

Charm++ on HPC cluster:

What is Charm++?

Charm++ is a parallel programming framework enhanced by its adaptive runtime system which allows users to run programs portably from personal multicore computers to large supercomputers.

Charm++ is designed to help write parallel programs without having to deal with low level processes and threads. With its object-oriented design, user can leave all the management to charm++ runtime system and focus on productivity.

HPC users are encouraged to use parallel programming interfaces to scale up their code to cluster environment without losing the ability to run on normal computers.

The full documentation with tutorials for Charm++ is found in the following links:

[Official Site](#)

[Tutorial](#)

Versions Available:

- Charm –v6.7.4

How to load a version of Charm++?

To load a version of Charm++ on the HPC, use the following command:

```
module load charm/6.7.4
```

Verify by using this command:

```
module list
```

It should list two dependencies, charm and MPI.

How to use Charm++ on the cluster?

To use charm, the user needs to write a program using charm++ framework and have all source code. To compile the program, users can load the charm module on the cluster and compile their program using **charm** executable.

For this demonstration, use the following [example file](#) from charm++ website.

```
# Make a test folder
mkdir ~/test && cd ~/test

# Get the tutorial tarball
wget --no-check-certificate
https://charmplusplus.org/tutorial/examples/ArrayHelloWorld.tar.gz

# Unzip the tarball
tar -xvf ArrayHelloWorld.tar.gz
```

Load the module and go to the extracted directory named ArrayHelloWorld. For this example, a make file is already included, and the user needs to put the charm install path to the Makefile.

```
# Use any test editor to edit makefile
gedit Makefile

#Replace the first line with
```

```
CHARMDIR = /share/apps/charm/6.7.0
```

```
# Now compile using make command  
make
```

Two executables should be compiled in the directory- **charmrun** and **hello**, run the program using the following command,

```
# Template  
./charmrun +p<no of processor to use> ./hello <no of hello world  
execution>  
  
# Run command for 32 processors and 32 function execution  
./charmrun +p32 ./hello 32
```

Where to find help?

If you are stuck on some part or need help at any point, please contact OIT at the following address.

<https://ua-app01.ua.edu/researchComputingPortal/public/oitHelp>