

CSE 291: Operating Systems in Datacenters

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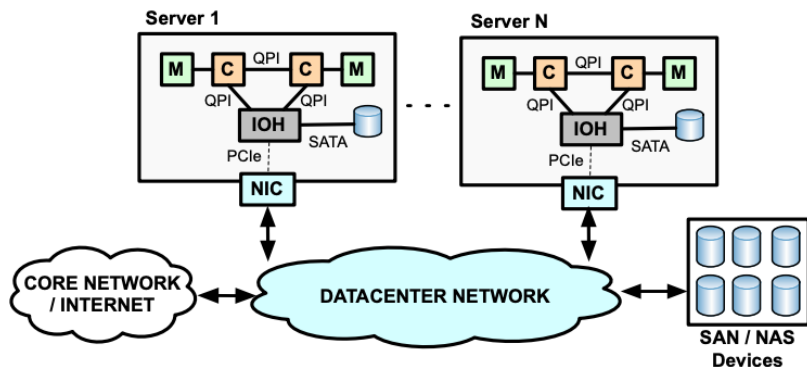
Agenda for Today

- Disaggregation overview
- LegoOS discussion
- The future of disaggregation

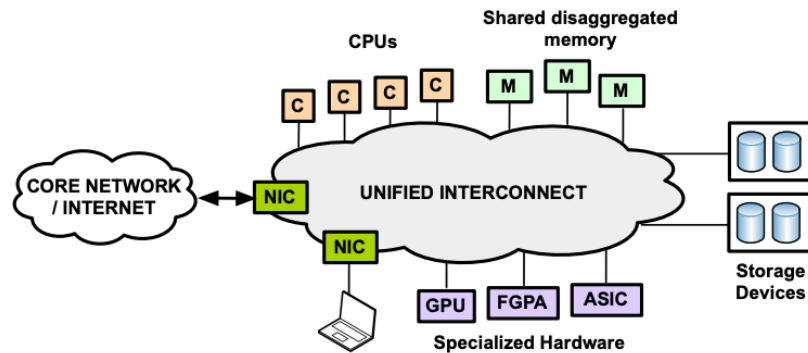
Disaggregation

What is disaggregation?

- Disaggregated datacenter
 - Resources directly connect to the network in “resource blades”
 - No notion of a “server” anymore
- Offers better resource utilization, easier upgrades, etc.



(a) Current datacenter

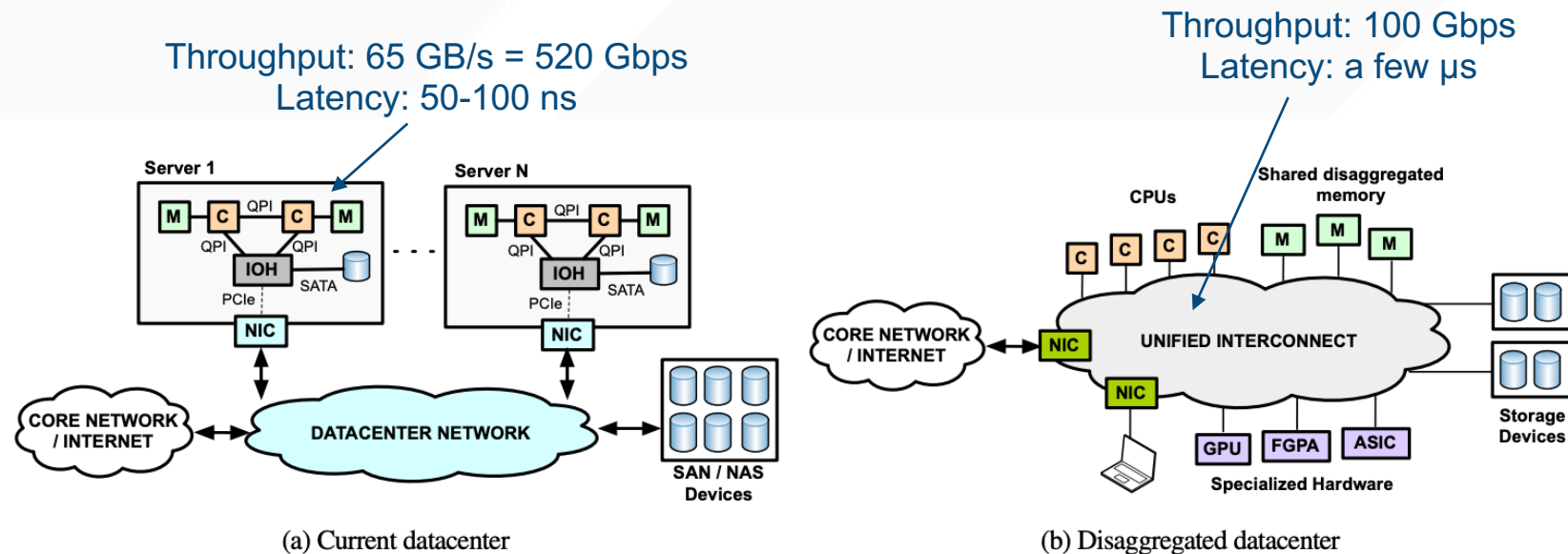


(b) Disaggregated datacenter

“Network Requirements for Resource Disaggregation” [OSDI ‘16]

What makes disaggregation challenging?

- Traditional datacenter networks have much lower throughput and higher latency than server interconnects



“Network Requirements for Resource Disaggregation” [OSDI ‘16]

Hardware for Disaggregation

- Many announcements of disaggregated hardware:
 - SeaMicro
 - Intel Rack Scale Architecture, 2013
 - HP The Machine, announced in 2014
 - UC Berkeley Firebox, 2014

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AMD kills off SeaMicro server business

Dense server subsidiary shut down after AMD posts a bigger-than-expected loss

April 17, 2015 By: [Max Smolaks](#) [Comment](#)

RIP HPE's The Machine product, 2014-2016: We hardly knew ye

Remains of lab experiment, including ReRAM, will be scattered into future gear

[Chris Mellor](#)

Tue 29 Nov 2016 / 07:28 UTC

But... no widespread adoption yet

Disaggregation-Related Research Questions

- What kind of network is required?
 - “Network Requirements for Resource Disaggregation” [OSDI ‘16]
 - “Pond: CXL-Based Memory Pooling Systems for Cloud Platforms” [ASPLOS ‘23]
- Transparent or not?
 - “AIFM: High-Performance, Application-Integrated Far Memory” [OSDI ‘20]
- How to share disaggregated resources?
 - “MIND: In-Network Memory Management for Disaggregated Data Centers” [SOSP ‘21]

LegoOS Discussion