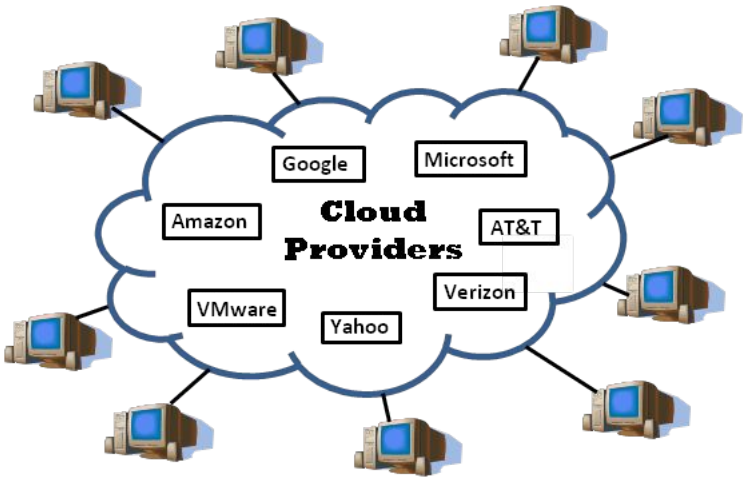
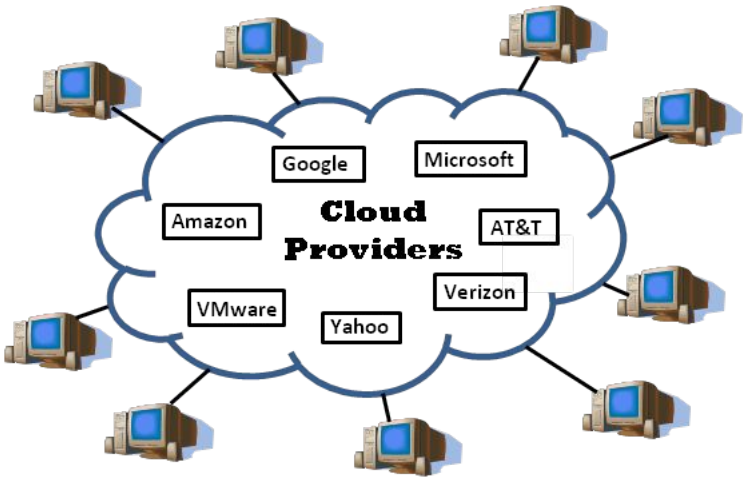
FLOCX: First Layer of Open Cloud eXchange

A Marketplace at the bottom of the cloud

Sahil Tikale
(PhD Candidate - Boston University)



Public Cloud



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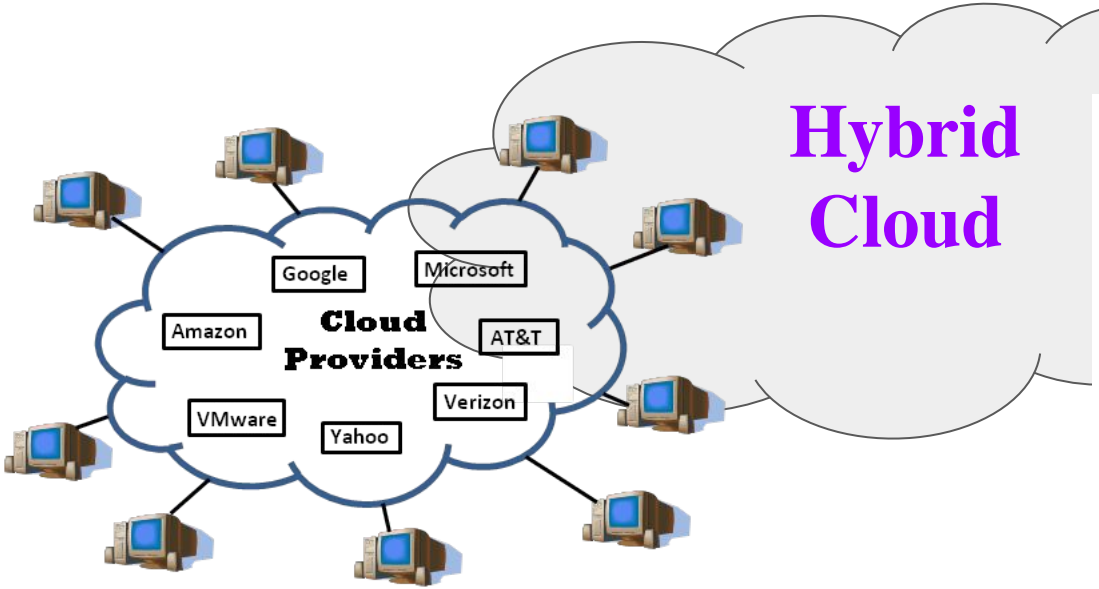

Hybrid Cloud

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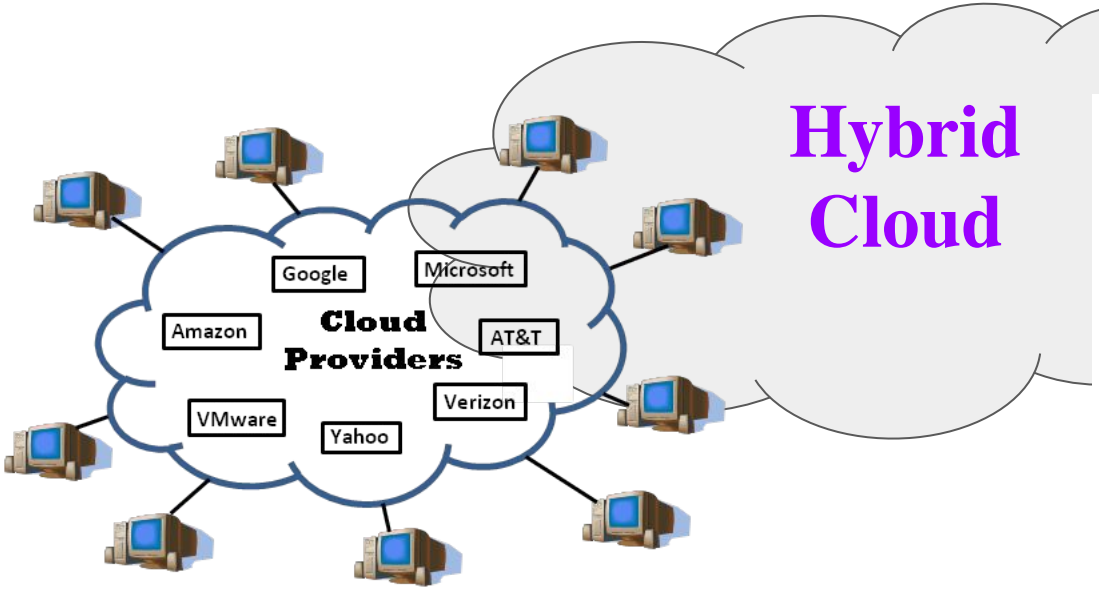

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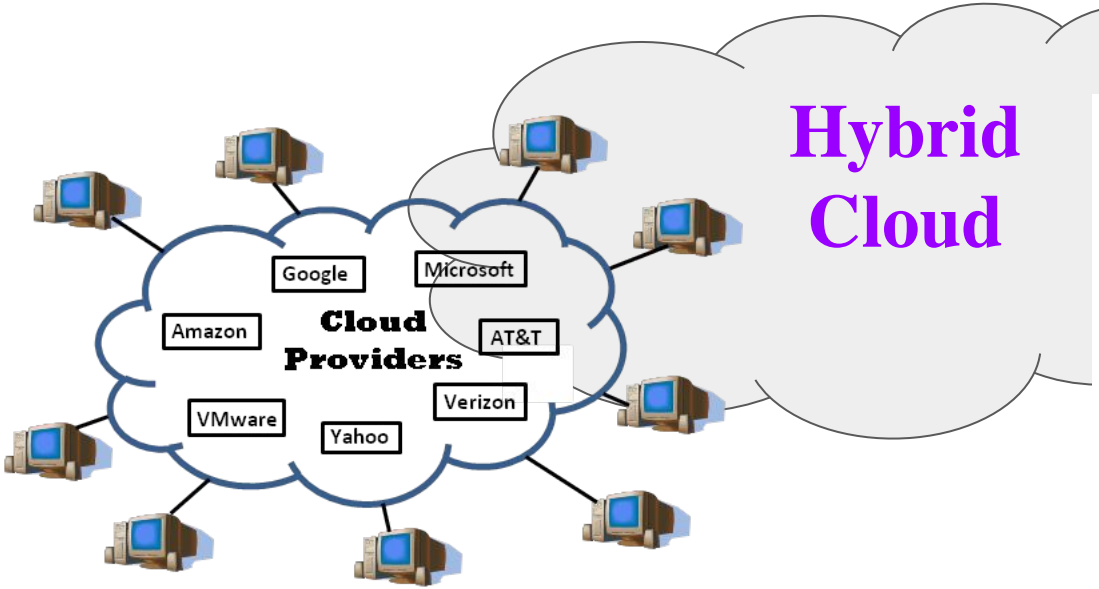

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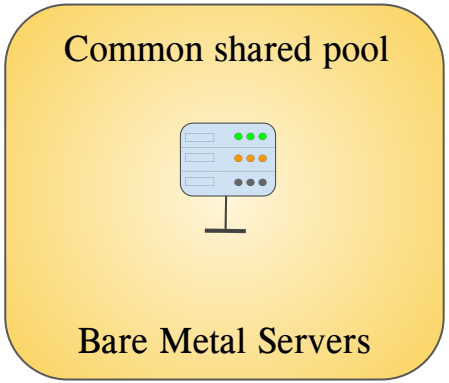
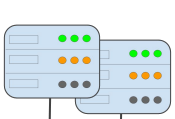

Common shared pool
Bare Metal Servers

HPC/HTC Cluster



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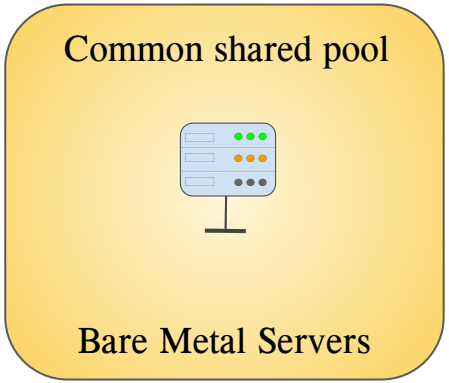

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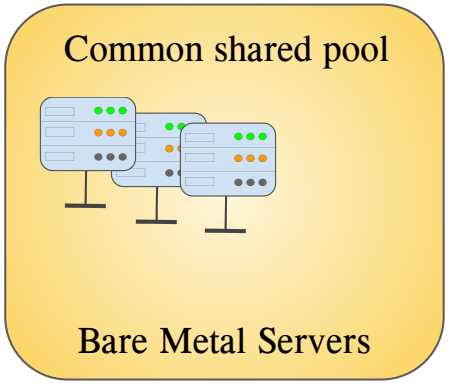

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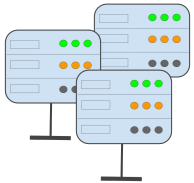

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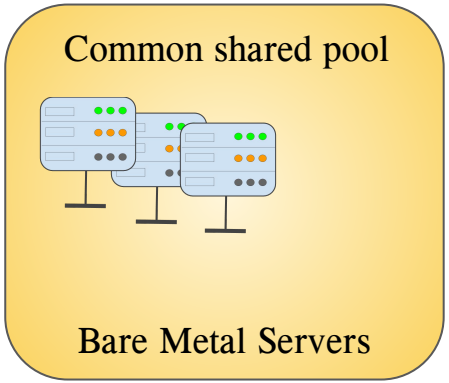

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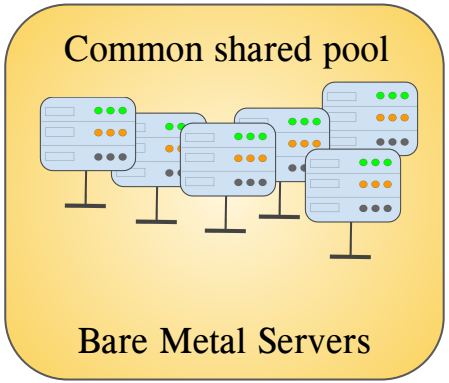

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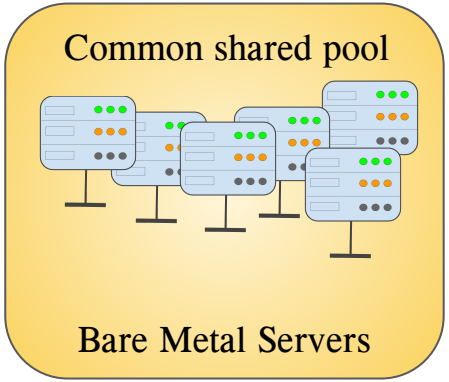

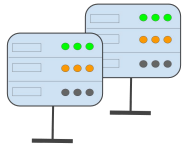

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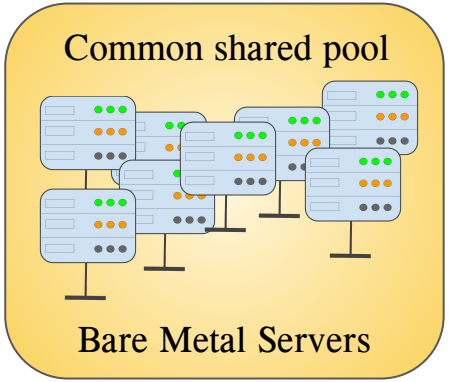

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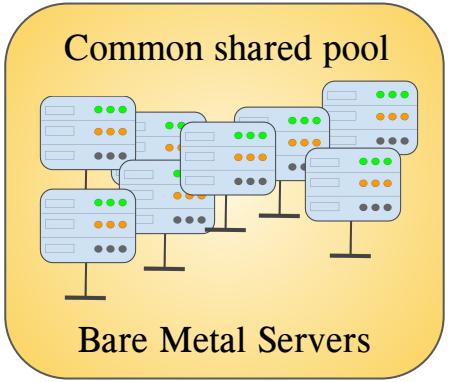

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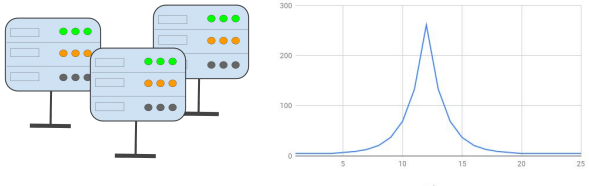

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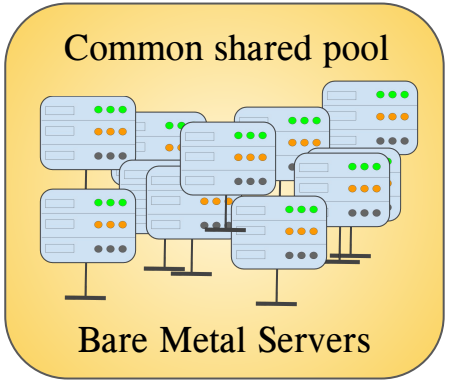

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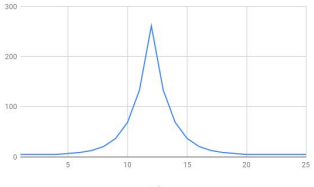

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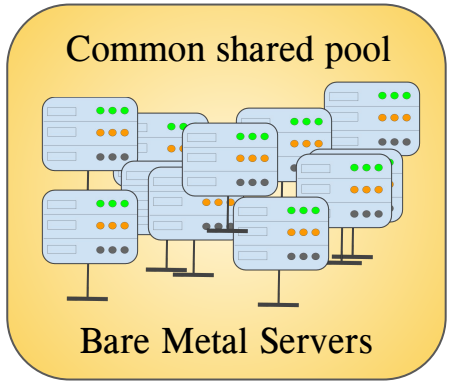

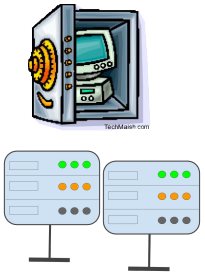

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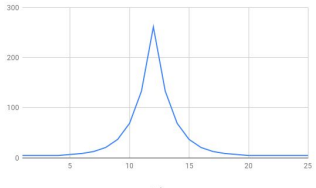

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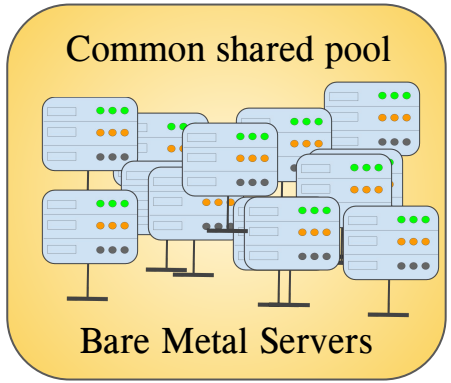

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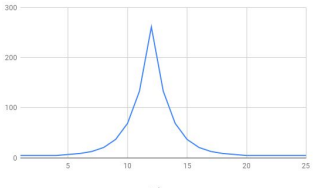

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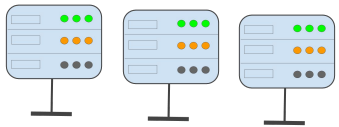

U.S. AIR FORCE

- Dedicated data-centers for National emergencies utilized mostly around 2%
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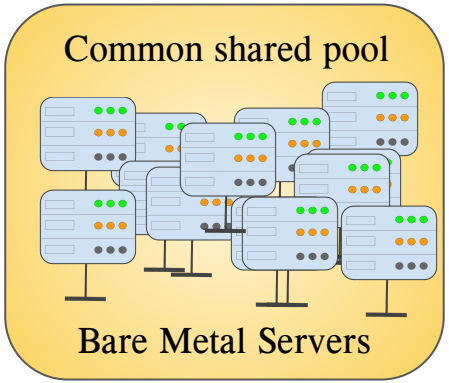

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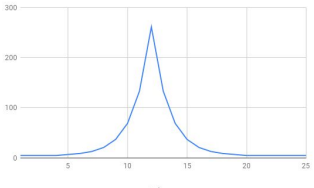

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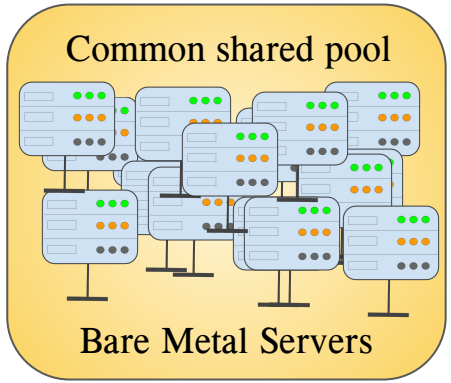

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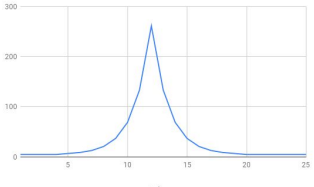

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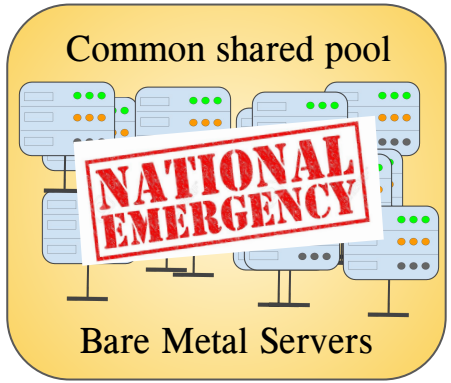

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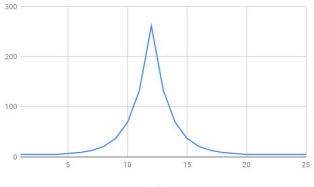


Requirements

How do we satisfy all these divergent needs ?

- Access to hardware you own whenever you want.
- Ability to reserve nodes for future use.
- Ability to request and offer specific hardware.
- Strong incentive to give up nodes when
    - You do not need them
    - Or someone else needs them more than you do.

Solution: Marketplace with an underlying economic model

Towards a Simple Marketplace: First-Steps

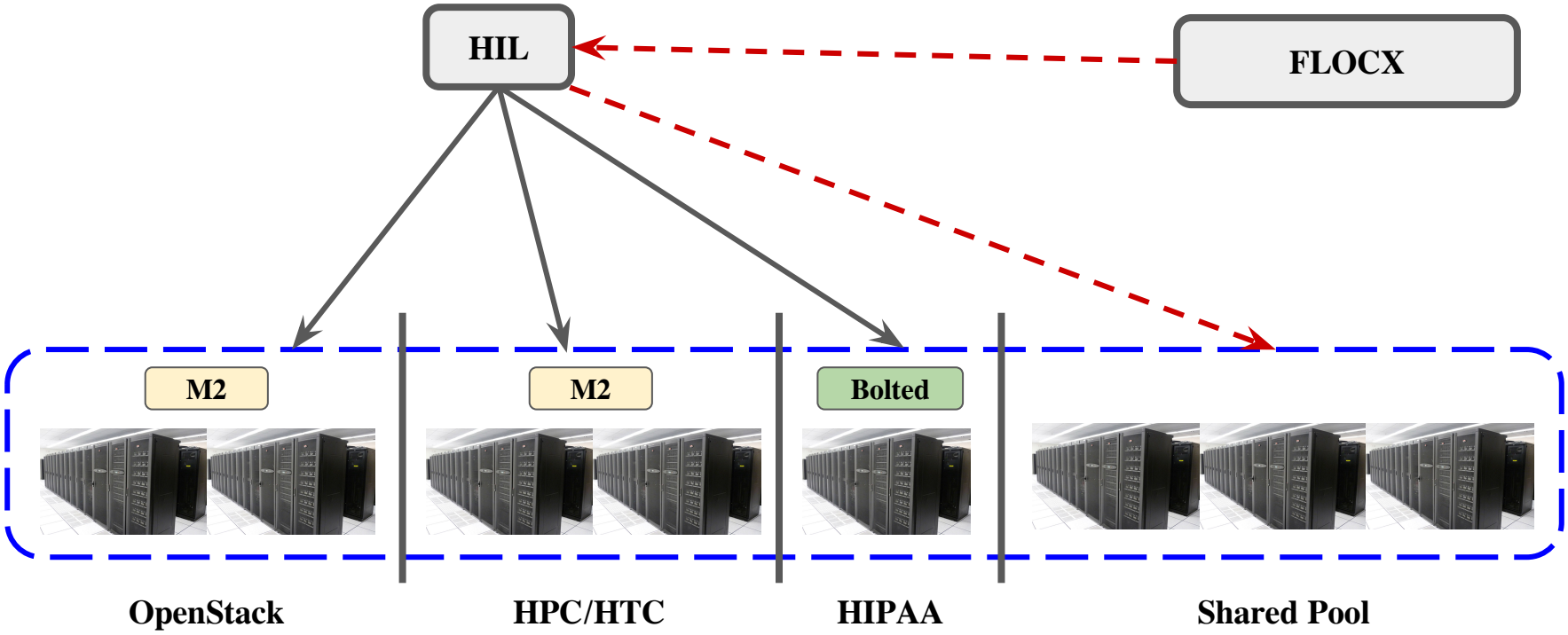
Assumptions:

- Homogeneous pools of Bare-Metal Servers
- Marketplace Tracks of Tenant Credits and Server Ownership

Incentivization:

- Tenants Accrue Credits when Other Tenants Lease their Servers
- Expend Credits to Lease Servers
- Price High $\Rightarrow$ Release Servers

FLOCX: Marketplace for Bare-Metal Servers



Future Features

- **Bids:** Requesting hardware at desired asking price-range
- **Offers:** Complex time intervals for sharing idle nodes
- **Advanced Reservation System:** Ability to make reservations in future
- **Dynamic Pricing:** Prices reflecting demand and supply fluctuations

Agent-Based Trading

- Initially human bid/offer resources in the FLOCX
- Consequently, develop agents for automated trading
  - Exemplary agents for HPC and OpenStack
  - HPC Agent: maximize CPUtime
  - OpenStack Agent: maximize revenue

Long Term Goals

- Deploy FLOCX at MGHPCC
  - Enabling Trade Between Universities
- Enable Organization to Deploy and Manage Agents
- Agile development model

Conclusion

- Addressed broad set of use-cases
- We believe:
  - building an economic model is the right approach
- Simple prototype microservice built on HIL, BMI and BOLTED.
- Service that offers economic incentives for tenants to release hardware

Questions / Feedback

FLOCX

First **L**ayer of **O**pen **C**loud e**X**change

A marketplace where sharing (servers) is always good !!

Thank You