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COMPUTING**  
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# Quantifying the Continuum:

## Cost, Value and Strategy for Hybrid Computing

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# Rethinking How We Invest in Scientific Computing

*Then*

**“What system should we build next?”**

*Now*

**“What computing environment best enables the science?”**

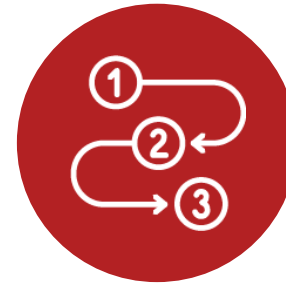
# Today's Scientific Workflows Don't Live in One Place



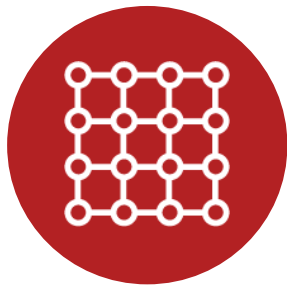
Simulation



AI



Data-Intensive  
Workflows



Edge  
Instruments



Cloud-Native  
Tooling

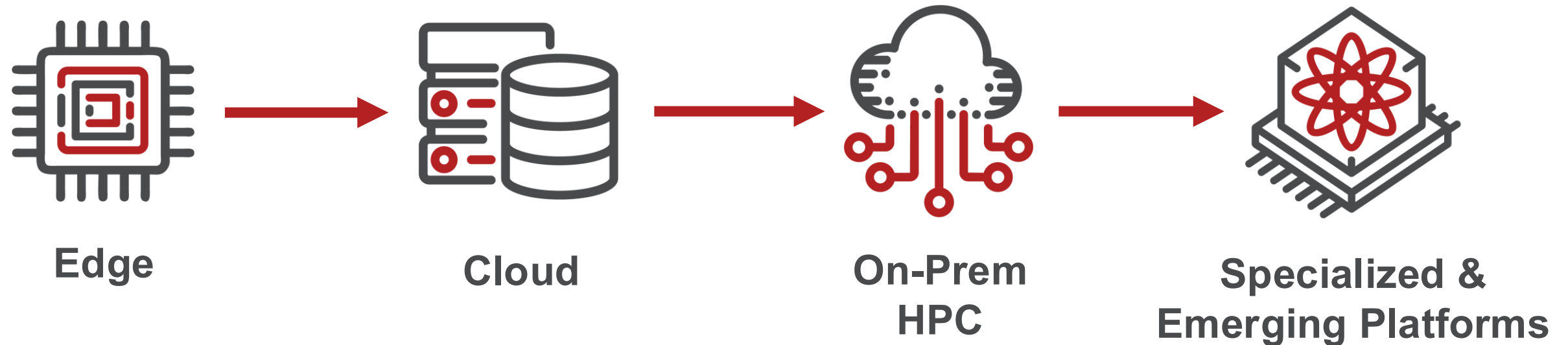


HPC

But the cost models, value models, and planning assumptions often still reflect a world where compute is mostly on-prem and homogeneous.

**Goal: Build a framework to evaluate cost, value, and strategic fit across the computing continuum**

# Science Has Outgrown a Single Environment



Every point on this continuum involves tradeoffs:

Performance → Flexibility  
Cost → Agility

Throughput → Optimization  
Control → Innovation

**The hardest HPC  
question isn't  
“Can we run it?”**

**It's “Where  
should it run,  
and why?”**

# Most Existing Decision Models Stop Too Early

## What is Often Measured

- Capital cost
- Hardware acquisition
- Utilization
- Run cost

## What is Often Under-measured

- Foundational infrastructure costs
- Staff time / Operational burden
- Queue delay / Access latency
- Workflow friction
- Data movement /integration cost
- Technology currency
- Opportunity cost

## What is Often Missing Entirely

- Time-to-insight
- Scientific value
- Research optionality
- Ability to scale collaboration
- Readiness for AI and hybrid workflows

# The Framework We Set Out to Build

**Computing  
Cost Model**

*“What does it really cost?”*

**Scientific  
Value Model**

*“What scientific value does it create?”*

**Continuum Strategy  
Framework**

*“How do institutions evolve towards this future?”*

## What We're Learning

1

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Most decisions  
are driven by  
familiarity and  
sunk cost

2

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Total cost of  
ownership is often  
incomplete

3

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Scientific value  
is missing from  
most comparisons

4

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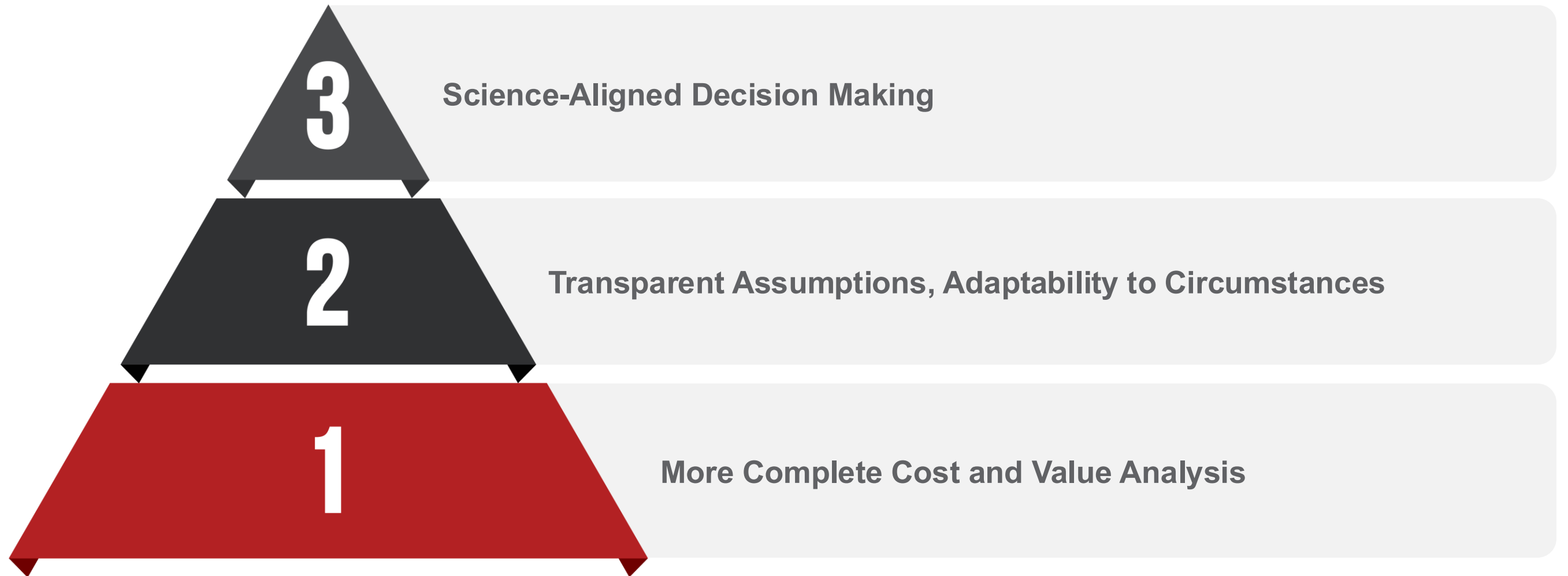
Hybrid is already  
the norm

5

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The community  
needs shared  
language and  
methods

# What This Framework Makes Possible



## Why This Should be a Community Effort

- Shared benchmark assumptions
- Common workload archetypes
- Reusable value metrics
- Better inter-site comparisons
- Stronger planning and sponsor communication
- More defensible investment decisions

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Help us build a common  
framework for  
**Cost, Value, Scientific  
Decision-making**



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**Thank you**