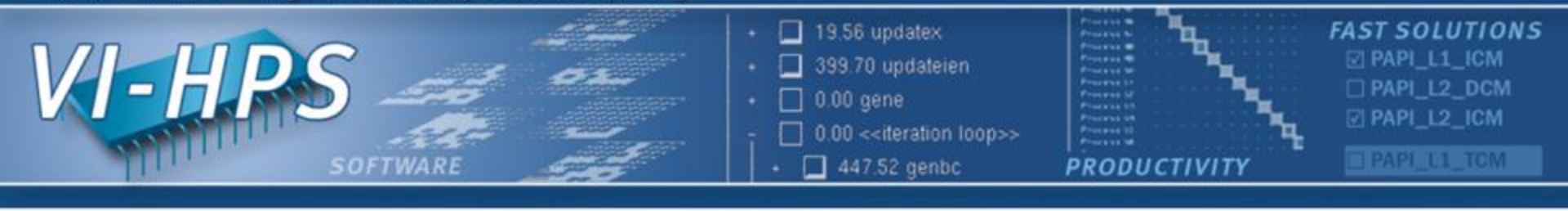

Periscope

Score-P Online Access Tutorial Exercise

NPB-MZ-MPI/BT

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Exercise Overview

Installation Checklist

Benchmark Instrumentation

Periscope Online Analysis

Performance Properties Exploration

Installation Checklist

- Confirm that the configuration file `.periscope` is in the home directory. Copy it if missing:

```
% cp $PERISCOPE_ROOT/etc/periscope.sample $HOME/.periscope
```

- It should look like:

```
MACHINE = localhost
SITE = LiveDVD
REGSERVICE_HOST = localhost
REGSERVICE_PORT = 50027
REGSERVICE_HOST_INIT = localhost
REGSERVICE_PORT_INIT = 50001
APPL_BASEPORT = 51000
AGENT_BASEPORT = 50002
```

- Load Periscope and Score-P modules:

```
% module use /lrz/sys/smuc_tools/modules
% module load UNITE
% module load periscope
% module load scorep
```

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Benchmark Instrumentation

- Change directory to the prepared NPB3.3 folder:

```
% cd $HOME/tutorial/NPB3.3-MZ-MPI
```

- Open the make configuration file with an editor:

```
% vi config/make.def
```

- Uncomment the MPIF77 definition for Score-P:

```
# Alternative variants to perform instrumentation
#MPIF77 = psc_instrument mpif77
#MPIF77 = scalasca -instrument mpif77
#MPIF77 = tau_f90.sh
#MPIF77 = vtf77 -vt:hyb -vt:f77 mpif77
MPIF77 = scorep --user mpif77
```

- Open the BT-MZ Makefile with an editor:

```
% vi BT-MZ/Makefile
```

- Comment out the MAIN definitions that are not for Score-P:

```
#MAIN = bt_epik
MAIN = bt_scorep
#MAIN = bt
```

Benchmark Instrumentation

- Take note of the Score-P Online Access phase definition in the prepared BT benchmark. Open the file `BT-MZ/bt_scorep.F` and move to line 219:

```
         if (mod(step, 20) .eq. 0 .or. step .eq. 1) then
            if (myid .eq. root) write(6, 200) step
            if (myid .eq. root) call flush(6)
 200        format(' Time step ', i4)
         endif

         SCOREP_USER_OA_PHASE_BEGIN(OA_Phase,"OA_Phase",SCOREP_USER_REGION_TYPE_COMMON)
```

- Make sure that the suite file defines the correct benchmark to build:

```
% cat config/suite.def
<comments>
bt-mz    B         4
```

- Build the benchmark:

```
% make bt-mz CLASS=B NPROCS=4
```

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Periscope Online Analysis

- Periscope is started via its frontend. It automatically starts application and hierarchy of analysis agents.
- Run `psc_frontend --help` for brief usage information

```
% psc_frontend --help
Usage: psc_frontend <options>
  [--help]                 (displays this help message)
  [--quiet]                (do not display debug messages)
  [--registry=host:port]   (address of the registry service, optional)
  [--port=n]               (local port number, optional)
  [--maxfan=n]             (max. number of child agents, default=4)
  [--timeout=secs]         (timeout for startup of agent hierarchy)
  [--delay=n]                (search delay in phase executions)
  [--appname=name]
  [--apprun=commandline]
  [--mpinumprocs=number of MPI processes]
  [--ompnumthreads=number of OpenMP threads]
…
  [--strategy=name]
  [--sir=name]
  [--phase=(FileID,RFL)]
  [--debug=level]
```

Periscope Online Analysis

- Change to the `bin.scorep` directory:

```
% cd bin.scorep
```

- Run Periscope by executing `psc_frontend` with the following command and options:

```
% psc_frontend --apprun=./bt-mz_B.4 --strategy=OMP
--mpinumprocs=4 --ompnumthreads=4 --phase="OA_phase"

[psc_frontend][DBG0:fe] Agent network UP and RUNNING. Starting search.

 NAS Parallel Benchmarks 3.3 -- BT Benchmark
 [...]
 Time step 200
 BT Benchmark Completed.

----------
End Periscope run! Search took 60.5 seconds (33.3 seconds for startup)
```

Exercise Overview

Installation Checklist

Program Instrumentation

Periscope Online Analysis

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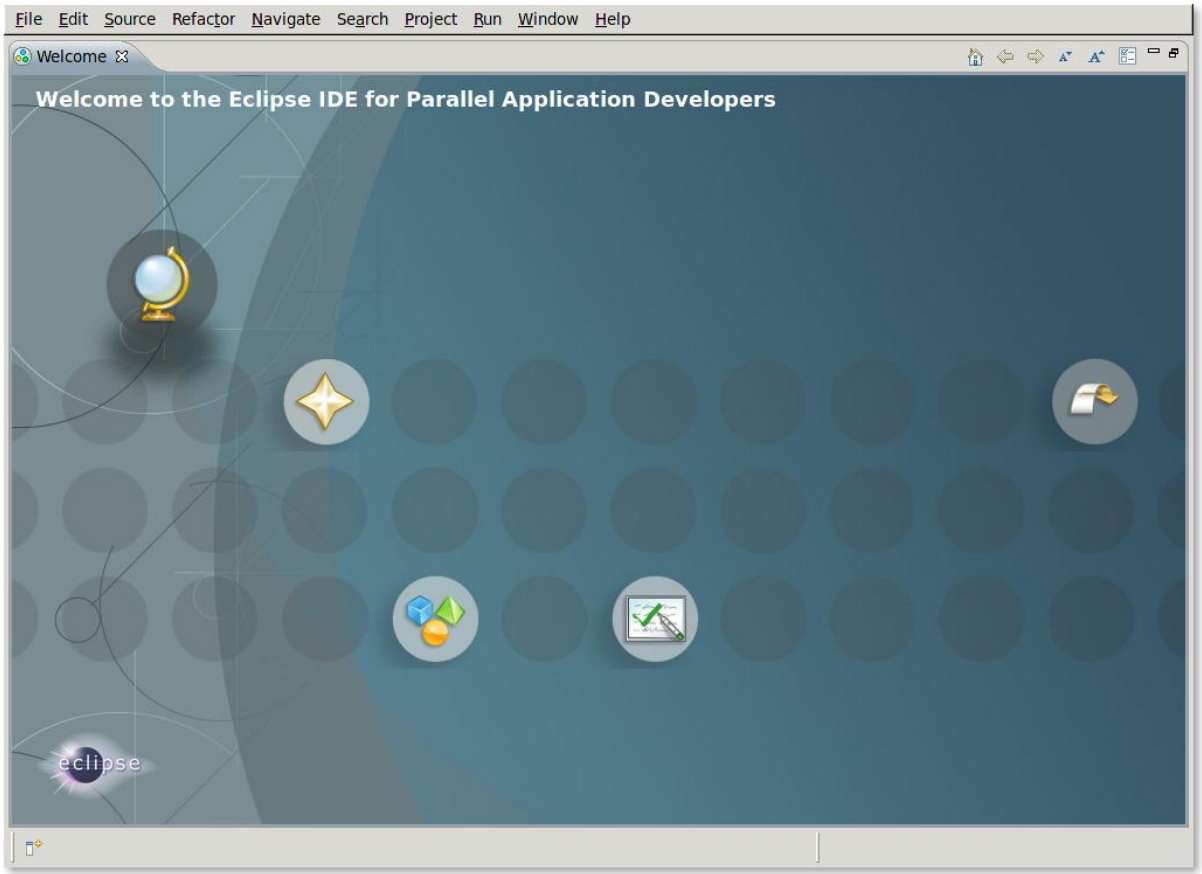
Starting Periscope GUI

- Start `Eclipse` with Periscope GUI from console

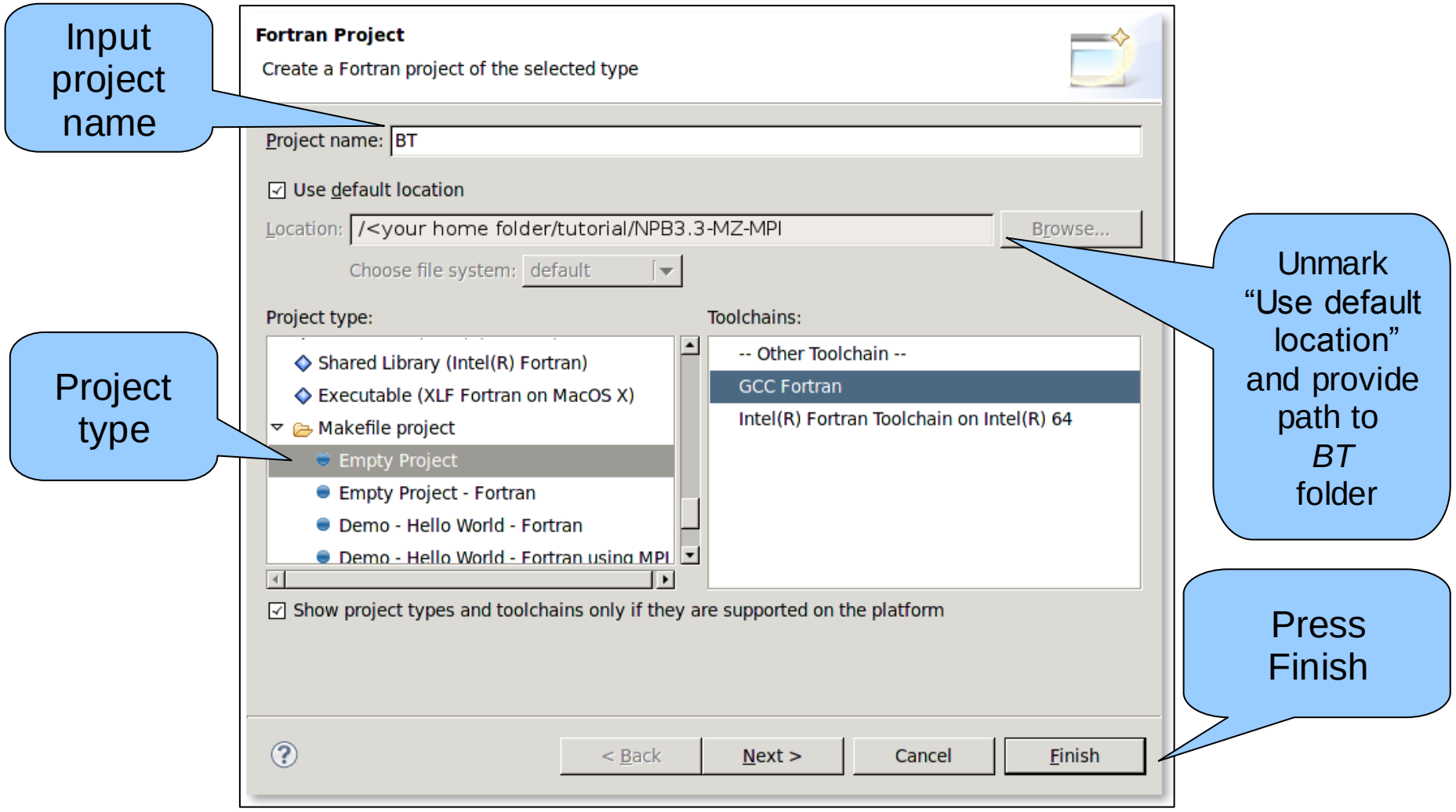
```
% module load eclipse/3.7.2-psc-gui
% eclipse
```

- Or by double-click on Eclipse pictogram on the Desktop



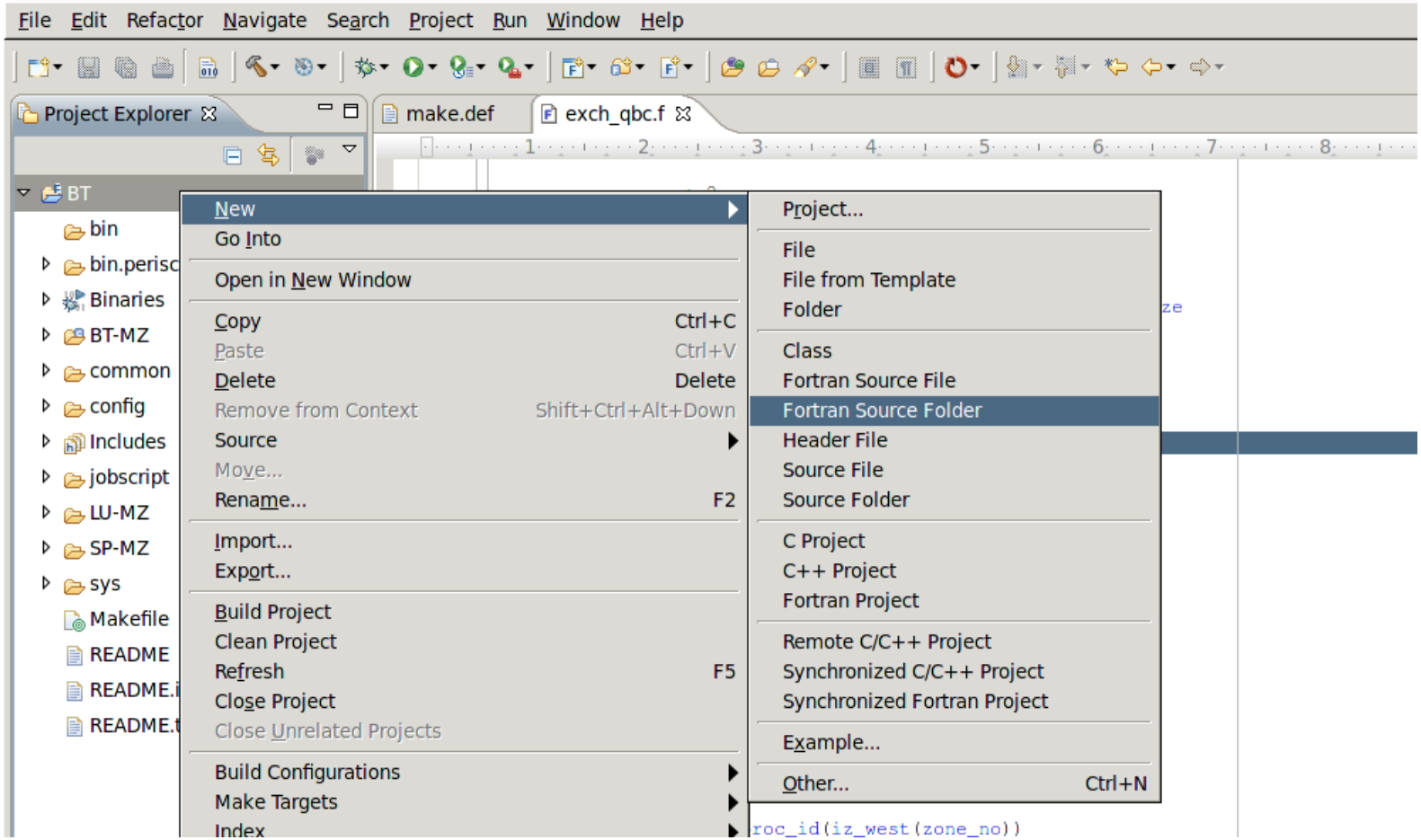
Creating Fortran Project

- File->New->Project... → Fortran->Fortran Project



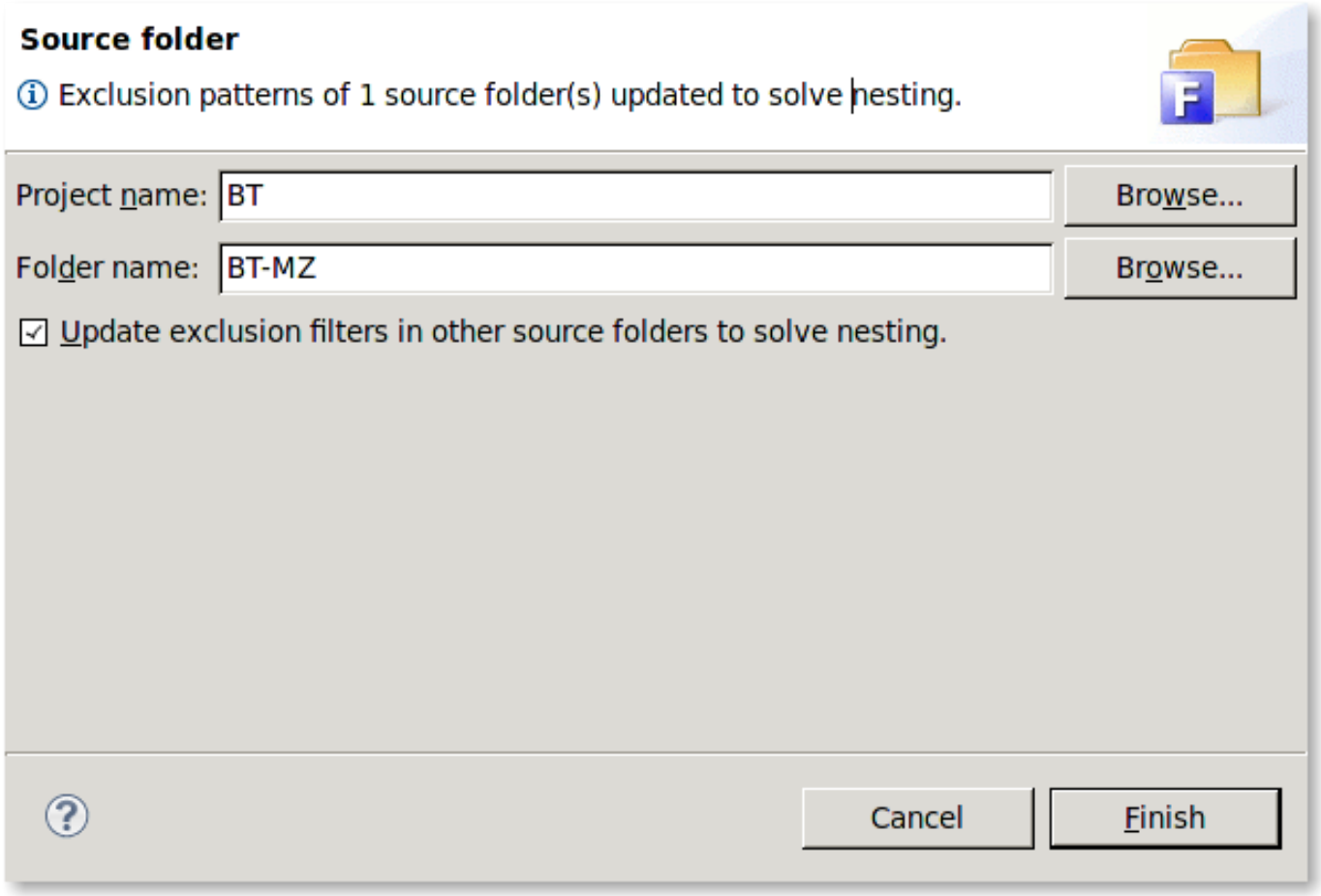
Add BT-MZ as a Source Folder

- Right-click -> File-> New -> Fortran Source Folder

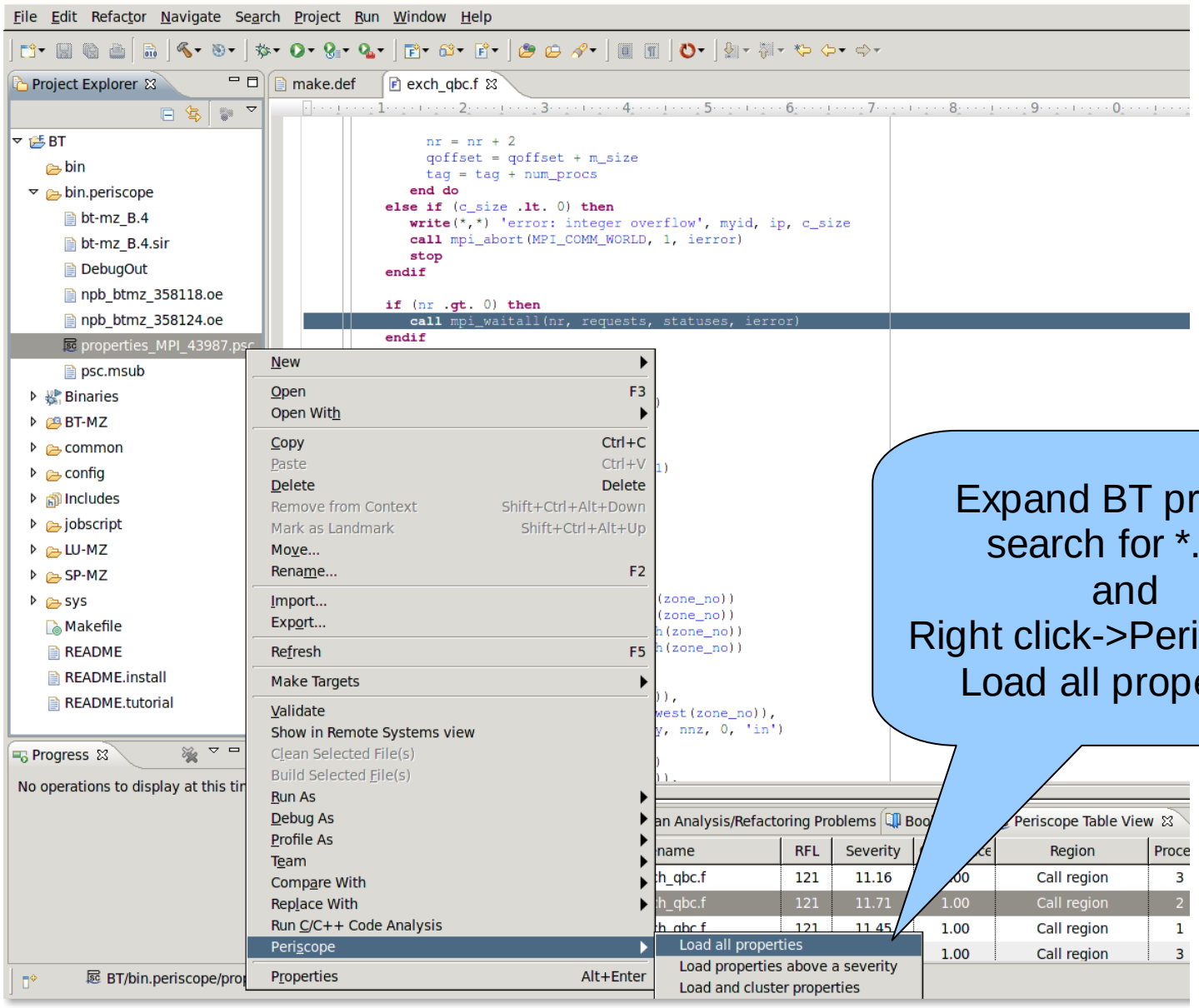


Add BT-MZ as a Source Folder

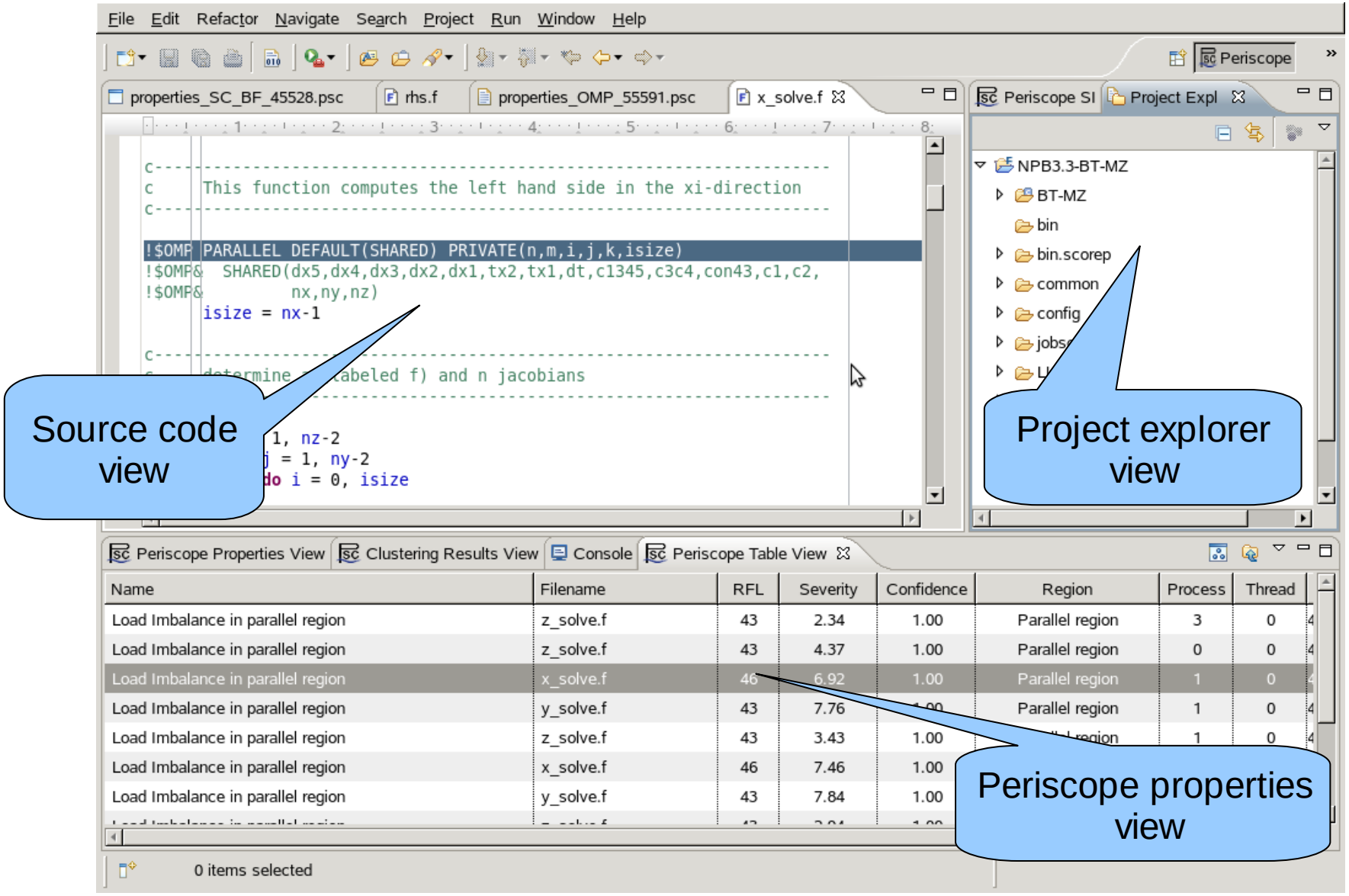
- Choose BT-MZ as a source folder



Loading properties



Periscope GUI

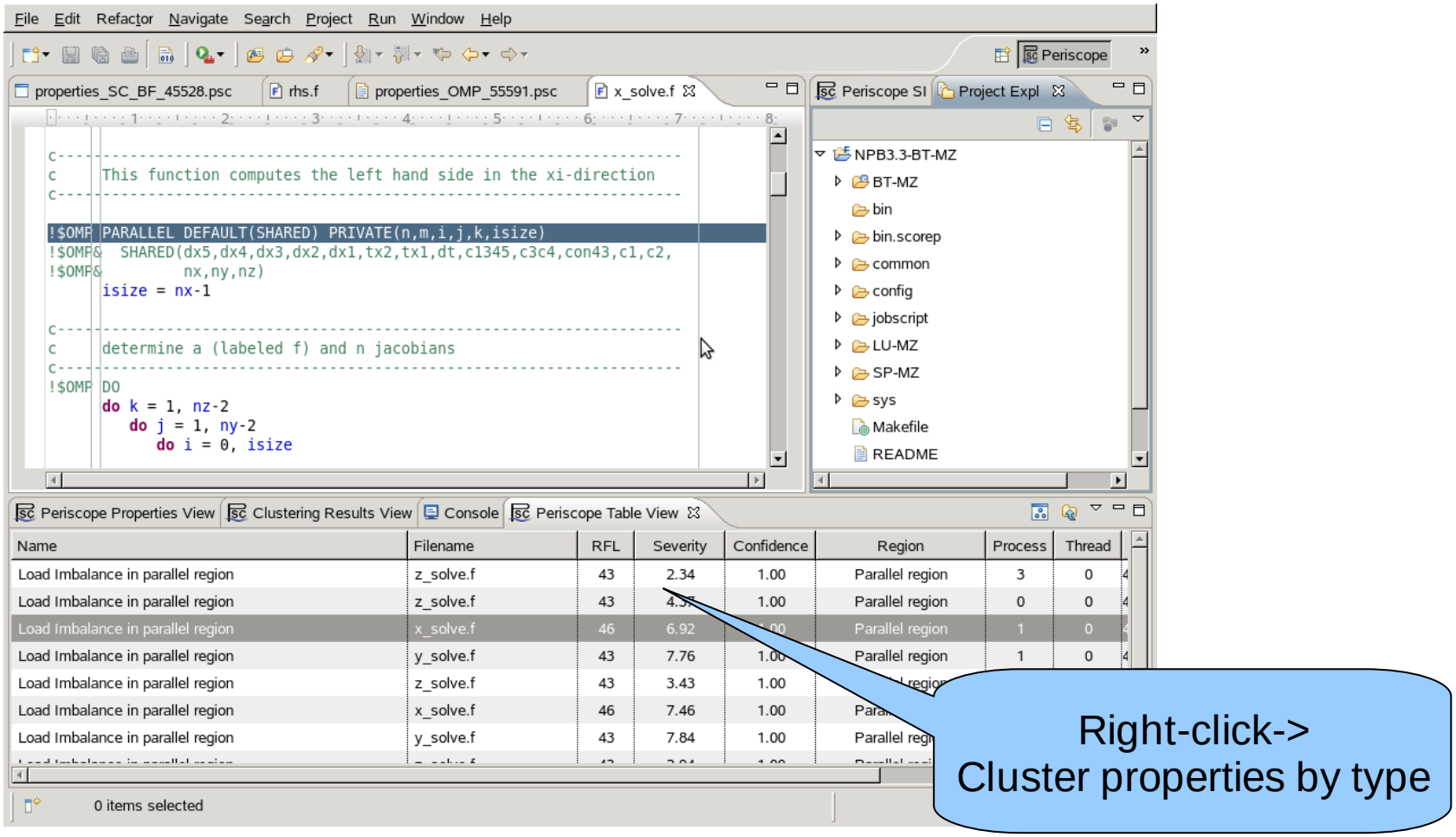


Periscope GUI report exploration features

- Multi-functional table is used in the GUI for Eclipse for the visualization of bottlenecks
  - Multiple criteria sorting algorithm
  - Complex categorization utility
  - Searching engine using Regular Expressions
  - Filtering operations
  - Direct navigation from the bottlenecks to their precise source location using the default IDE editor for that source file type (e.g. CDT/Photran editor).

Properties clustering

- Clustering can effectively summarize displayed properties and identify a similar performance behaviour possibly hidden in the large amount of data



Properties clustering