



# Project RUNTIME

## Efficient runtime systems for grids

<http://runtime.futurs.inria.fr/>

### Padico™

#### a Communication Framework for Grid

##### ■ Component-based communication framework

- Dynamically composable building blocks
- Flexible and extensible

##### ■ Configurable protocol stack

- "Best-effort" automatic selection for most cases
- User-configurable for complex topologies

##### ■ Enables all combinations

- Any middleware over any network

##### ■ Supports wide range of middleware systems

- CORBA: omniORB, MICO
- MPI: MPICH, YAMPII
- SOAP (gSOAP), DSM (Mome), HLA, JXTA, JVM, ...

##### ■ Supports grid networking technologies

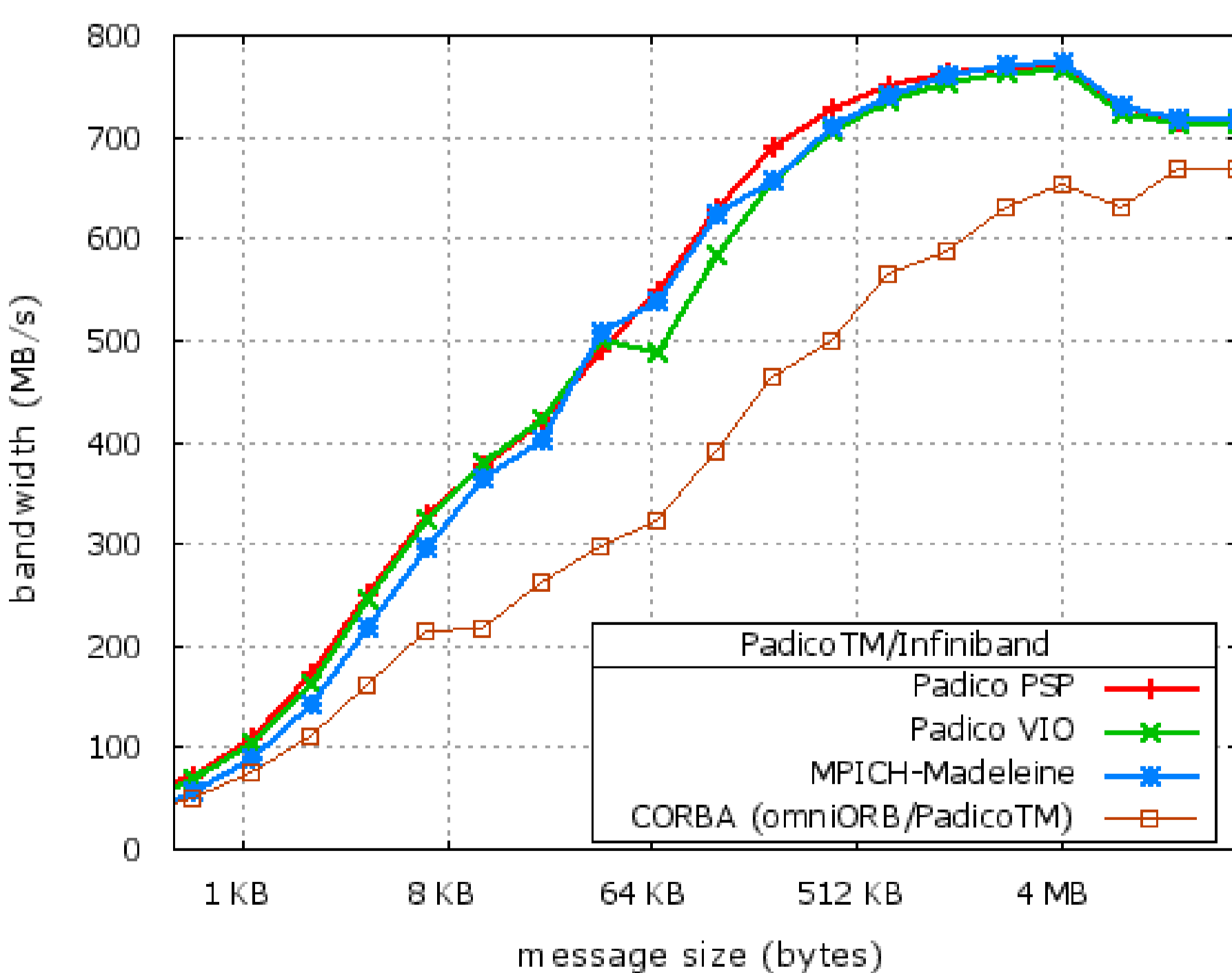
- High performance networks – through Madeleine: Myrinet, Quadrics QsNet, Infiniband, SCI
- Wide area networks – firewalls traversal, parallel streams, ...

##### ■ Usable through various API

- Virtual sockets – for legacy code
- Virtual Madeleine – for efficient MPICH-Madeleine over Padico™

##### ■ Pluggable communication methods

- Firewall traversal: TCP splicing, SSH tunnel
- Compression: ZIP, LZO, adaptive ZIP (AdOC)
- Parallel streams: for high bandwidth on WAN
- Security: TLS, SSL, SSH tunnel
- Message routing



##### ■ Software available

- Download software from:
- Padico™: <http://runtime.futurs.inria.fr/Padico™/>
- MPICH/Madeleine: <http://runtime.futurs.inria.fr/mpi/>

##### ■ High performance

- Reaches 96% of the hardware bandwidth on Myrinet, Infiniband, SCI or Quadrics
- Low latency : Infiniband < 7μs; Myrinet < 9μs.

### MPICH-Madeleine MPI for Clusters of Clusters

##### ■ MPI implementation for clusters of clusters

- Derived from MPICH
- Supports heterogeneous networks
- Multithreaded communication engine
- Very high performance
- Usable over Padico™ or directly over μPM2

##### ■ Supports grid networking technologies

- High performance networks through Madeleine : Myrinet, Quadrics QsNet, Infiniband, SCI
- Deployment tools tested over Grid'5000 allowing to run applications on multi-sites clusters

