Star-P:
The high level HPC language

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Parallel MATLABs

- CMTM
- DP-Toolbox
- MatlabMPI
- MATmarks
- MPITB/PVMTB
- MultiMATLAB
- Parallel Toolbox for MATLAB

- DistributePP
- MATLAB Parallelization Toolkit
- MULTI Toolbox
- Paralize
- Parmatlab
- Plab
- PMI

- Dlab
- Paramat
- PLAPACK
- Matpar
- MATLAB*P
- Netsolve

- CONLAB Compiler
- FALCON
- MATCH
- Menhir
- Otter
- ParAL
- RTExpress
Parallel MATLABs

Cornell
Rostock, Germany
Lincoln Labs
UIUC
Granada, Spain
Cornell
Wake Forest

WUStL
Linkopings, Sweden
Purdue
Chalmers, Sweden
Northeastern
TUDenmark
Lucent

UIUC
Alpha Data UK
UTAustin
JPL
MIT
UTK

Umea, Sweden
UIUC
Accelchip
IRISA, France
OSU
Sydney, Australia
ISI
Parallel MATLABs

CMTM
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Parallel Toolbox for MATLAB

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Parmatlab
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Netsolve

CONLAB Compiler
FALCON
MATCH
Menhir
Otter
ParAL
RTExpress
Star-P & SGI

Star-P
- MATLAB expertise
- Expertise in HPC
- High Productivity Focus
- Solution Oriented

SGI
- Best scalable systems
- Linux/Intel direction
- Integration of computation, visualization, and large data sets
- Defense/industrial user focus

- Star-P lowers the entry barrier to HPC
- Star-P: the high level parallel computing language
Benchmark Case Study

Example: RT-STAP (radar) code

- RT-STAP (synthetic aperture radar benchmark code)
  - serial Matlab code modified for Star-P
  - run in parallel on Altix
  - 1850 lines of code (3 lines changed!)
  - scalability: 10 on 16 processors
## Benchmark Case Study

**FFTW**

<table>
<thead>
<tr>
<th></th>
<th>FFT1</th>
<th>FFT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=16000</td>
<td>3.0s</td>
<td>7.9s</td>
</tr>
<tr>
<td>n=32000</td>
<td>5.7s</td>
<td>26.7s</td>
</tr>
<tr>
<td>n=64000</td>
<td>17.7s</td>
<td>107.5s</td>
</tr>
</tbody>
</table>

**Serial MATLAB on beowulf**

n=4000 FFT1: 2.2048s FFT2: 14.3s
Structure of the System

Server #0

- PBlas
- FFTW
- Scalapack
- ...

Package Manager

Matrix 1

Matrix Manager

Matrix 2

Matrix 3

Client Manager

Server Manager

Server #1

Server #2

Server #3

Server #4

Proxy

Client

MATLAB