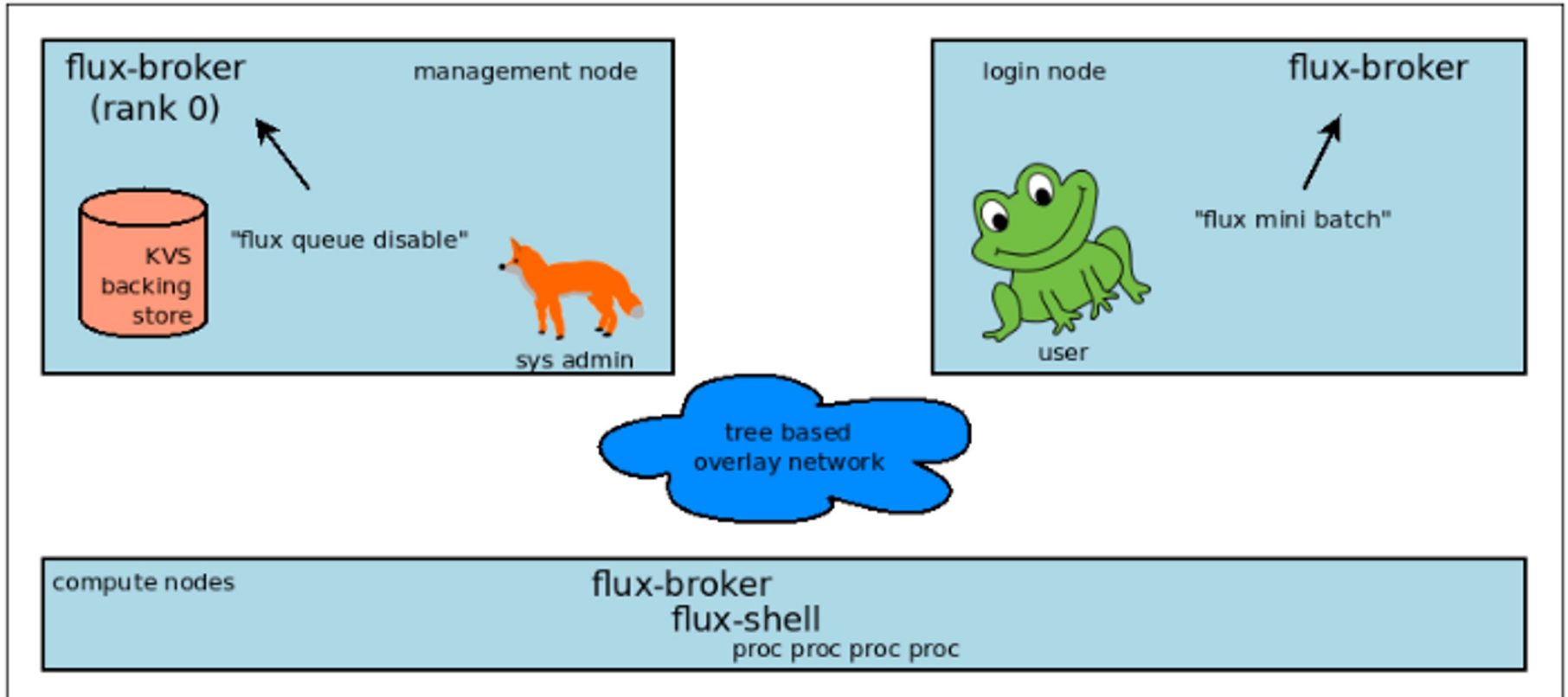
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What is Flux?

- Resource management framework
 - Job scheduling algorithm
 - Allocation policy
- Designed for better throughput, job coordination/communication, portability



What is Flux?



<https://flux-framework.readthedocs.io/en/latest/adminguide.html>

Project Objective

- Install Flux on our cluster
 - flux-core, flux-security, flux-sched
- Run MPI jobs



Running jobs

```
#include <mpi.h>
#include <stdio.h>

int main(int argc, char** argv) {
    // Initialize the MPI environment
    MPI_Init(NULL, NULL);

    // Get the number of processes
    int world_size;
    MPI_Comm_size(MPI_COMM_WORLD, &world_size);

    // Get the rank of the process
    int world_rank;
    MPI_Comm_rank(MPI_COMM_WORLD, &world_rank);

    // Get the name of the processor
    char processor_name[MPI_MAX_PROCESSOR_NAME];
    int name_len;
    MPI_Get_processor_name(processor_name, &name_len);

    // Print off a hello world message
    printf("Hello world from processor %s, rank %d"
           " out of %d processors\n",
           processor_name, world_rank, world_size);

    // Finalize the MPI environment.
    MPI_Finalize();
}
```

```
[flux@siliconi ~]$ flux mini run -n4 -N4 hostname
siliconi
silicon4
silicon3
silicon2
```

```
[flux@siliconi ~]$ cat flux-run-hello.sh
#!/bin/bash

export OMPI_MCA_btl="tcp,self"
flux mini run -n 4 /var/flux/hello 2>/dev/null | grep -v Unable
```

```
[flux@siliconi ~]$ flux mini batch -n4 -N4 flux-run-hello.sh
f3B23bEkdKM
[flux@siliconi ~]$ flux jobs
JOBID USER NAME ST NTASKS NNODES RUNTIME NODELIST
f3B23bEkdKM flux flux-run-h R 4 4 2.811s silicon[2-5]
[flux@siliconi ~]$ cat flux-f3B23bEkdKM.out
Hello world from processor silicon2, rank 0 out of 4 processors
Hello world from processor silicon4, rank 2 out of 4 processors
Hello world from processor silicon3, rank 1 out of 4 processors
Hello world from processor silicon5, rank 3 out of 4 processors
```

Challenges

- ❖ Limited Web Resources and Documentation
 - Trial and error, and digging around a lot
- ❖ Precise Command Line Usage
 - Expert-Friendly, tough if you are used to GUI's, once you know certain commands it gets easier
- ❖ Minor edits to configuration files
- ❖ Enabling Certain Repos

Future Work and High End Goals

- ❖ Explore using the flux API to manage jobs
- ❖ Setup the exclude for the mgmt node - normally we would not run real end-user work on the mgmt node
- ❖ Investigate the Prolog/epilog

Tools Used



References

<https://flux-framework.readthedocs.io/en/latest/adminguide.html>

https://flux-framework.readthedocs.io/projects/flux-rfc/en/latest/spec_18.html#language

<https://computing.llnl.gov/projects/flux-building-framework-resource-management>

https://sc18.supercomputing.org/proceedings/workshops/workshop_files/ws_works115s2-file1.pdf

<https://flux-framework.readthedocs.io/en/latest/quickstart.html#spack-recommended-for-curious-users>

Questions?





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