

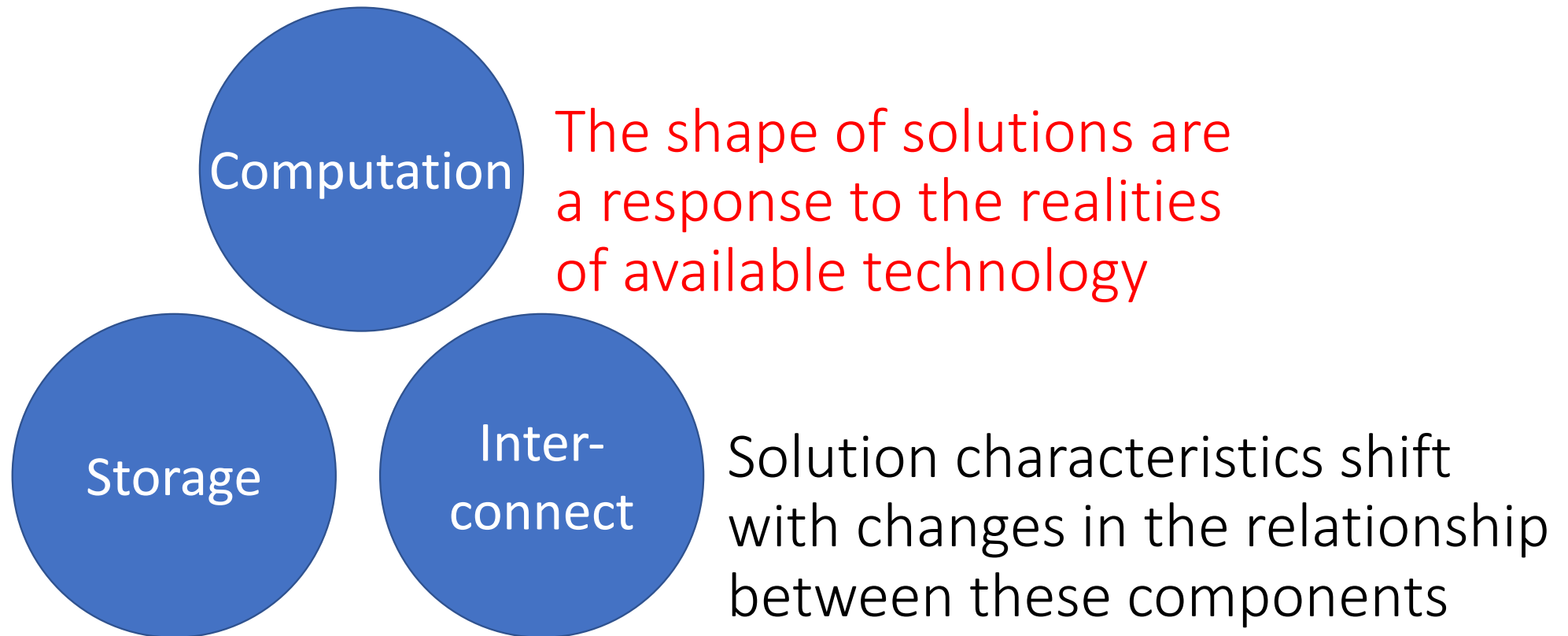
Massive-Storage Networks (MSN)  
versus  
Intensive-Computing Networks (ICN)

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## Please Discuss:

- Define how Massive-Storage Networks (MSN) and Intensive-Computing Networks (ICN) are similar and different.
- Should research funding agencies support research in MSN or ICN?
- Bandwidth: Do we need more bandwidth for either MSN or ICN?
- MSN are more cost-conscious, compared with ICN. Should MSN providers invest in HPC ICN to help drive down cost?
- Will MSN and ICN converge in the future? If so, when and what will that network look like?

The industry has always built its solutions based on the costs and characteristics of its major system components



## Define how Massive-Storage Networks (MSN) and Intensive-Computing Networks (ICN) are similar and different.

- Simple argument: They are the same except for the block sizes of the data they move
- Alternative argument: Storage and computation are different because we have tuned their usage to the relative speeds of legacy technologies
- In the longer term, they may become exactly the same
- Conversely, software is slow to change and usage patterns may never equalize
  - Hardware is made of silicone
  - Software is made of concrete

## Should research funding agencies support research in MSN or ICN?

- Should the entities that care about research results pay for those results, or should everyone pay for them?
- Are we discussing the relative value of Corporate Welfare vs Academic Welfare?
- I believe that this is a political question that lacks a technical solution

Bandwidth: Do we need more bandwidth for either MSN or ICN?

- We need lower latency
- Then we will need more bandwidth

## MSN are more cost-conscious, compared with ICN.

- Is this true or thuthy (in either the Colbert or JavaScript sense)?
- We needed “fancy” storage networks and Ethernet was sufficient for computation.
- One could argue that ICN is less expensive form a broad industry adoption perspective

Should MSN providers invest in HPC ICN to help drive down cost?

- Why would they?
- Business runs on being able to sell stuff.
- MSN should only invest if they can make money
- Any business that takes sees large scale technology development as a charitable enterprise of will not survive for long



# Will MSN and ICN converge in the future? If so, when and what will that network look like?

- Is this not hyper-convergence and has it not already happened with scale-out as the solution to ICN?
- Currently scale-up has limited appeal on the broader computational horizon
- If Amazon, Microsoft, and/or Google decide that scale-up makes sense for them, then something interesting might happen
  - Only one makes their own hardware and then just barely
  - Any serious movement in this space will require architectural (CPU) changes to overcome the existing costs of maintaining coherency
    - Scale-up with non-coherent memory is largely indistinguishable from scale-out
    - A faster interconnect is not going to solve this problem

## What I Believe

- Storage that is independent of processing is no longer interesting, except in archives
- Protocol based communication is too expensive
- Coherency cost are containable in up to at least 500 node systems
- Unified interconnect infrastructures are better than independent infrastructures
- Security is the critical feature that could create an infrastructure shift
- Unfortunately: Ethernet's hegemony will become more pervasive