Reducing Total Cost of Ownership

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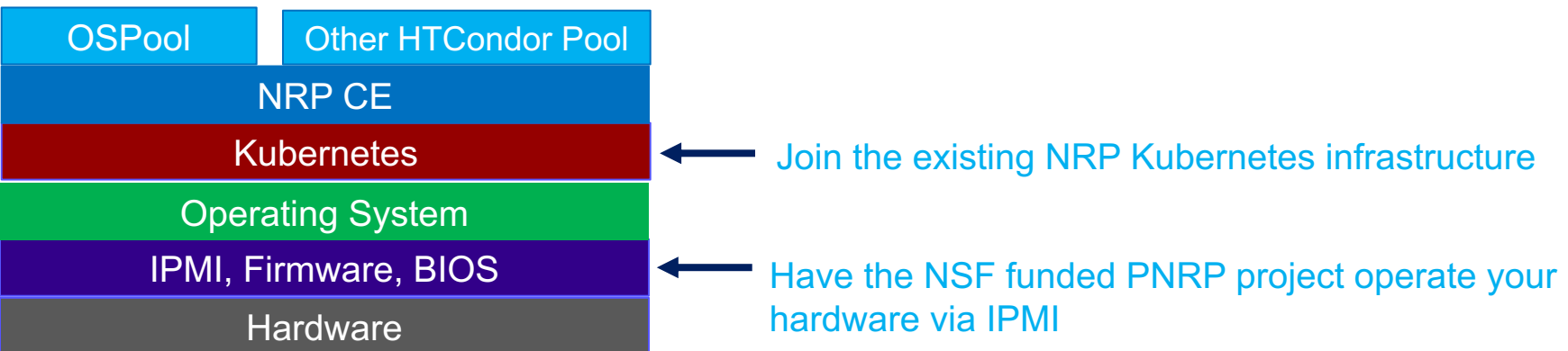
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The Minds We Need

- **Connect every community college, every minority serving institution, and every college and university, including all urban, rural, and tribal institutions** to a world-class and secure R&E infrastructure, with particular attention to institutions that have been chronically underserved;
- **Engage and empower every student and researcher** everywhere with the opportunity to join collaborative environments of the future, because we cannot know where the next Edison, Carver, Curie, McClintock, Einstein, or Katherine Johnson will come from; and

https://mindsweneed.org

Problem Statement

- OSG requires the institution to operate a batch cluster and/or a storage cluster in order to join the OSG

- Many (?) of the ~4,000 accredited institutions of higher learning may not have the staff to do so.
  - Can't afford them
  - Can't recruit them given location
 - Doesn't make sense to sustain them given size of institution

**Can we reduce the total cost of ownership
of compute & data infrastructure ?**

NRP Reduces TCO for Compute

- You can "outsource" operations to NRP.
  - At the IPMI layer …
  - … or at the Kubernetes layer

OSPool	Other HTCondor Pool
NRP CE	
Kubernetes	
Operating System	
IPMI, Firmware, BIOS	
Hardware	

← Join the existing NRP Kubernetes infrastructure

← Have the NSF funded PNRP project operate your hardware via IPMI

- Your ops effort may be as little as:
  - Provide space, power, cooling, networking
  - Deal with hardware failures

68 Institutions integrated in NRP
43 integrated at IPMI layer
**25 integrated at Kubernetes layer**
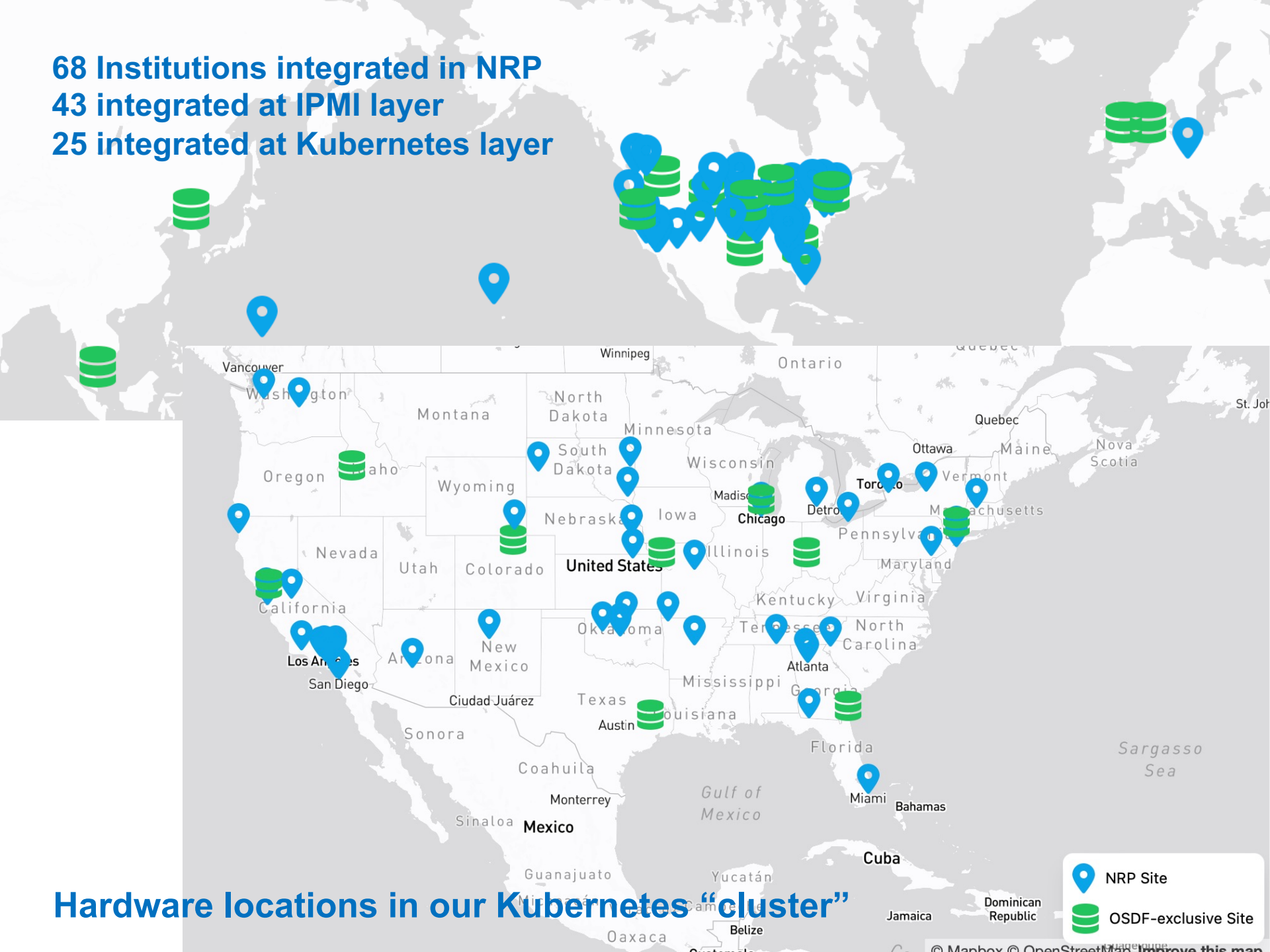
Hardware locations in our Kubernetes "cluster"

NRP Site

OSDF-exclusive Site

What about Storage ?

There is no NSF funded storage solution that would allow you to outsource your storage operations … but …

- Open Storage Network provides:
  - Shopping list for what to buy
    - <$100k for "pod" provides 2PB of S3
  - $10k/year for operations
- You can then join your OSN pods to OSDF

https://www.openstoragenetwork.org

Summary & Conclusion
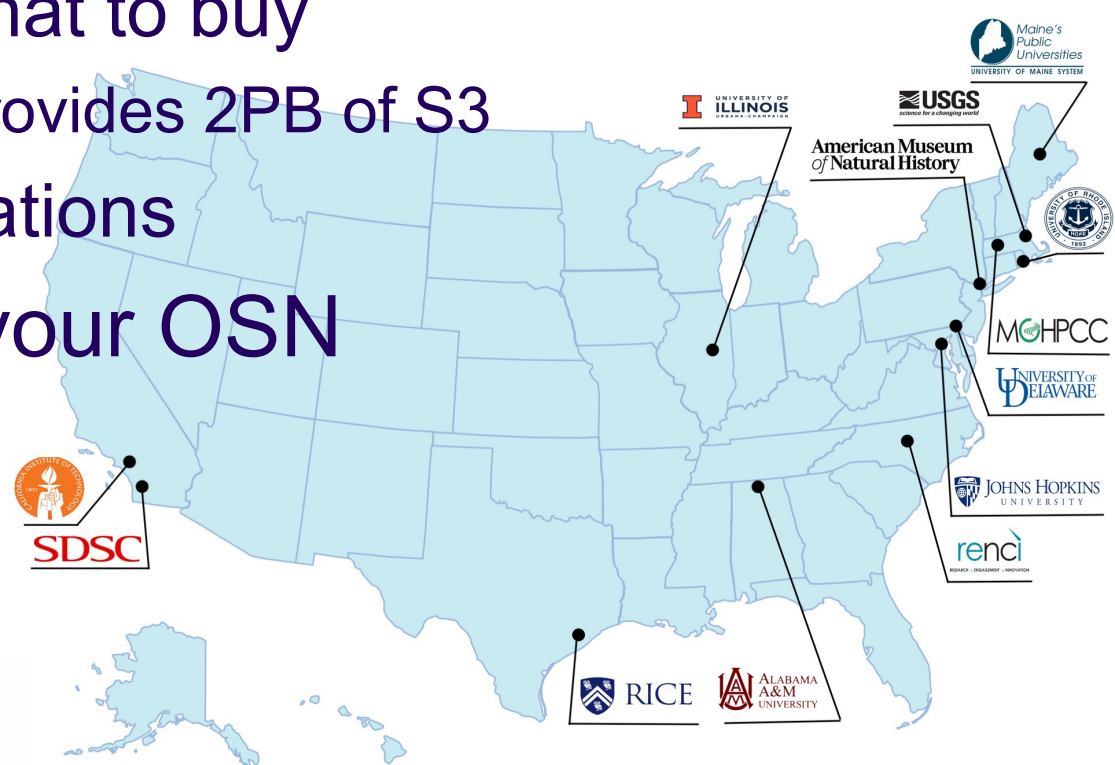
- **You can submit a CC* proposal for compute or storage even if you don't have the workforce to operate a batch or storage infrastructure.**
  - Outsource compute system operations to NRP
  - Outsource storage system operations to OSN
- Whether or not you want to run your own batch & storage infrastructure depends on what infrastructure you already have in place, how you are presently supporting research computing, and how restrictive your campus' cybercontrol requirements are.

Acknowledgements

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