# Project: Institutional Cluster

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Projects Meeting

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# Definitions

- Institutional Cluster (IC)

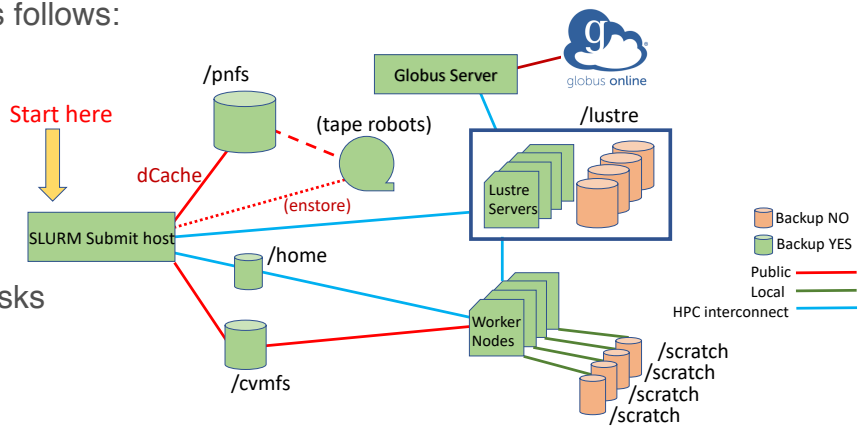
  An IC is hardware that is designed and operated by an institution, such as Fermilab, to fulfill the diverse needs of its user community. The idea is that an IC is similar to an investment portfolio which contains all types of an individual's investments. In this case, the IC contains clusters of machines that can each serve the diverse needs of the institutions' user community.

- HPC Clusters

  An HPC cluster is a collection of many separate servers (computers), called nodes, which are connected via a fast interconnect. The standard layout of a Fermilab HPC cluster is as follows:

- HTC Clusters

  An HTC cluster is a collection of many separate servers (computers), called nodes which are embarrassingly-parallel or not connected via a fast interconnect. Such a cluster is designed for the efficient execution of a large number of loosely-coupled tasks over a long period of time.



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# Project IC Steps – Executive Summary

| | | Weeks |
|---|---|---|
| **LQ1 -** Already Accomplished | | |
| 1 | Procure and deploy LQ1 per requirements set forth in the Joint Acquisition Evaluation Committee Report (August 2018). (*Assuming designing a new IC cluster*) | ~~52~~ |
| **pi0 & pi0g -** Step #1 | | |
| 1 | Enable WAN connectivity for as many worker nodes as budget allows. | 8 |
| 2 | Reconfigure worker nodes and Lustre similar to LQ1. | 6 |
| 3 | Setup and test SLURM (Wilson-dev). *(Learning curve for SCS)* | 4 |
| | TOTAL | 18 |
| **Wilson -** Step #2 | | |
| 1 | Relocate and install Wilson hardware from GCC-B to C. | 4 |
| 2 | Reconfigure Wilson worker nodes similar to LQ1. | 4 |
| 3 | Wilson-dev => Wilson-IC, test and deploy to production. | 4 |
| X | Update user documentation. | 2 |
| | TOTAL | 12 |
| **HTCondor -** Step #3 | | |
| 1 | Need to have CE in front of HPC resources that allows single-node jobs. | 12 |
| **Science Gateway -** Step #4 *(out of scope for this project but a major dependency)* | | |
| 1 | HEPCloud Project: Need to have CE in front of HPC resources that allows MPI jobs. | |
| 2 | HEPCloud project: Completes development of Decision Engine | |
| **Community Engagement -** Step #4 | | |
| X | Update user documentation. | 2 |
| X | Tutorials/Articles/Whitepapers on IC resources and access to IC resources via HEPCloud. | 4 |
| | TOTAL | 4 |

- All Steps have to be executed in the listed order.
- No <u>additional</u> effort being requested than what has already been budgeted in FY20 !!
- "Weeks" indicates steady state effort.
- "X" indicates an independent activity.



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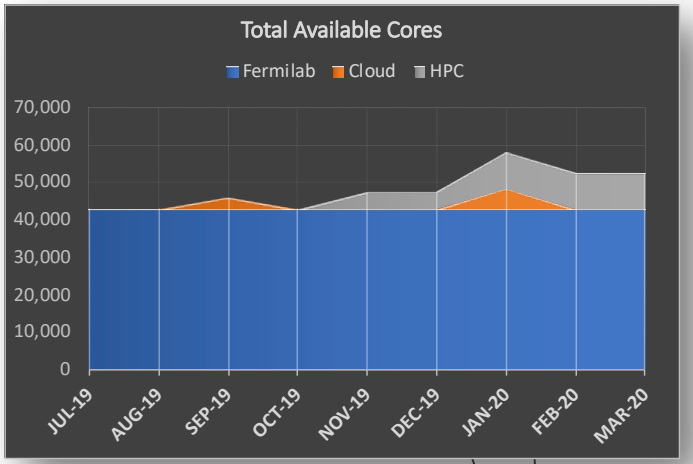
# Project IC Steps – Another view




HPC Clusters

SLURM Instance #1: LQ1

SLURM Instance #2: pi0, pi0g

SLURM Instance #3: Wilson

NOW

HTC Clusters: Fermi Grid, Tier-1

1. Need to have CE in front of LQ1+Wilson.
2. HEPCloud project develop Decision Engine.

HEPCloud project develop Decision Engine.

Institutional Cluster

SLURM Instance #1: LQ, Fermi Grid

SLURM Instance #2: Wilson-IC, Tier-1

Nirvāna

Liberated from existence



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