The March with the Clouds

By Brian Dobbins

The March Toward the Clouds: MF Perspectives

March 2, 2022
CI Compass Cyberinfrastructure for NSF Major Facilities Workshop

With

~~The March Towards~~ the Clouds: NCAR

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CI4MF 2022

March 1st, 2022

The National Center for Atmospheric Research

Supercomputers	Open-Source Models

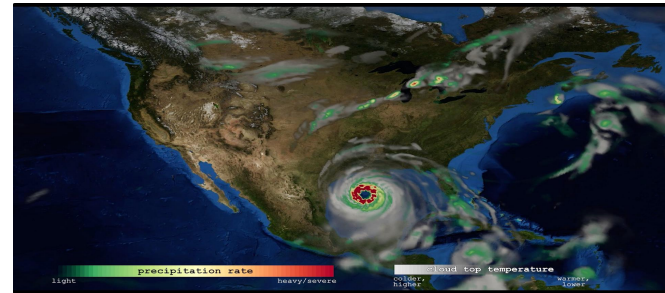"Cheyenne"
- 5.34 PF
- 145K cores
- ~40PB

CESM
WRF
MPAS-A
+ *others..*

Two of our key cyberinfrastructure focuses – a supercomputing facility, and *leading-edge, open-source, community models.*

Cloud Cost Comparison
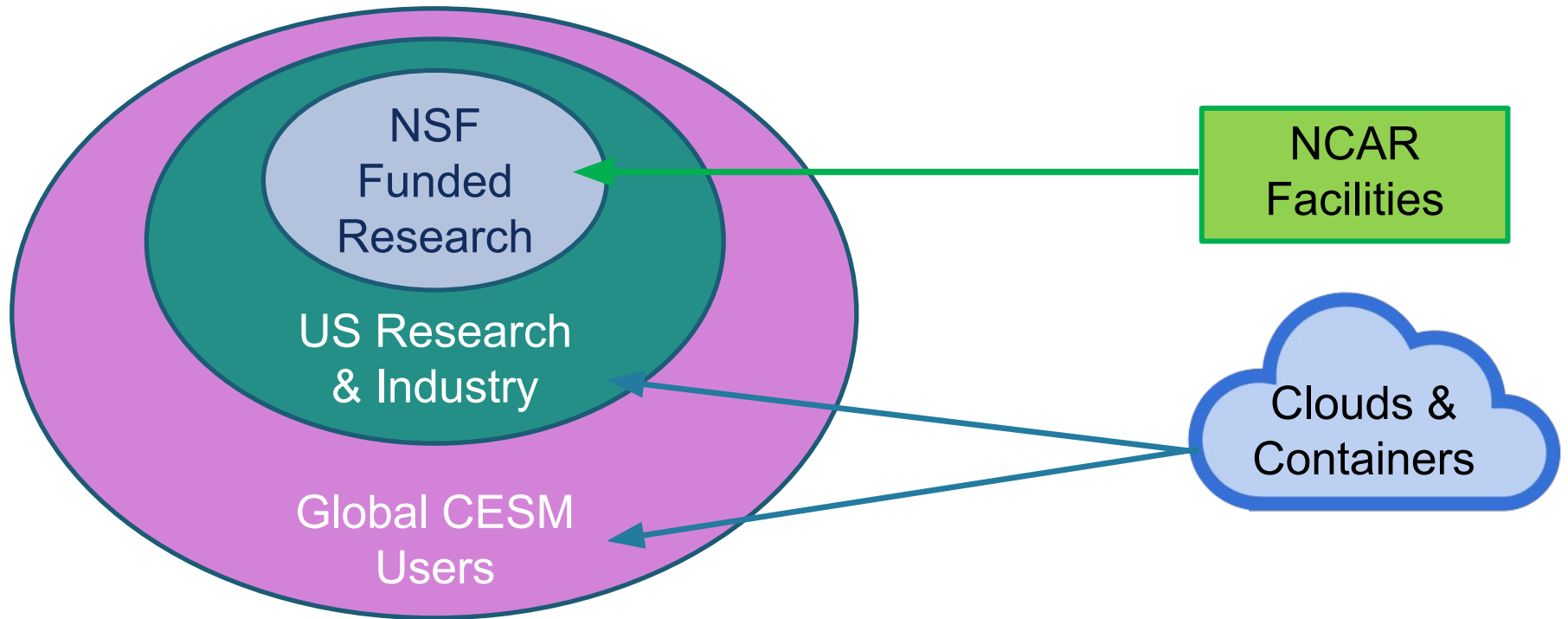
On-Demand Cloud Pricing (2022)			
Node	AWS C5N	AWS HPC6a	Azure HBv3
Price (per core-hour)	**0.11**	**0.03**	**0.03**

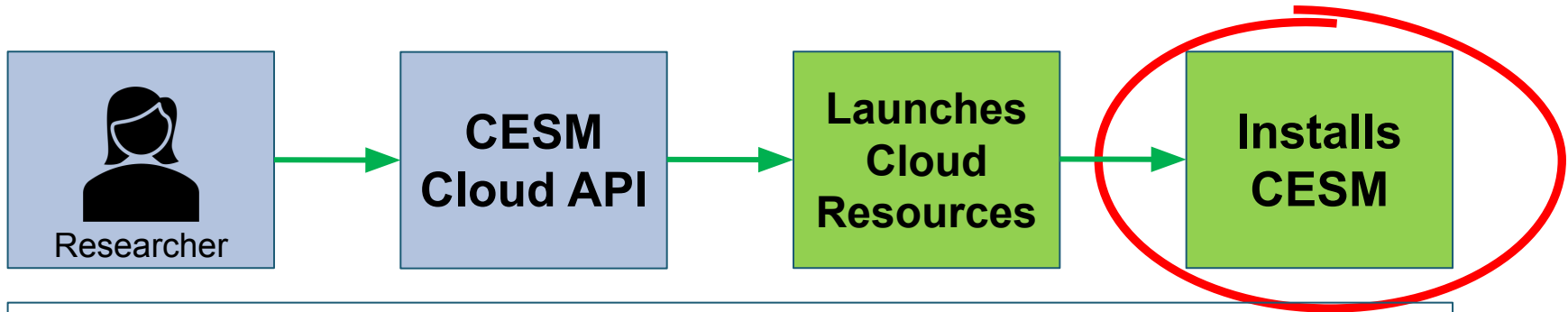| NCAR "Derecho" (2022)	
Cost	~$35M-$40M
Power / Year	~$1.25M
Lifetime	~5 years
Cores	~320K

Derecho Cost (per core-hour): **~$0.003**

Supporting Users Communities via the Cloud

Our facilities serve a *subset* of our users; cloud technologies enable the *rest* of that community *easy* access to *ready-to-use* modeling capabilities.

Cloud & Container 'Platforms'

The CESM Cloud API actually does _two_ things:
- It handles the configuration and launching of cloud resources
- And _installs a preconfigured, ready-to-run CESM environment_

This full environment, or 'platform', is _standardized_:
- Enables easier training & educational materials
- Enables _shared scientific workflows_
- Improves support ('snowflake HPC systems')
- _Containers_ bring these benefits to owned (non-cloud) systems

Summary on Model Enablement (NCAR)

- Cloud is *complementary* to our on-prem resources, <u>not</u> a replacement for them.

- Cloud *enables* widespread use of scientific computing resources… but complexity is a barrier without APIs / gateways.

- The opportunity to *standardize* science platforms on clouds *and* containers is transformative – let scientists do science, not IT!