

# MessageWay

## Efforts Toward a MessageWay Standard

Chuck Seitz (& Danny Cohen)

Myricom, Inc.

325 N. Santa Anita Ave, Arcadia, CA 91006  
818-821-5555 <Chuck@Myri.com> Fx:818-821-5316

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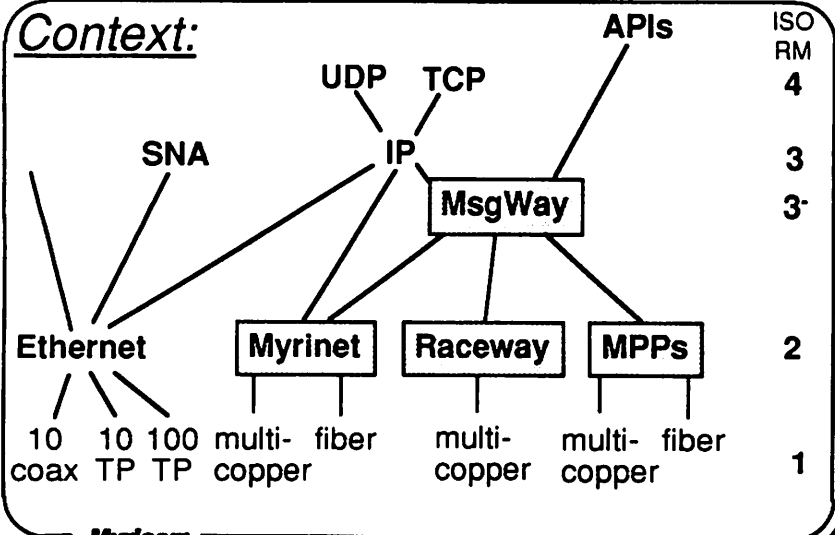
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## What is MsgWay?

Context:



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# “Marketplace” Goal

**Interoperability of heterogeneous computers, using a variety of high-performance communication media and packet-switching technologies.**

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# Technical Goals

## “MPP-like” Inter-node network:

scalable high performance  
high data rate (> 1Gb/s)  
low (path-formation) latency (< 1 $\mu$ s)  
low error rate (BER ?< 10<sup>-13</sup>)  
moderate range (~10m Cu, ~1Km fiber)  
heterogeneous computers  
general, scalable, extensible topology  
continuous mapping and monitoring  
fine-grain addressing (not just nodes)

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# Applications

- High-Performance LAN
- I/O Fabric
- Network internal to MPPs
- Platform bus  
(*e.g.*, satellite, ship, aircraft)

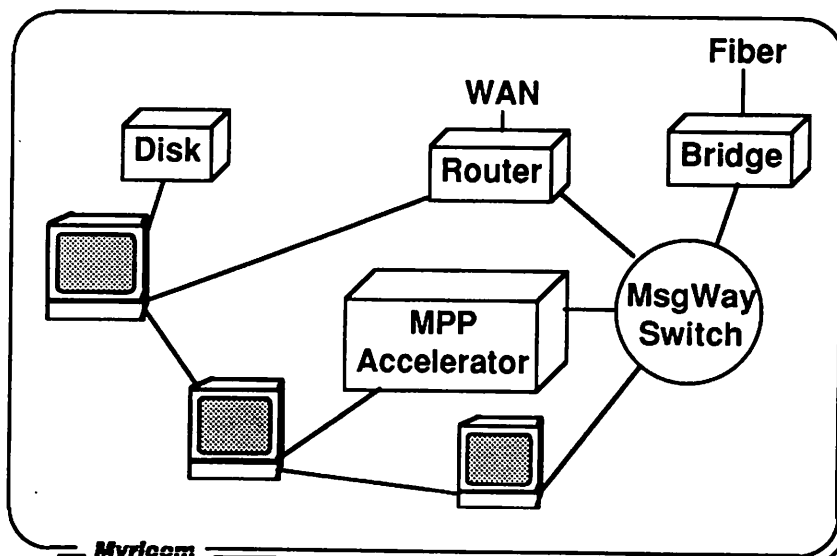
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## I/O Fabric + LAN



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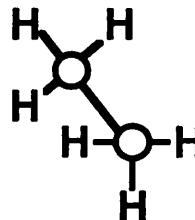
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# Key Techniques

Point-to-point, full-duplex, communication links.



Cut-through switches.

Source routing, mapping, route selection in a general topology.

The packet format defines **MsgWay**.

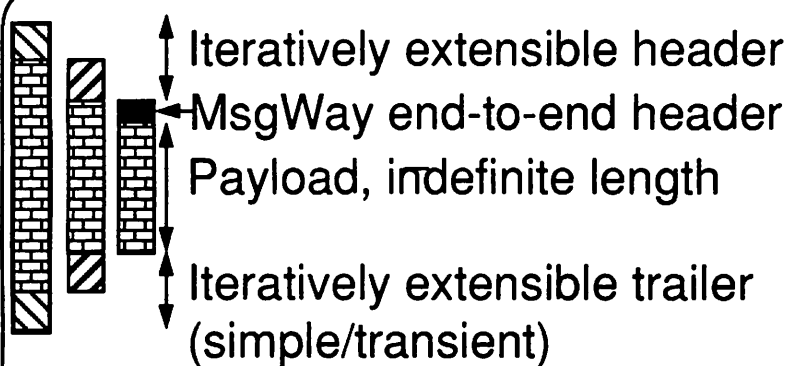
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# Packet Structure



**MsgWay hdr is source route + type**

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# Packet Types

- **Control**
  - Mapping (individual, aggregate)
  - Network management (SNMP)
- **Data**
  - Lightweight Protocols
    - APIs, cache fill, DMA transfer
  - encapsulated IP packets
  - Any other Ether-type?

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# Why Packets?

- Flexible structure.**
- Time-division multiplexing of the communication medium.**
- Dynamic route selection and multiplexing.**
- Long-range DMA.**

Thank you, Paul Baran!

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# Why Full-Duplex?

- Point-to-Point channels
  - Speed
  - Electrical simplicity
- Full-Duplex Links
  - Efficient flow control
  - Efficient fault detection
  - Ease of mapping

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# Why Source Routing?

Address = F(destination) → 

SrcRoute = f(destination, location)

Handling addresses requires online use of external knowledge (tables) that must be computed, imported, loaded, verified, ...

Source routes are acted upon entirely locally.

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# Who Routes?

**IP**: Switches route,  
Hosts don't.

**MsgWay**: Hosts route,  
Switches don't.

Both are right, given the sizes of  
their environments, performance,  
cost, and fault frequency.

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# MsgWay and IP

- IP was defined ~20 years ago, and has survived technology changes. MsgWay should also be defined to survive future changes.

- **MsgWay intends to supplement IP, for faster communication and fine-grain addressing.**

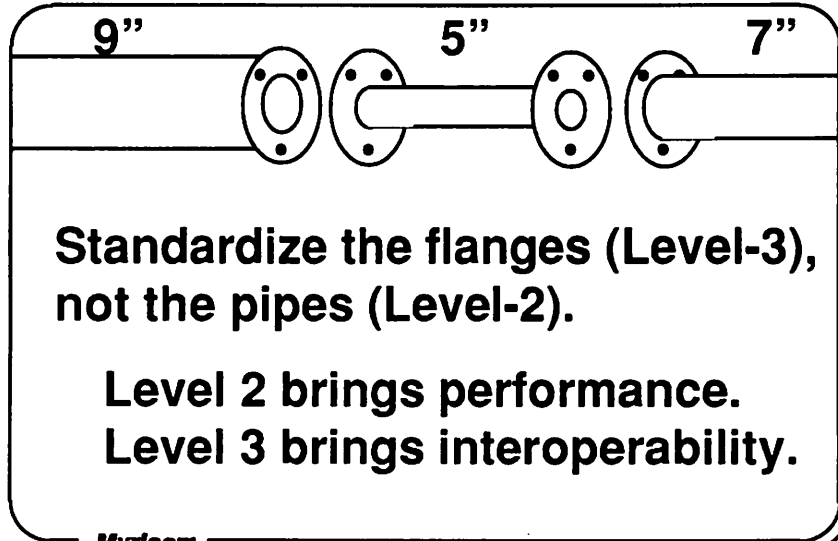
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# What to Standardize?



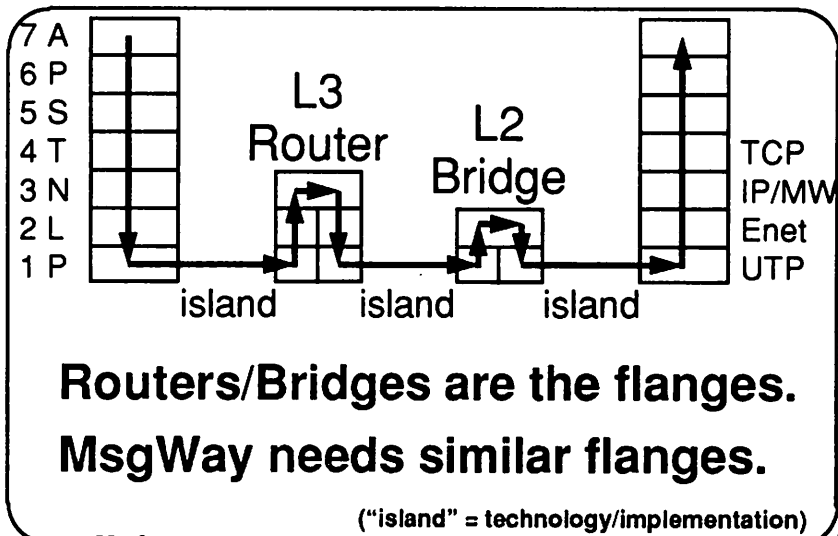
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# Routers / Bridges



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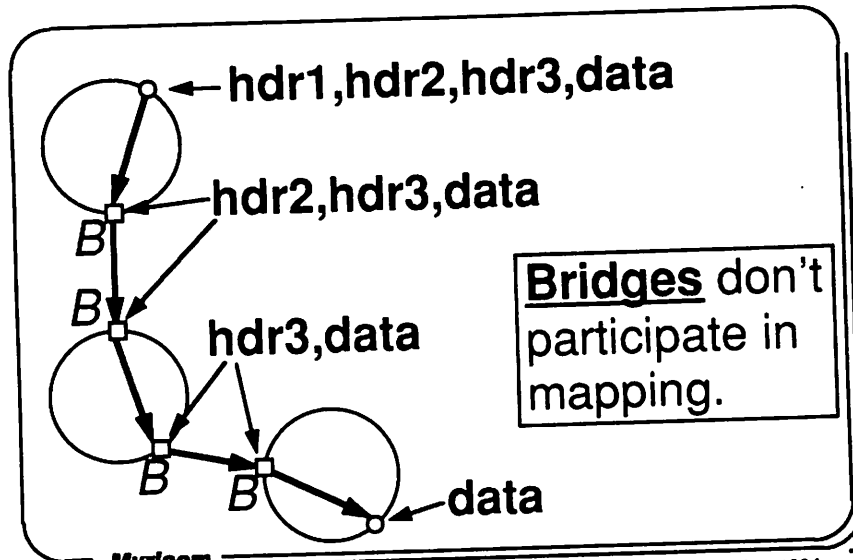
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# Connecting Islands /L2



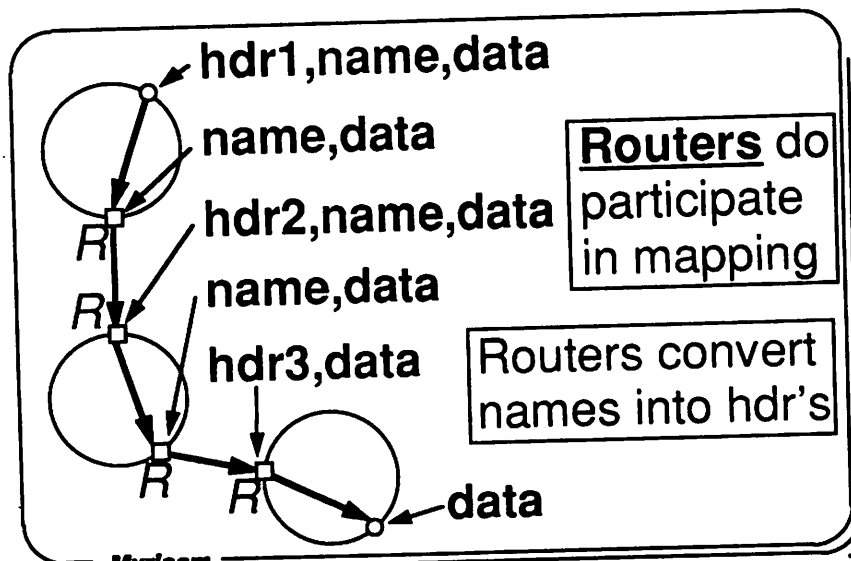
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# Connecting Islands /L3



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# Constituents

- **Technology Suppliers**  
**Components**  
**Software**
- **Technology Users**  
**Computer (and MPP) builders**  
**Cluster-software developers**

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# Unified Communication

A cluster is a heterogeneous set of multicomputers, servers, workstations, accelerators, *etc.*, communicating in a *unified* way.

MsgWay seeks to be that unified way.

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