

For major cluster upgrade & expansion projects ChemIT has developed a process method to build / rebuild with minimal interruption to existing systems and users, while providing a quality, up-to-date cluster on completion. For existing clusters, the basic process is to build up a new cluster, get it running and tested, then transfer any existing hardware to the new cluster.

The build & convert process addresses some important needs –

- To upgrade the operating system and applications
- To be able to support new hardware, which may not be supportable in older OS environments.
- To bring the cluster up to current cluster best practices

In some cases, additional hardware can simply be added to an existing cluster – this usually works only if the cluster is of recent build.

### 1) Planning – determine:

- State of current system and components
  - Hardware – quantity, age
  - Software – what applications, versions
  - Fit / gap with best practices (storage, power, backup, archives, accounts, quotas, etc.)
- Upgrade goals
  - Hardware additions, storage, performance criteria
  - Scope of upgrade project (vs additional or ongoing work)
  - Software
  - Budget
  - Timeframe
- Hardware specifications for components
  - CPU's, Memory, Disk
  - Networking, Rack space, Power, UPS
- Software
  - desired applications, versions, licensing
- Contacts, Roles & Responsibilities - for upgrade & daily operations
  - Research Group – Cluster lead, testers, users
    - Decisions
    - Software specifications, installs
    - Testing & verifications
  - ChemIT
    - Staff for Project management, purchasing, hardware & software install, maintenance
- Project Management, Schedules & methods
  - Project steps & timeline
  - Decision making, change process
  - Communications- status, meetings, alerts, etc.
  - External scheduling factors
  - Testing needs, critical points
  - Maintenance agreement (on-going)

### 2) Implementation

- Purchasing
    - Final Specs
    - Final Quotes / pricing
    - Purchase approvals
    - order hardware
  - Hardware installation
    - Rack, network, and power setup
    - swaps or new computers for headnode & CNode (compute node)
    - Add additional new compute nodes
  - New Cluster build
    - OS & queuing installation
    - Application installations & testing
    - Preliminary new cluster approval
  - Expand cluster
    - convert old cluster hardware
    - move user data
    - Test & modification
    - Cluster Functional / signoff
    - Expanded cluster operational / production
- 3) Project Wrap-up
- Review & assessment
    - Address any remaining needs, future desires
  - Use system in production
  - Convert old headnode to compute node after 30-90 day wait
    - Archive of old data?
  - Final review / closeout