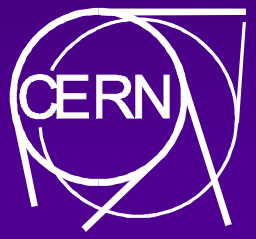


Message Oriented Middlewares (MOMs)

V.Baggiolini, M.Vanden Eynden

- MOM Concepts & Applications
- Microsoft MSMQ®
- Talarian SmartSockets® (old RTWorks)
- SoftWired iBus®
- Summary

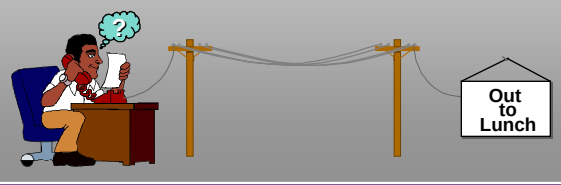
MOM Concepts & Applications

- A MOM is a Middleware that facilitates :
  - asynchronous,
  - point to multipoint,
  - non-blocking communications
- Examples : IBM MQSeries, Microsoft MSMQ, Talarian SmartSockets, iBus, ...

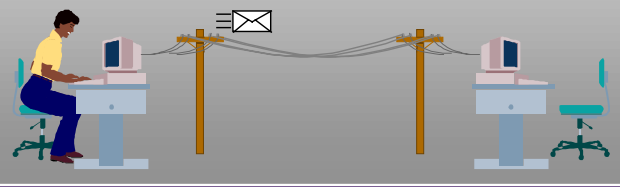
RPC

MOM

Telephone : Synchronous



E-mail : Asynchronous



MOM Concepts & Applications

Loose Coupling

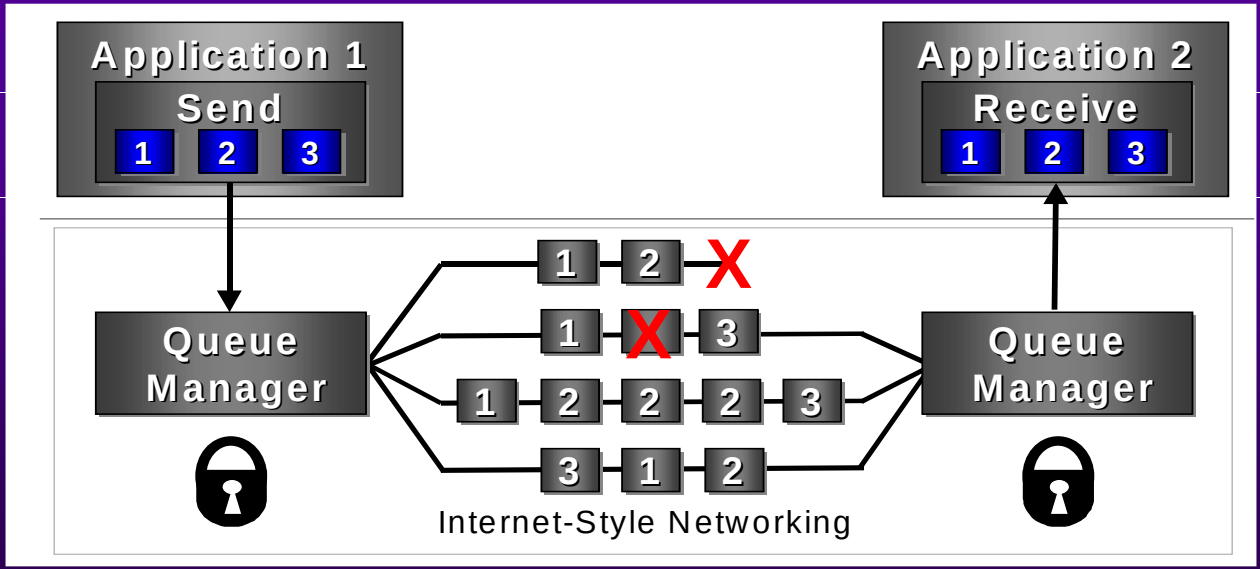
- Processes loosely coupled in time and location

Push Technology

- Applications send (Push) data asynchronously and move on to other work without waiting to connect to receiving applications.

Reliability

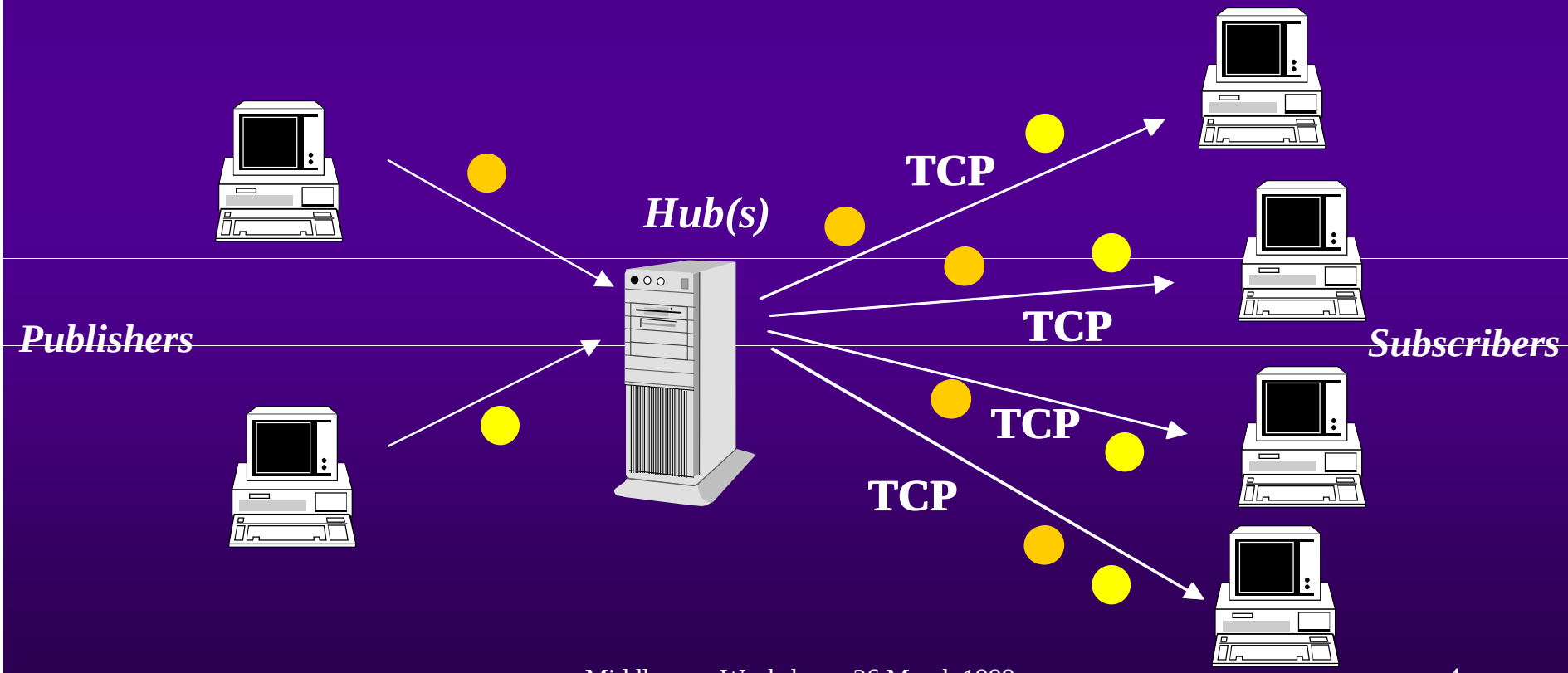
- Data must not be lost, reordered or duplicated



MOM Concepts & Applications

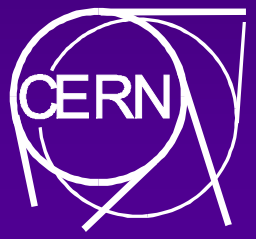
Publish/ Subscribe

- A service through which Applications can “publish” and “subscribe” to subjects



MOM Concepts & Applications

- **Typical Applications**
  - **For information diffusion**
    - Software timing distribution
    - “Page-1” information
    - Alarms
    - Messages from operators
    - Measurements from beam instrumentation
    - …
  - **For information federation**
    - Existing ST TDS System



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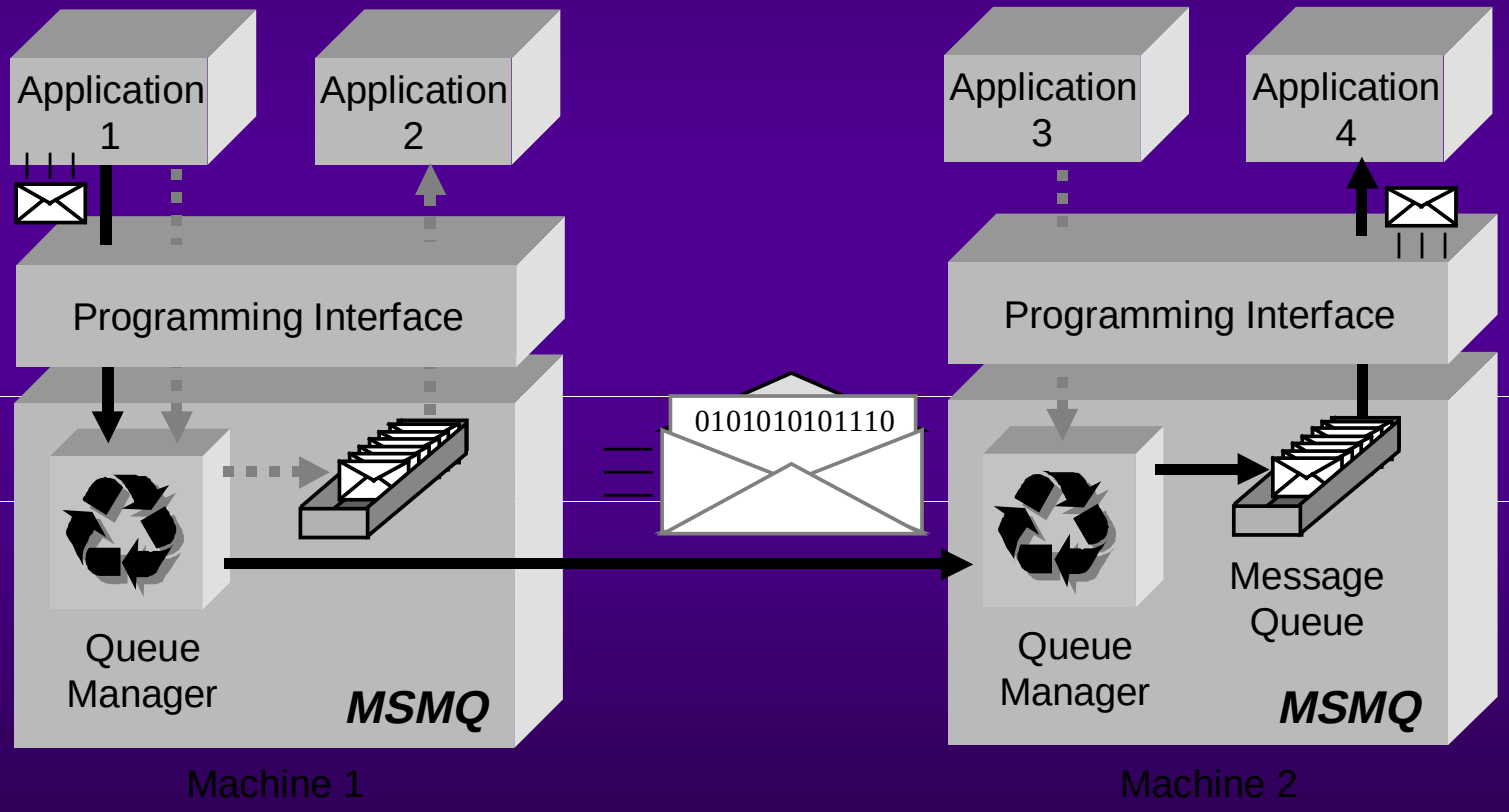
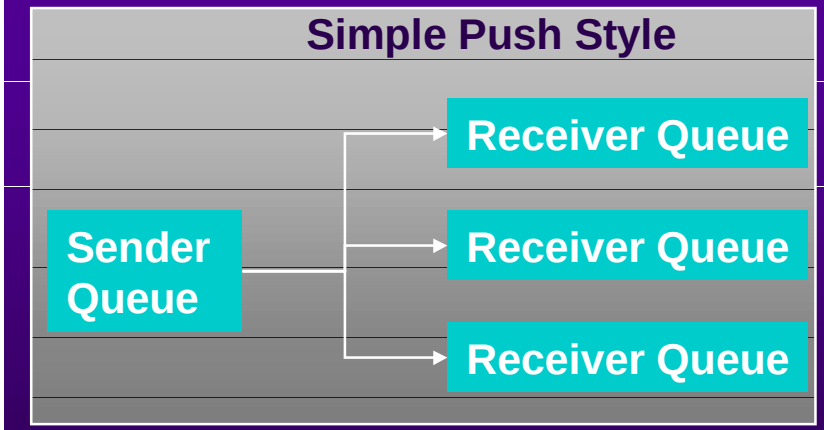
Microsoft MSMQ

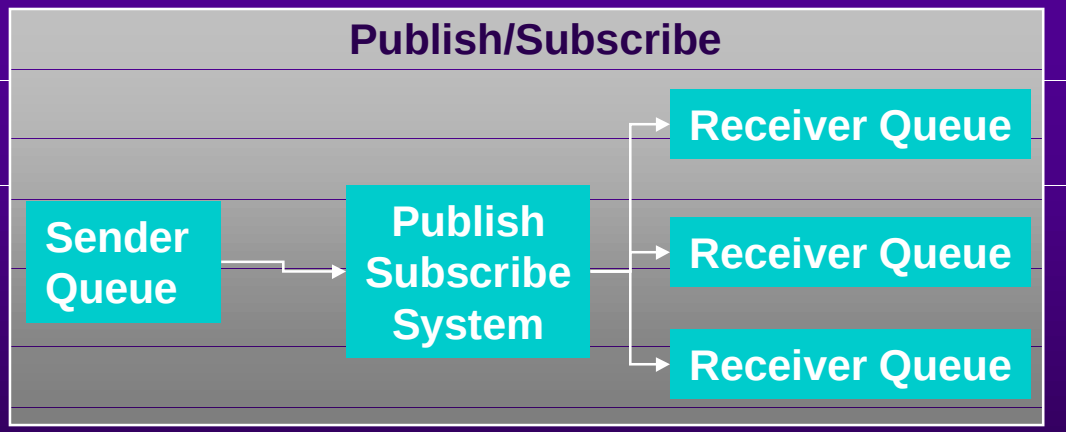
- **Key Idea**



Microsoft MSMQ Highlights

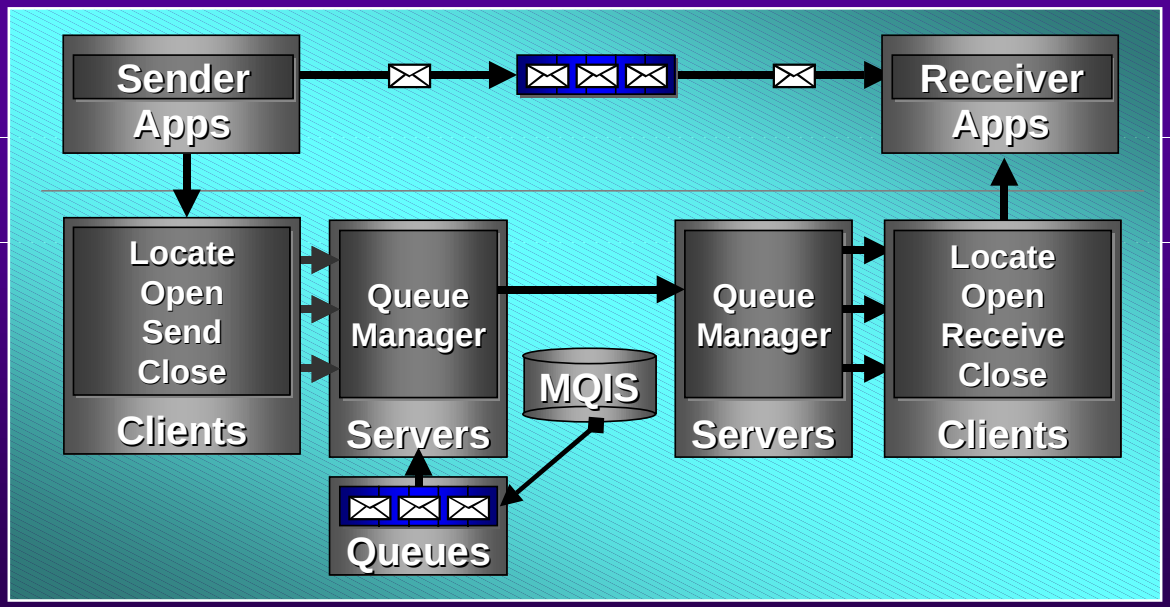
- Included in Windows NT Edition 4.0 or higher
- “Push style” communication
- Not yet built-in publish-subscribe mechanism





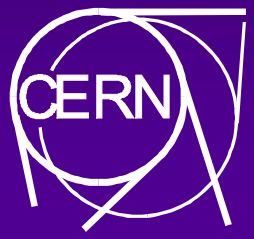
Microsoft MSMQ Highlights

- Narrow API (ActiveX Component for Visual Basic, Excel, Visual C++, Visual J++, ...)
- Information about queues stored in MQIS based on Microsoft SQL Server™ 6.5



Microsoft MSMQ Highlights

- Support for transactions (and rollback) via Microsoft Transaction Server (MTS)
- Messages can be delivered and processed according to priorities
- Supports IPX and TCP/IP protocols
- Bridge possible with UNIX platforms (FalconMQ component from Level 8 Systems)



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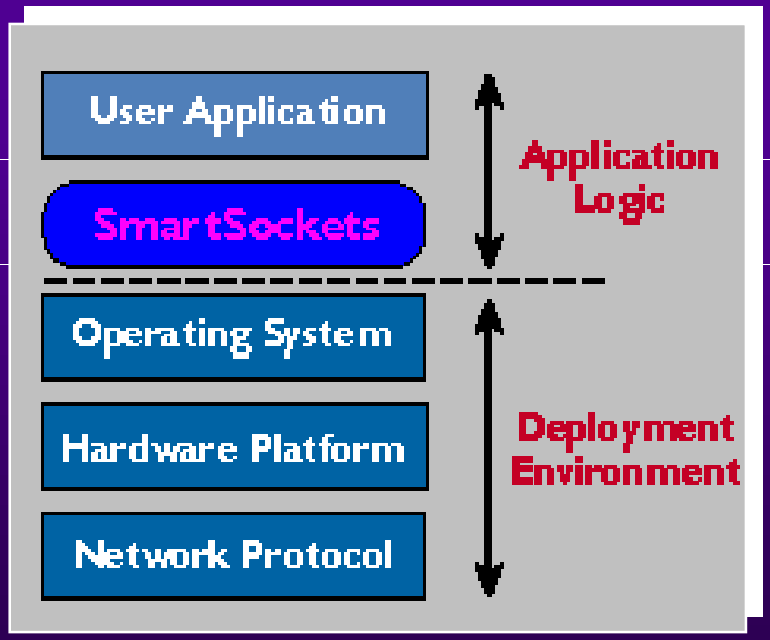
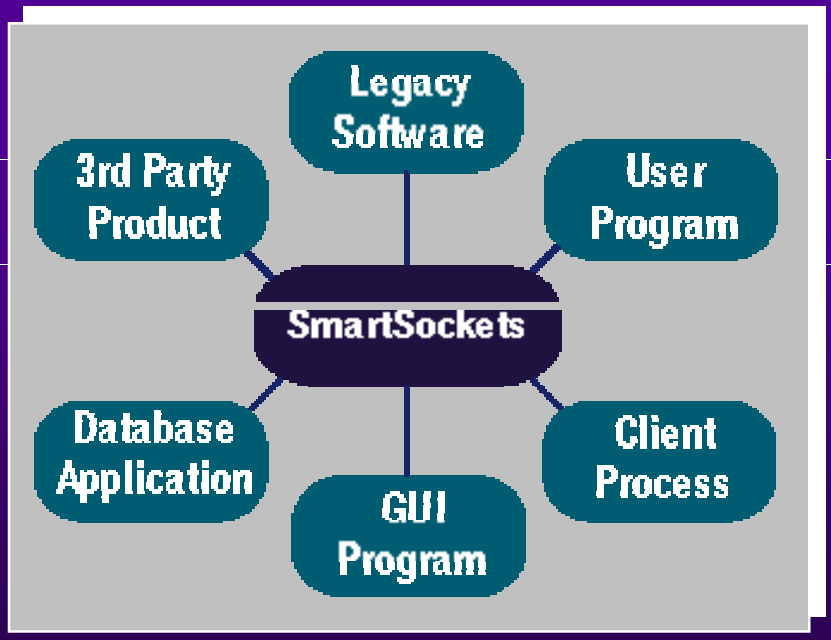
SmartSockets - What is it ?

Talarian Products

- A rapid application development toolkit
- Enables processes to communicate quickly and reliably across platforms, through the use of messages
- Guarantees delivery of messages
- Deals with recovery after system/network problems





SmartSockets Highlights

- Interoperability between Platforms (UNIX, WindowsXX)
- High Speed Binary Message Routing
- Asynchronous Message Transfer
- Publish-Subscribe Services
  - client processes publish and subscribe to a subject (with wildcards)
  - A many-to-many virtual connection between client processes
- Multiple RTServers
  - In charge of enabling Publish-subscription services
  - Backup processes can be receiving the same message as the primary process all along, and be ready to take over instantly if the primary process fails
- Prioritized Message Queues

SmartSockets Highlights

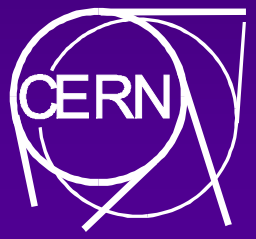
- **Flow Control**
  - **Buffering capability for supporting variable traffic rates**
- **Guaranteed Message Delivery**
- **Peer-to-Peer Communication is possible**
- **Re-usable Extensible Message Types (> 100)**
- **Logging and Debugging tools**
- **Other SmartSockets Modules**
  - **Rtdaq, RTie, RTarchive, RTplayback, Rthci**
- **Software Development Kit (SDK)**
  - C/C++ API
  - Java API (classes) supporting **serialization** (objects in messages)
  - ActiveX support (seamless integration in Excel , …)

SmartSockets Highlights

- **Supported Platforms & Operating Systems**

Platform	*Operating System*
Intel	Windows NT
Intel	Windows 95
Sun SPARC	Solaris
Sun SPARC	SunOS
IBM RS/6000	AIX
IBM S/390	OS/390*
HP 9000	HP-UX
SGI IRIS	IRIX
DEC Alpha	Dec UNIX
DEC Alpha	OpenVMS
DEC VAX	OpenVMS

- No support for RT UNIX (LynxOS, VxWorks, …)



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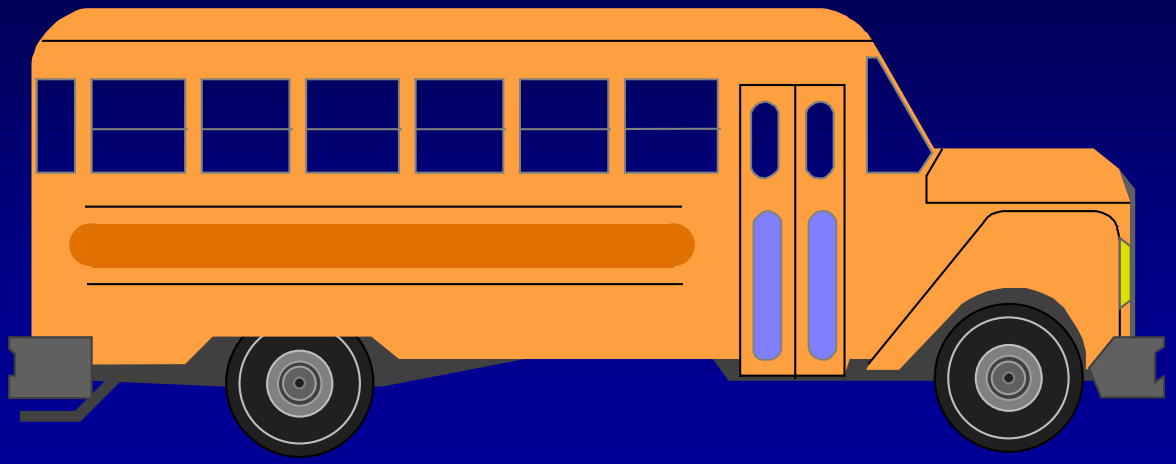


iBus
Multicast Software Bus

Dr. Silvano Maffeis

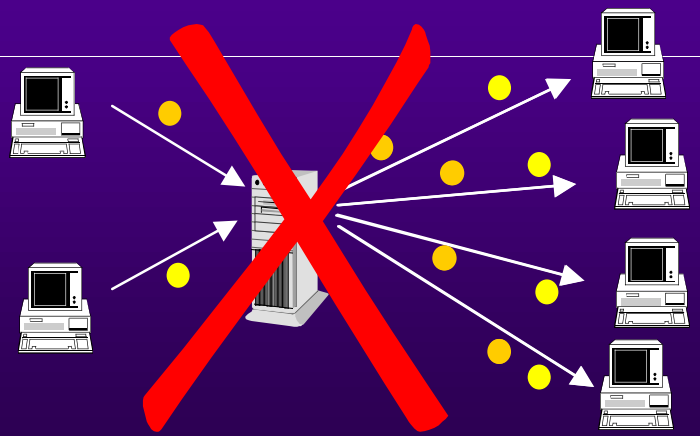
SoftWired AG, Zürich

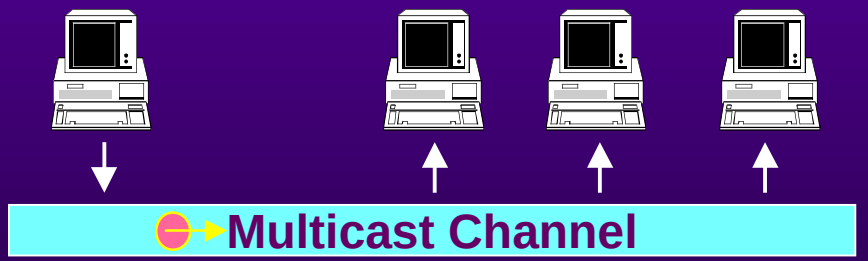
maffeis@softwired-inc.com

http://www.softwired-inc.com/

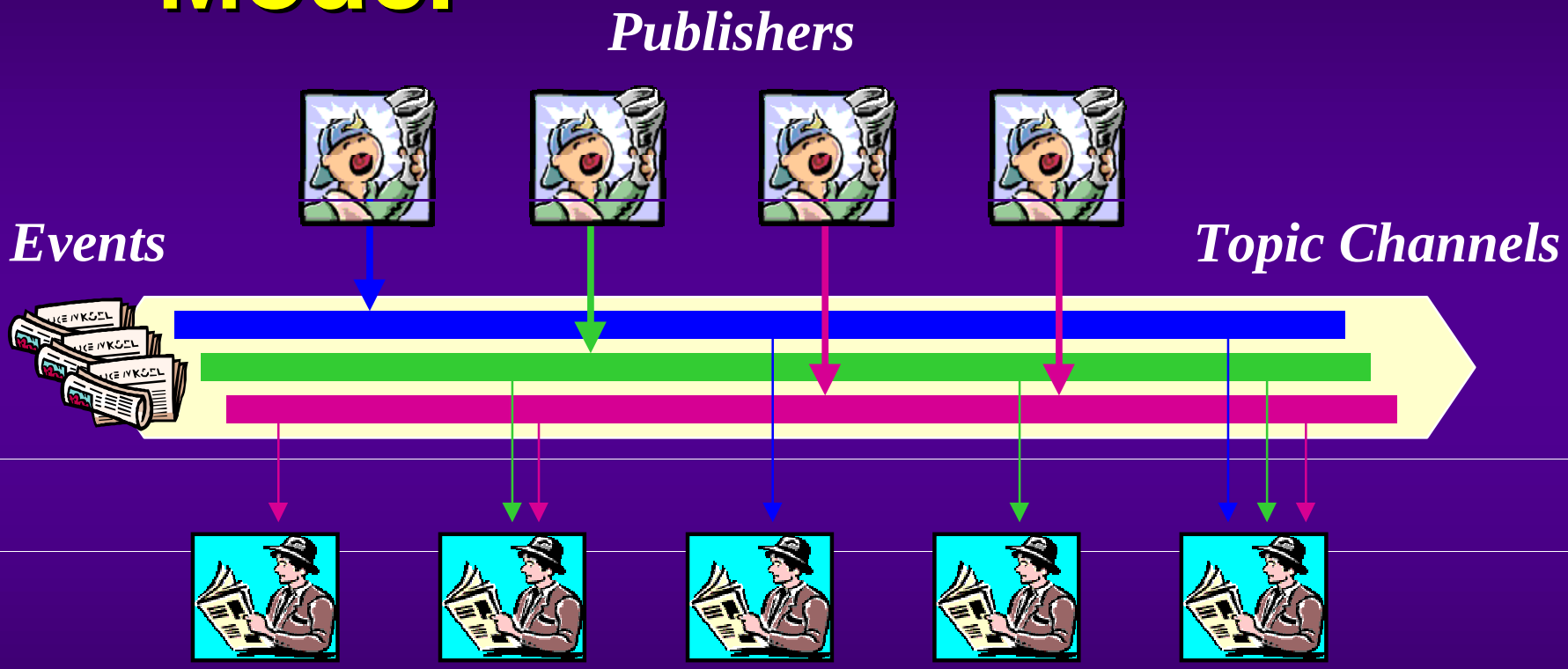
What is a Software Bus

- Message-Oriented Middleware
- Much like a Hardware Bus, but in Software
- Diffusion, not Store-and Forward
  - No Centralized Queues
  - Uses IP Multicast (not TCP)





Publish/Subscribe Model

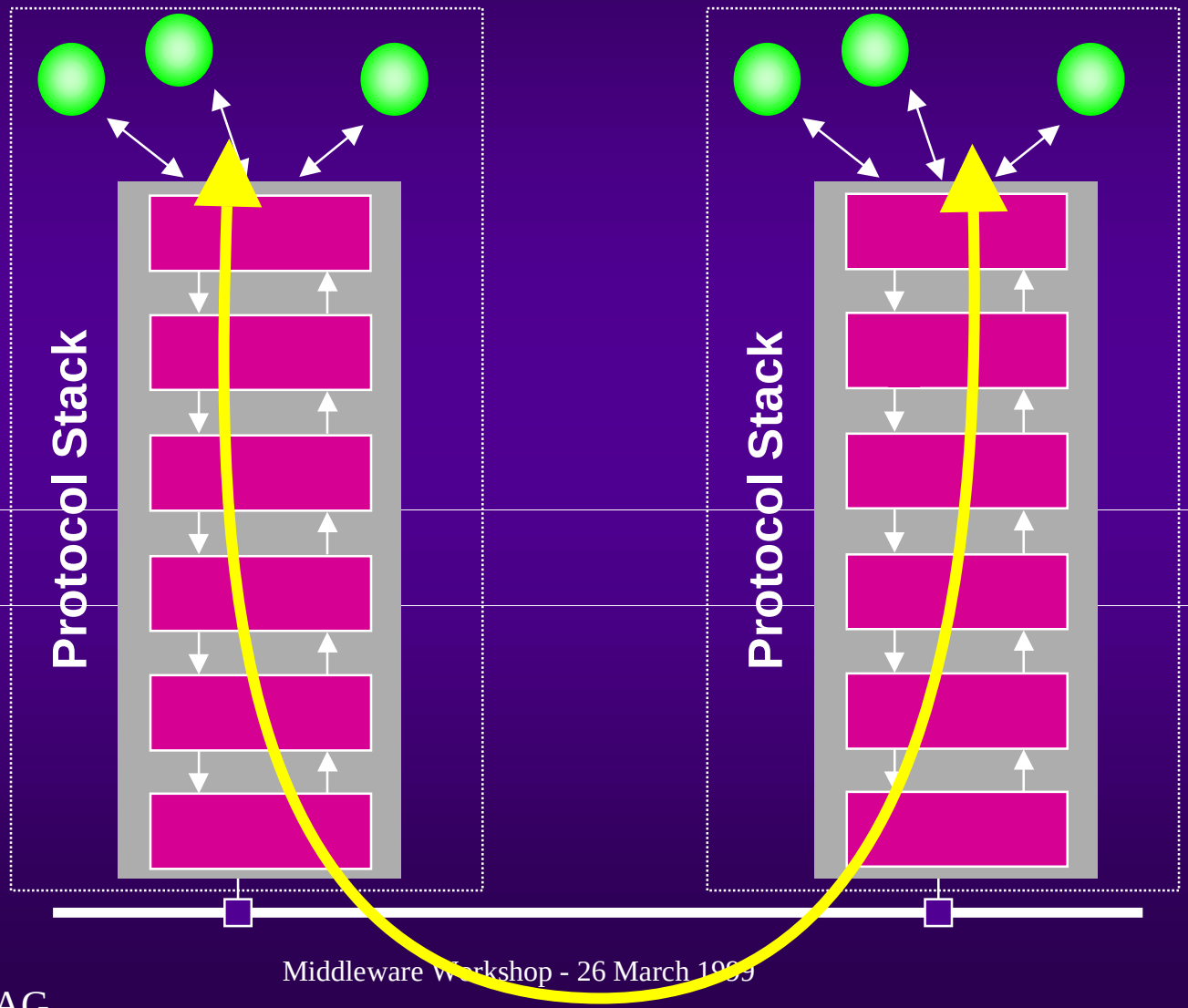


Publishers and subscribers do not have to know each other!

iBus from Softwired Inc.

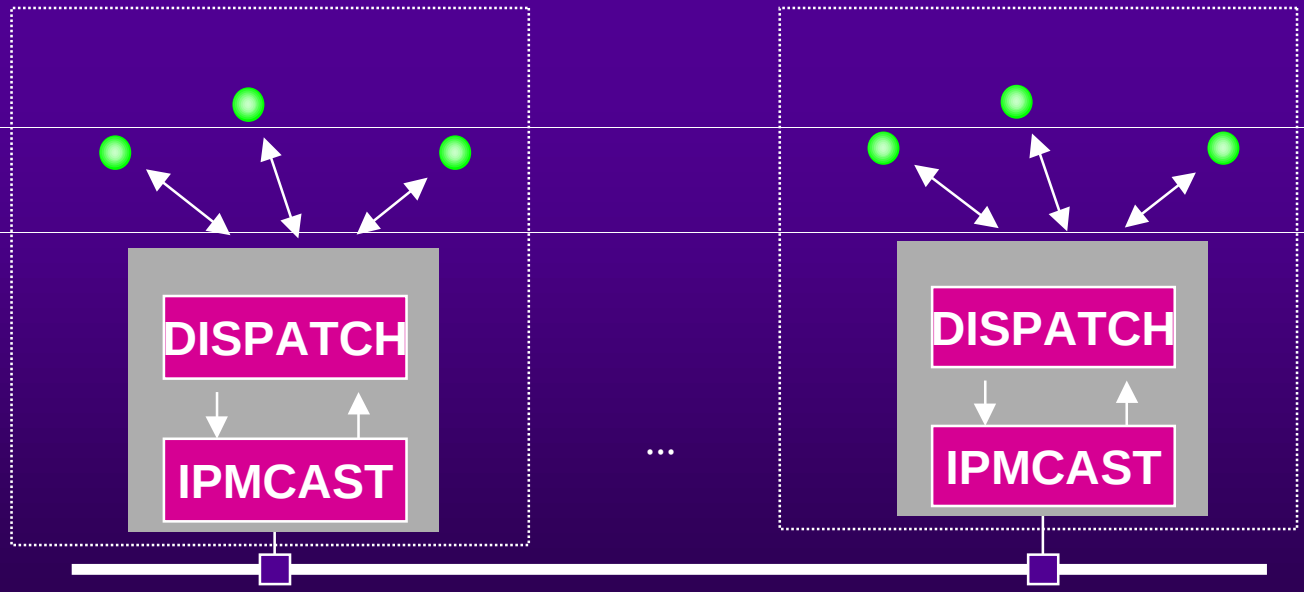
- Implementation of Software Bus technology
- 100% Java
- C/C++ & CORBA API
- Small memory footprint (< 240 kB Jar-File)
- Easy to use (JavaBean interface)
- Fault tolerance features
- Inherently scalable
- Modular design

iBus Protocol Stack (1)

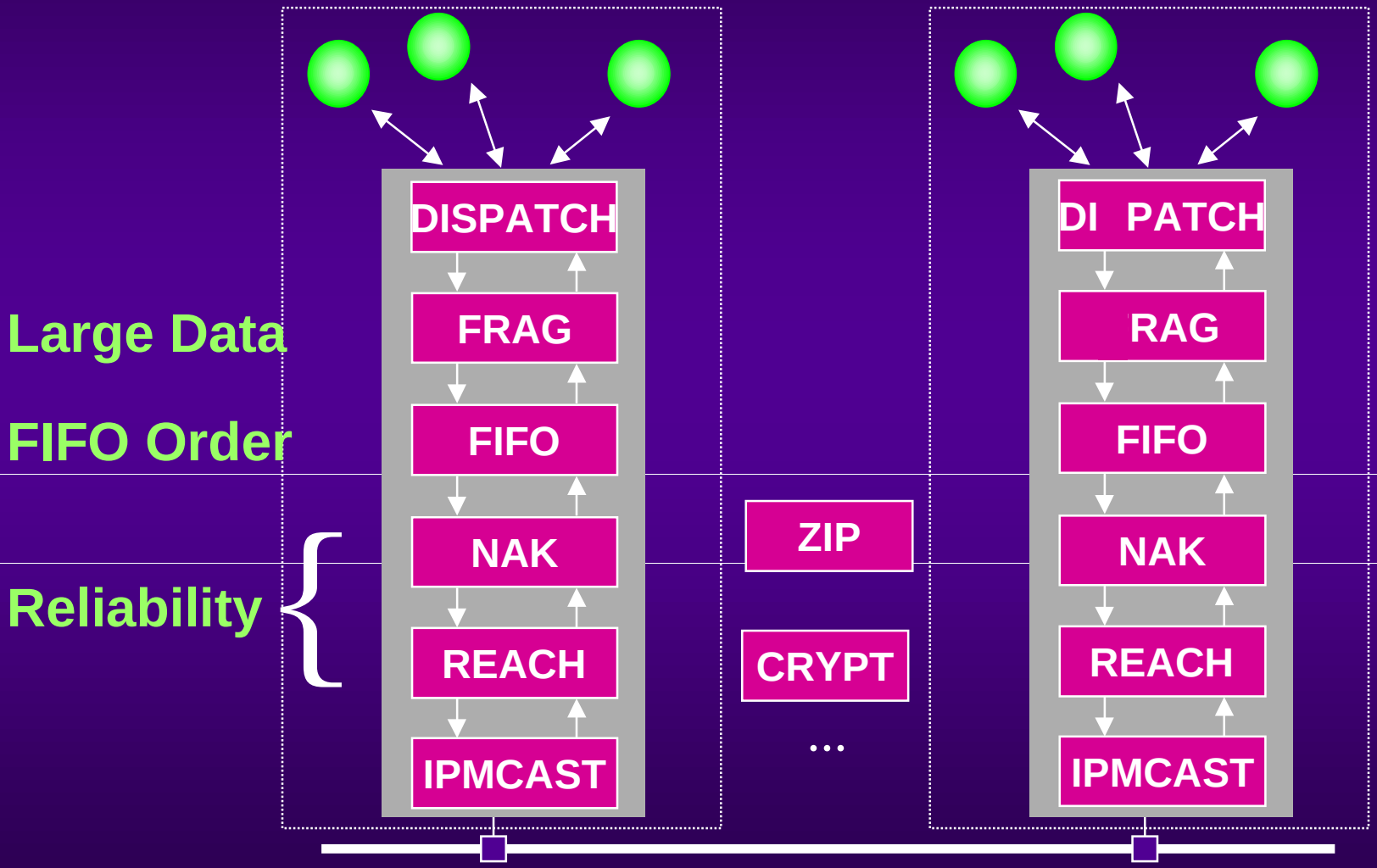


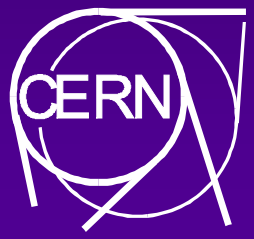
iBus Protocol Stack (2)

- **Minimal Stack**
  - Best-effort (unreliable)
  - Packets < 1500 Bytes



iBus Protocol Stack (3)





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MOM Summary

- Advantages
  - Loose coupling of processes in time and location
  - Inherent Push and publish/subscribe models
  - High degree of scalability
  - High availability and reliability
- Drawbacks
  - No open standard nor specification (vendor specific)
  - No Remote Method Invocations