

# 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**

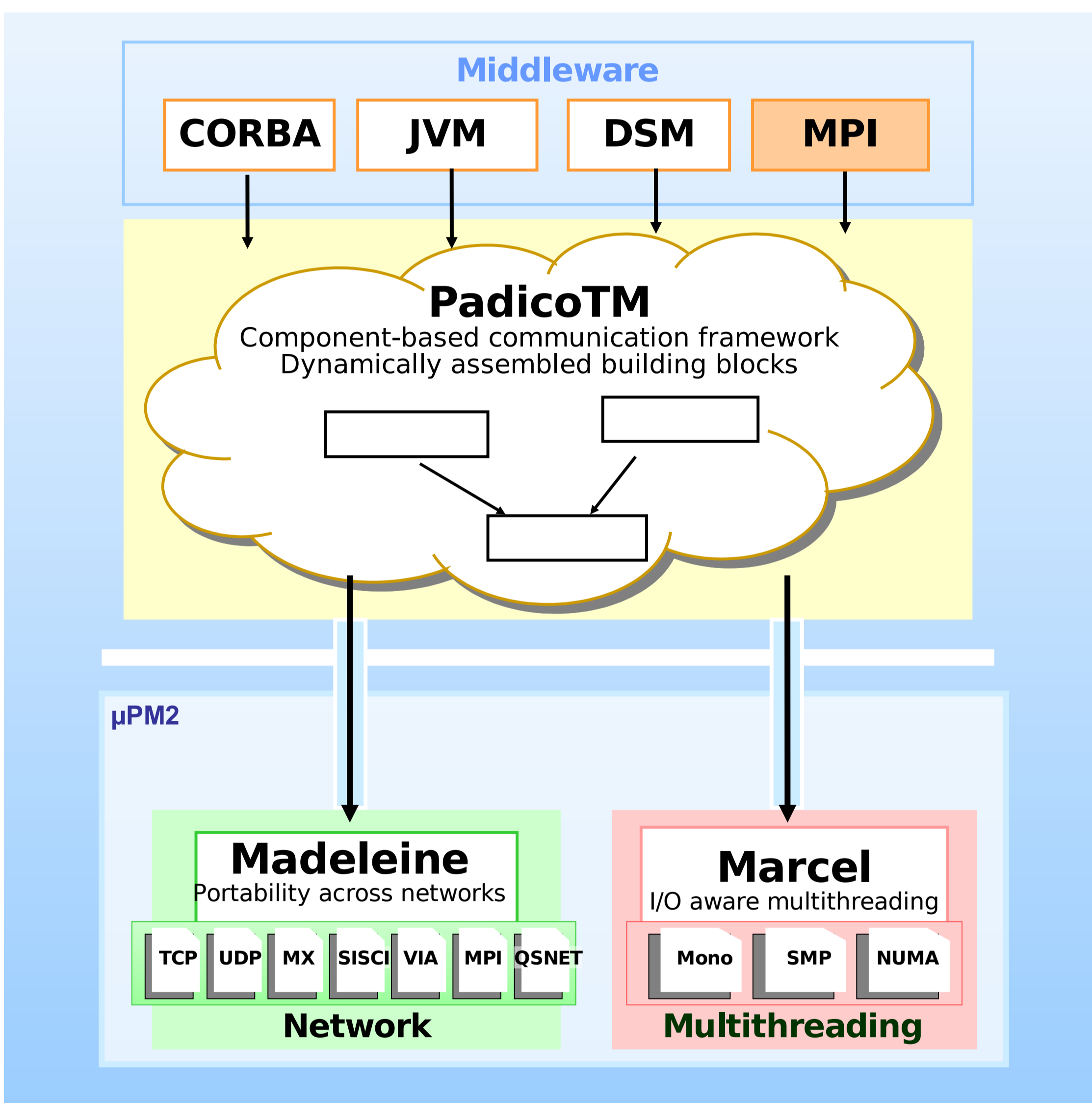
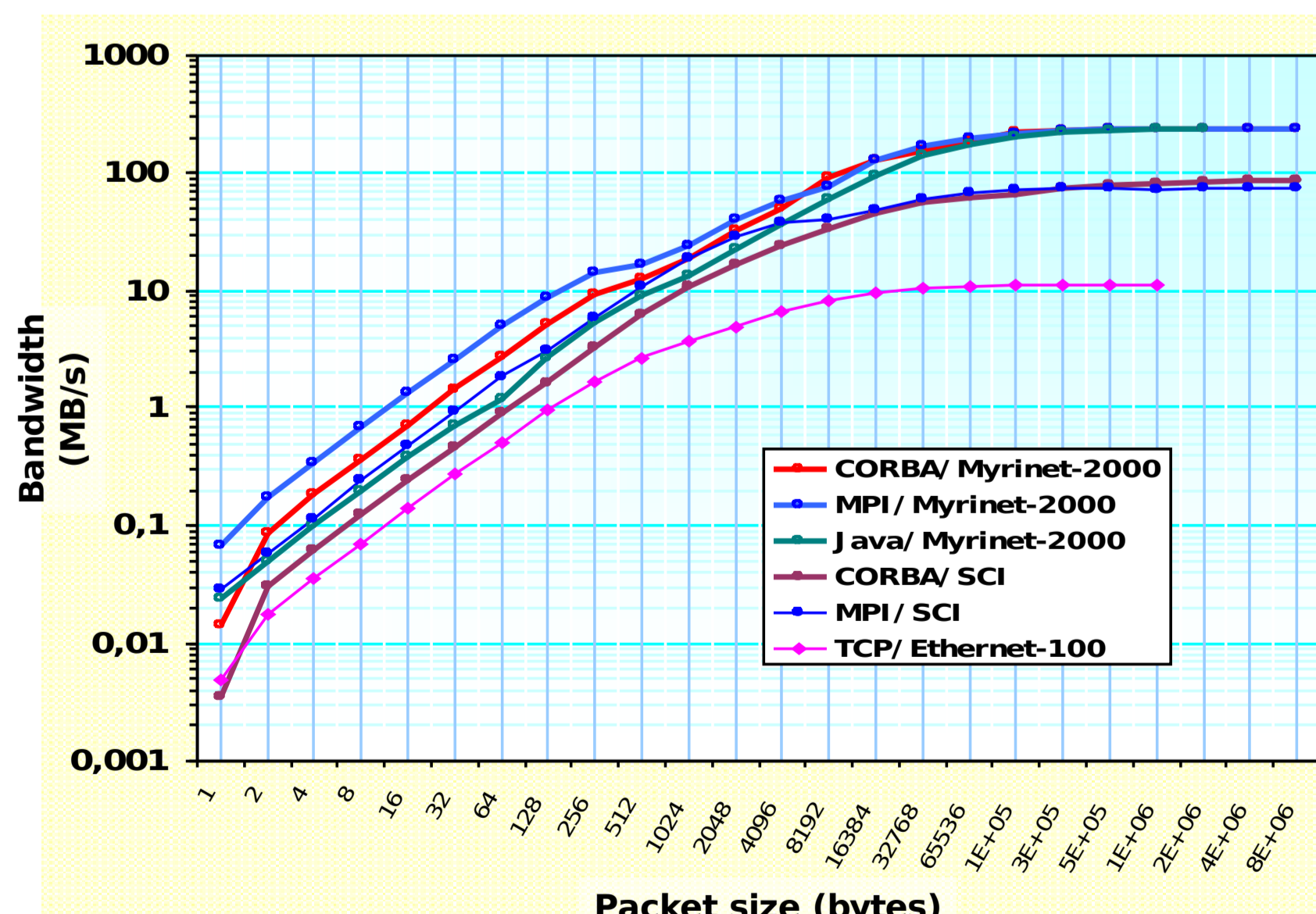
- High performance networks – through Madeleine: Myrinet, Quadrics QsNet, Infiniband, SCI
- Wide area networks – firewalls traversal, parallel streams, ...

**■ Usable through various API**

- Virtual sockets – for legacy code
- Virtual Madeleine – for efficient MPICH-Mad 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



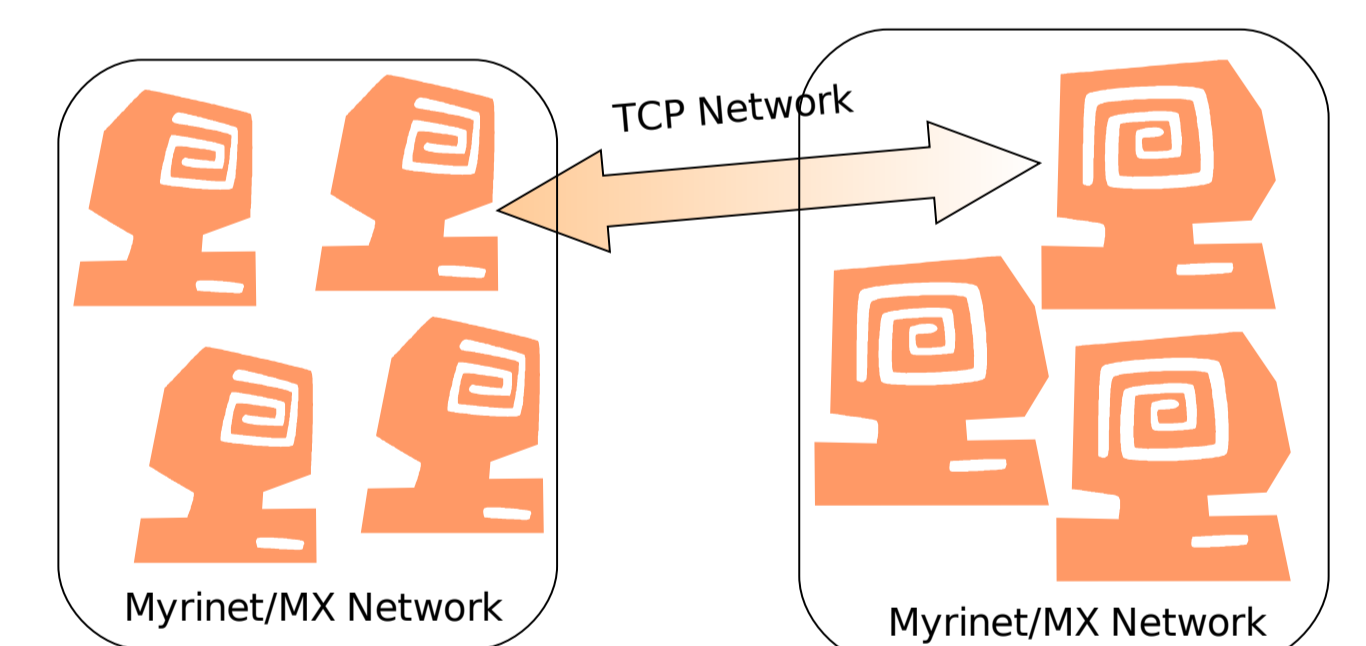
### MPICH/Madeleine MPI for Clusters of Clusters

**■ 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



**■ Software available**

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

**■ High performance**

- Reach 96% of the hardware bandwidth on Myrinet, Infiniband or Quadrics
- Bandwidth actually available for MPI and CORBA
- Low latency CORBA and MPI (< 9 usec.)

