SR8000 – Programming Models on SR 8000

Programming–Models	Hitachi supports several programming models
	Compas–MPI
	OpenMP–MPI
	MPI–MPI
	Compas
	OpenMP
	Scalar
	ION

For details see
http://www.hlrs.de

MPI + Compas	Each 8–CPU SMP node is used as one MPI process. Inside of each MPI process, pseudo–vectorization (Compas) with the Fortran or C compiler is used.	
	Compile	**mpi**f90 –OSS –parallel
		mpicc –Os –parallel
	Batch	qsub –q multi –N #nodes *jobscript* ***with:*** **mpiexec** –N $NODES –n $NODES *my_appl my_options*
	Interact.	**mpiexec** –p multi –N #nodes –n #nodes *my_appl my_options*

MPI + OpenMP	Each 8–CPU SMP node is used as one MPI process. Inside of each MPI process, the process is parallelized into eight threads with OpenMP.	
	Compile	**mpi**f90 –OSS –parallel **–omp**
		mpicc –Os –parallel **–omp**
	Batch	qsub –q multi –N #nodes *jobscript* ***with:*** **mpiexec** –N $NODES –n $NODES *my_appl my_options*
	Interact.	**mpiexec** –p multi –N #nodes –n #nodes *my_appl my_options*

MPI-MPP	Massively Parallel Processing MPI: Each CPU is used for one MPI process, i.e., on each SMP node with 8 CPUs, up to 8 MPI processes can run.	
	Compile	**mpi**f90 -OSS -**no**parallel
		mpicc -Os -**no**parallel
	Batch	qsub -q multi -N #nodes *jobscript* ***with:*** **mpiexec** -N $NODES -n $**PROCESSES** *my_appl my_options*
	Interact.	**mpiexec** -p multi -N #nodes -n #**processes** *my_appl my_options*

Compas	The application has only one process on one node and it is parallelized by using the 8 CPUs of the node via the Compas pseude-vectorization:	
	Compile	f90 -OSS -parallel
		cc -Os -parallel
	Batch	qsub -q single -N 1 *jobscript* ***with:*** **prun** *my_appl my_options*
	Interact.	**prun** -p single *my_appl my_options*

OpenMP	The application has only one process on one node and it is parallelized by using the 8 threads on the 8 CPUs of the node via the OpenMP compilation flag.	
	Compile	f90 -OSS -parallel **-omp**
		cc -Os -parallel **-omp**
	Batch	qsub -q single -N 1 *jobscript* ***with:*** **prun** *my_appl my_options*
	Interact.	**prun** -p single *my_appl my_options*

Scalar	The application has only one process with a single thread on one CPU of a node.	
	Compile	f90 -OSS -**no**parallel
		cc -Os -**no**parallel
	Batch	qsub -q scalar -N #nodes *jobscript* ***with:*** **hrexec** *my_appl my_options*
	Interact.	**hrexec** -p scalar *my_appl my_options*

<table>
<tr><td rowspan="4"><u>ION</u></td><td colspan="2">The default model used for all commands, like ls, vi, ...</td></tr>
<tr><td rowspan="2">Compile</td><td>f90 -OSS -noparallel</td></tr>
<tr><td>cc -Os -noparallel</td></tr>
<tr><td>Execute</td><td>just start it: my_appl my_options</td></tr>
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