Serial Attached SCSI

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Storage for MicroTCA

µTCA™

PICMG®

AdvancedMC™

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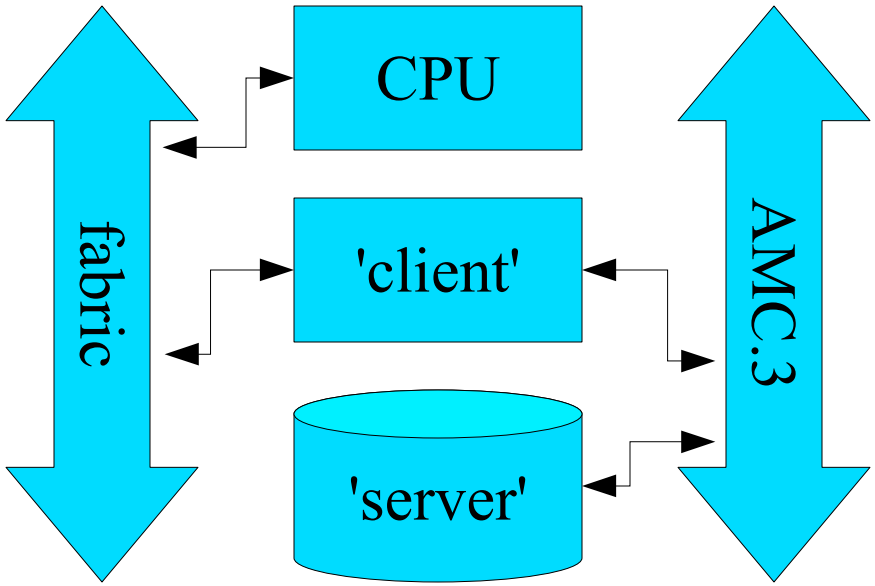
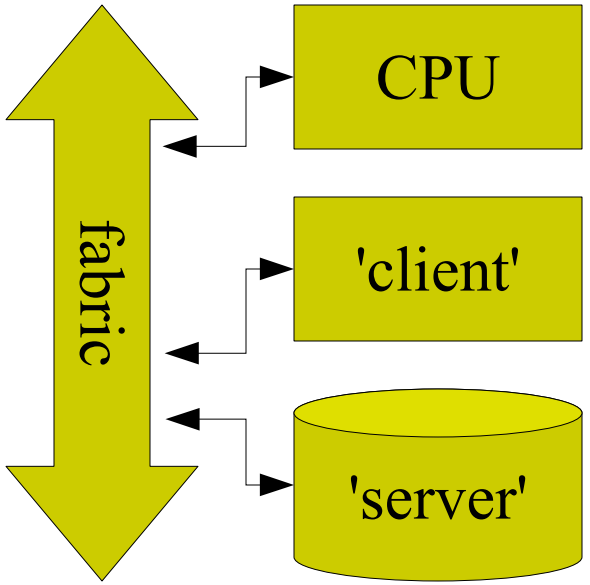
Introduction

- MicroTCA has native support for storage
  - Most systems support point-to-point SAS/SATA links on Port2/Port3 in compliance with AMC.3
  - For high reliability systems MicroTCA also specifies a fully-redundant routing architecture
- System builders need more information on how to use these elements effectively to incorporate storage for their application

•Storage Support

- AMC.3 defines an HBA as a storage 'client' and a target device as a storage 'server'
- Other options include iSCSI over base or fabric interfaces





•AMC.3 Storage options

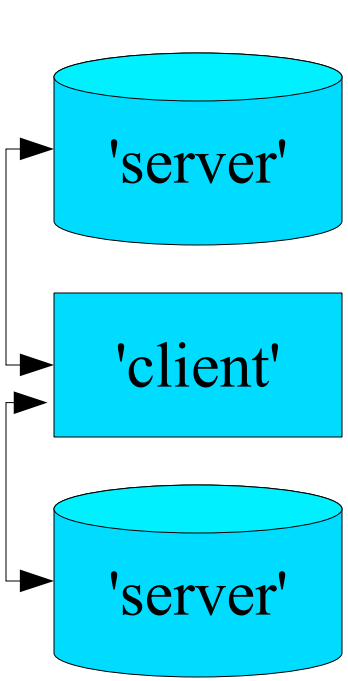
- Defined fabrics:
  - SerialAttached SCSI (SAS)
  - Serial ATA (SATA)
  - FibreChannel
- a 'server' is an AMC module that provides storage on Ports 2/3 (disks)

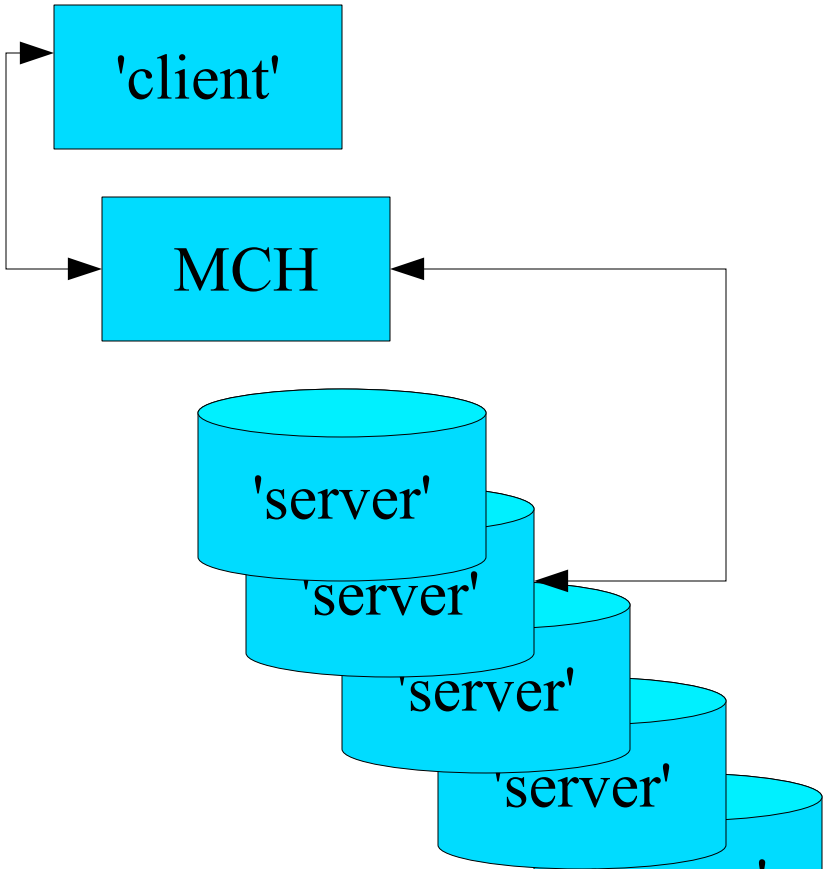
•AMC.3 Storage 'Clients'

- ProcessorAMC may supply a SAS or SATA initiator ports on AMC Port2/3
- Alternate is an external HBA AMC module
  - Generally requires a PCI-Express fabric between processor and HBA
  - Separate HBA module can only access 2 lanes through the AMC connector
  - Separate HBA module has access to front-panel area the host processor may not have room for
- SAS 'clients' (initiators) can accept SAS or SATA 'servers' (disks)

•Storage Routing

- MicroTCA defines two options
  - Point-to-Point
  - Fabric/MCH





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•Point-to-Point Routing

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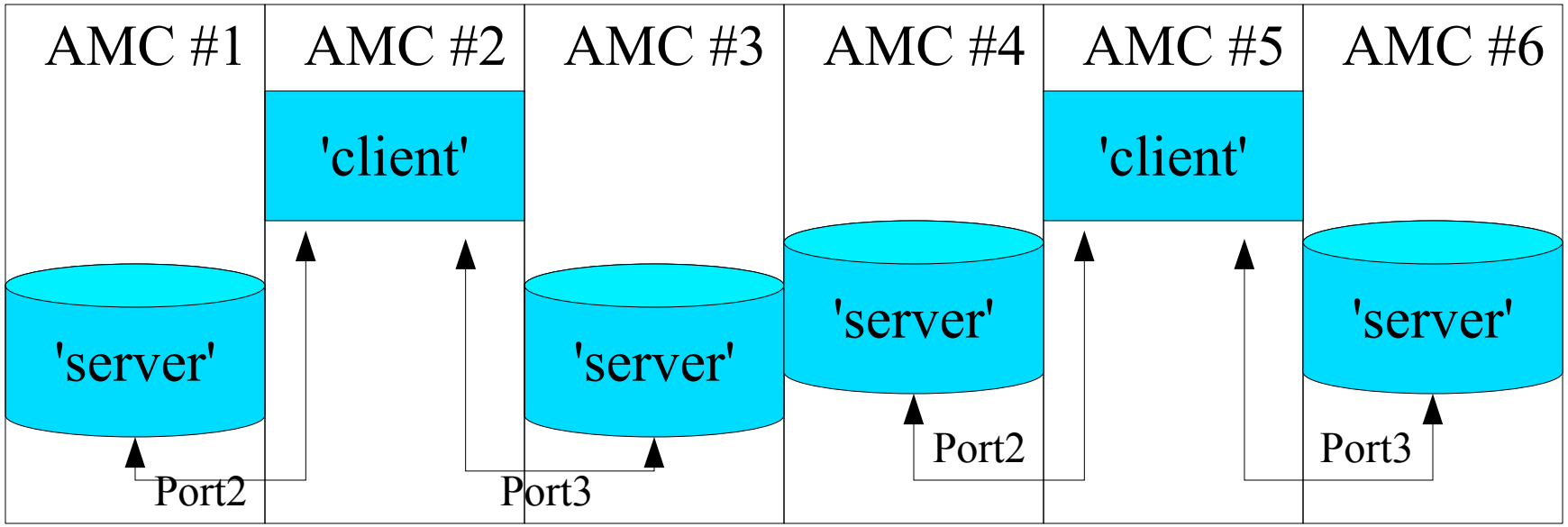
- Direct Attach from PrAMC/HBA AMC to target disks
- Most common implementation in today's systems



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•Limits of Point-to-point

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- Little or no redundancy
- Redundancy costs an AMC slot in the enclosure
- Even with a second disk redundancy is limited to mirroring
- Limit on the volume size

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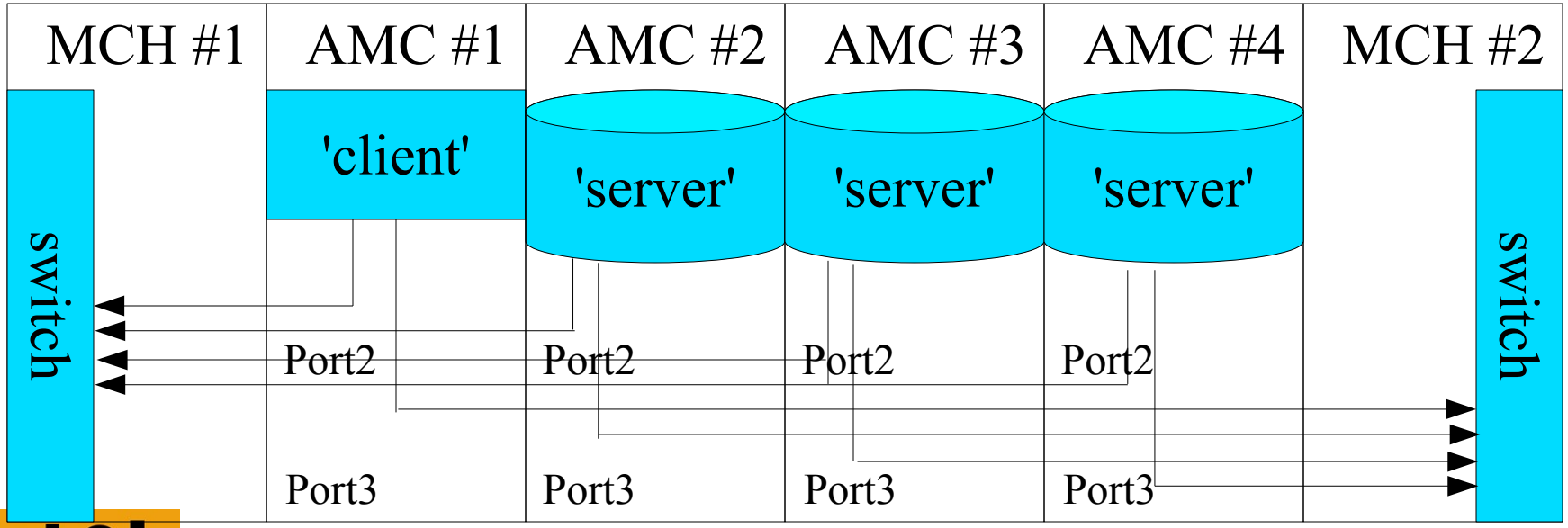
•Fabric Routing

- Anticipated by MicroTCA specification but not seem commonly
- Requires an MCH with a SAS expander
  - Tongue-2 supplies Fabric Port B to the MCH
  - A fully-redudant MTCA enclosure routes Port2 to MCH1 and Port3 to MCH2



•Limits of Fabric Routing

- Most ProcessorAMCs do not supply SAS initiators, SATA initiators cannot drive a SAS expander
- Makes the MCH more complex
  - requires a storage fabric switch
  - Uses Toungue2 connectors normally left open (PCB congestion)

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•Other options

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- Use fabric to access iSCSI storage
  - Base interface is available but depreciated (1G)
  - Fat-pipe fabric preferred option
    - Better bandwidth (XAUI)
    - Intended to carry traffic
- Use an add in HBA AMC to go off-board
  - Costs an AMC payload slot
  - May require the use of non-TCA elements (JBODs)

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•Benefits of SAS

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- 3Gb/s PHY links
- SAS logical layer allows for multiple links to be aggregated into 'wide' ports.
- Enterprise class disks, 15k RPM
- All SAS disks support 2 PHYs (native redundancy)
- Every SAS PHY has a unique World Wide ID (WWID)
- Protocol specification includes 'Expanders' which act as a bus switch
  - Typical device has 36 ports
  - Using expanders allows for up to 255 nodes (PHYs)

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•Benefits of SATA

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- 1.5Gb/s (SATA) or 3Gb/s (SATAII) links
- Inexpensive disks
- Light duty (laptop) or extended duty (enterprise class)
- Dual port emulation can be achieved through the use of port multipliers such as those from Silicon Image

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- Questions?

- Copies of this presentation, and a white paper detailing the assembly of a MicroTCA storage server at:
  http://www.astekcorp.com/