

# Testing Remote Job Processing with RunManager

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## Background

The RunManager UI tool is capable of dispatching XML Pre-processor, EnergyPlus and Radiance (future) jobs to super computer clusters running the SLURM batch processing tool. For users inside of NREL, this is relevant to the Red Rocks and Red Mesa clusters.

The connection made to the remote systems is via SSH. Due to the secure nature of the cluster and the use of SSH, there are not very many good options for automatic testing of remote job execution. Therefore, the following document outlines the manual process of configuring and testing remote job execution through the UI.

## Prerequisites

### Super Computing Cluster Access

Before any jobs can be executed remotely, the user must have an account on one of the relevant clusters. Please see <https://sccdata.nrel.gov/hpc/accounts/account-request> to gain access.

# Remote Tools

## XML Pre-processor

XML Pre-processor built for 64 bit Linux and packaged for remote execution can be downloaded from <https://cbr.nrel.gov/preprocessor/svn/trunk/bin/EPXMLPreproc2>.

## EnergyPlus

EnergyPlus packaged for remote execution can be downloaded from [https://cbr.nrel.gov/optimization/svn/trunk/common/usefiles/EnergyPlusV60/\\_energyplus.tar.gz](https://cbr.nrel.gov/optimization/svn/trunk/common/usefiles/EnergyPlusV60/_energyplus.tar.gz)

# Configuring RunManager

## Adding Appropriate Tools

The tools which are configured by default only have support for local job execution. It is necessary to either remove the existing tools and add new ones or update the existing to reference the remote packages.

## Creating New Tools with Remote Packages

1. Remove existing tools
  - a. Open preferences window with “Settings->Preferences”
  - b. Select existing XML Pre-processor tool (if it exists) and click the “-” button in the upper right of the box.
  - c. Select existing EnergyPlus tool (if it exists) and click the “-” button in the upper right of the box.
2. Add new tools
  - a. Adding EnergyPlus
    - i. Click the “+” button on the top right of the tools box.
    - ii. Select tool type as “EnergyPlus”
    - iii. Enter location for EnergyPlus binary installation directory
    - iv. Enter location for previously downloaded EnergyPlus remote tool in the “SLURM Tool File” directory.
    - v. Leave the version numbers as “-,” it is not worth configuring the version number for this test
    - vi. Click “OK”
  - b. Adding XML Pre-processor
    - i. Click the “+” button on the top right of the tools box
    - ii. Select tool type as “XML Pre-processor”
    - iii. Enter location for XML Pre-processor binary installation directory

- iv. Enter location for previously downloaded XML Pre-processor remote tool in the "SLURM Tool File" directory.
- v. Leave the version numbers as "-", it is not worth configuring the version number for this test
- vi. Click "OK"

## Updating Existing Tools with Remote Packages

1. Open Preferences window with "Settings->Preferences"
2. Update EnergyPlus
  - a. Click on the existing EnergyPlus tool. If EnergyPlus does not exist in the tool list, follow the directions above for how to add the appropriate tool.
  - b. Double-click on the "Remote Binary Archive" field
  - c. Enter the location of the tar.gz file downloaded in the prerequisites section.
3. Update XML Pre-processor
  - a. Click on the existing XML Pre-processor tool. If XML Pre-processor does not exist in the tool list, follow the directions above for how to add the appropriate tool.
  - b. Double-click on the "Remote Binary Archive" field
  - c. Enter the location of the tar.gz file downloaded in the prerequisites section.

## Updating SLURM Configuration

1. Open Preferences window with "Settings->Preferences"
2. Select the "SLURM" tab.
3. Enter the appropriate SLURM host name (redrock-login1.nrel.gov or redmesa-login1.sandia.gov)
4. Enter the respective user name assigned to you for the selected SLURM host
5. Set "Max SLURM Processes" to at least 4.

## Executing Remote Jobs

The application should now be configured properly for remote execution of jobs. To test that all tools are working for remote execution:

1. Switch to the "Job" tab
2. Select an XML input file for processing (check the box next to the file name). An appropriate file can be acquired from the "resources/runmanager/test.xml"
3. Select "xmlpreprocessor->energyplus" for the workflow
4. Click "Add To Queue"
5. Switch to the "Job Output" Tab
6. Click on the job workflow you just added on the list of workflows in the upper left.
7. Click the "pause" button on the tool bar to begin processing of the jobs

8. The application should ask you for your password to the cluster within 1 second.
9. Provide your password
10. Watch the job processing and verify that the jobs go through a process of uploading tools/files -> processing -> downloading results

## Running Remote Jobs from the Command Line

The RunManager executable supports the following command line arguments:

<code>--help</code>	produce help message
<code>--showstatus</code>	Show status UI of job processing to user
<code>--input arg</code>	Set file to process
<code>--weather arg</code>	Weather file or directory to search for weather file
<code>--workflow arg</code>	The workflow to process, example: "modeltoidf->expand objects->energyplus"
<code>--energyplus arg</code>	Path to directory containing energyplus binary
<code>--xmlpreproc arg</code>	Path to directory containing the xml preprocessor binary
<code>--radiance arg</code>	Path to directory containing the radiance binaries
<code>--ruby arg</code>	Path to directory containing the ruby binaries
<code>--remote_energyplus arg</code>	Path to package for remote execution of energyplus
<code>--remote_xmlpreproc arg</code>	Path to package for remote execution of xml preprocessor
<code>--remote_radiance arg</code>	Path to package for remote execution of radiance
<code>--outpath arg</code>	Path to send processing output to
<code>--slurmusername arg</code>	User name to use when making remote SLURM connections
<code>--slurmhostname arg</code>	Host name to use when making remote SLURM connections

To remote test an energyplus job, you can execute:

```
RunManager --remote_energyplus /path/to/_energyplus.tar.gz --energyplus
/path/to/EnergyPlus/bin --outpath /path/to/put/output --workflow energyplus --input
/path/to/input.idf --showstatus --slurmhostname redmesa.nrel.gov --slurmusername
myusername
```