

CONTROL YOUR WORLD

On-premises HPC hardware solutions
that provide performance
with confidence.



**Design your model.
Design your HPC solution.**

**Implementing a numerical
weather model**

Scott Capps, Ph.D.
Atmospheric Data Solutions



Atmospheric Data Solutions

Core responsibilities: implement high-resolution numerical weather modeling solutions

- Wildfire potential forecasts
- High-impact weather studies and forecasts
- Utility load and outage forecasts
- Building climatological datasets
- Conducting climate change studies

PARTIAL CLIENT LIST



A Sempra Energy utility®



Designing your model

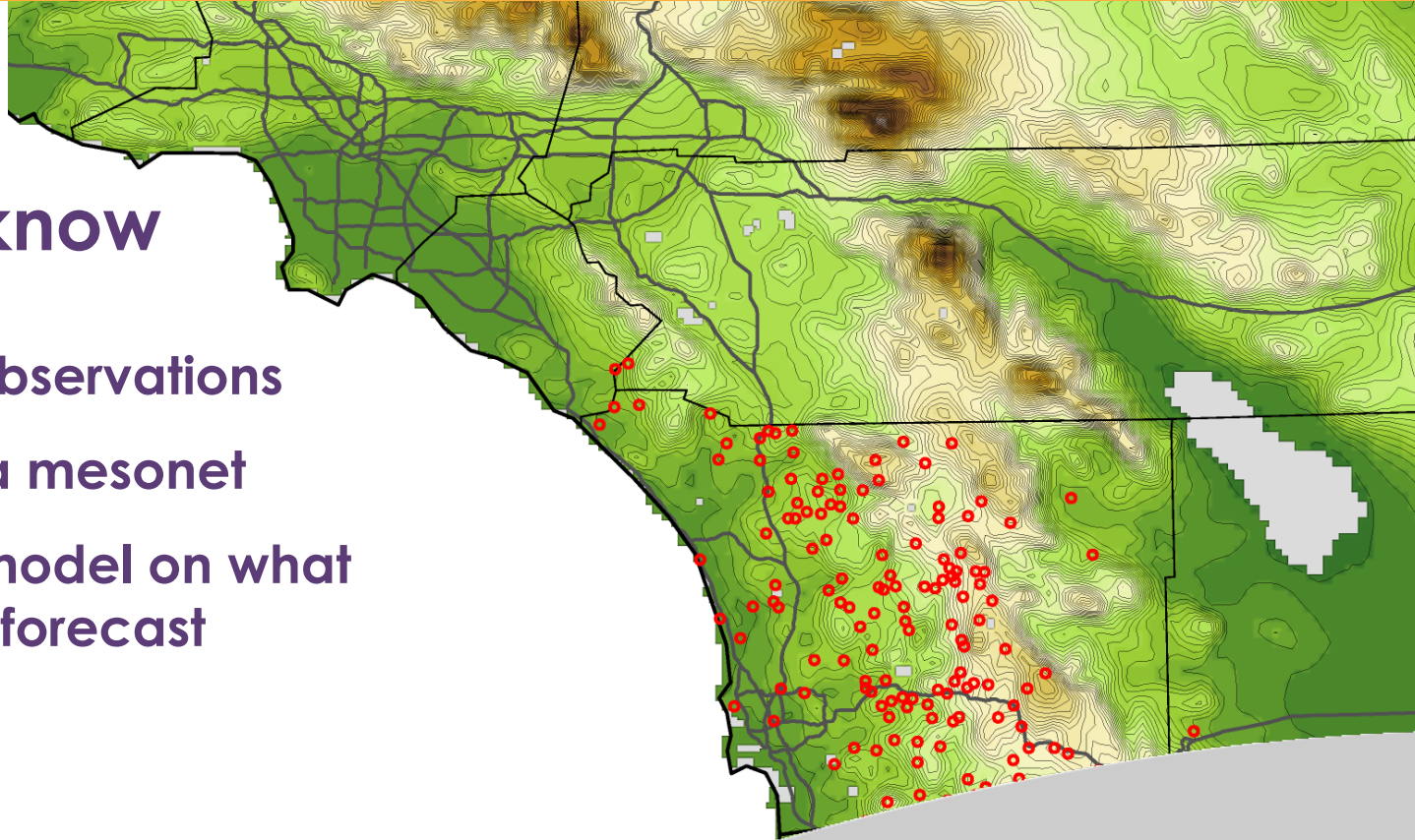
**“ALL MODELS ARE
WRONG, BUT SOME ARE
USEFUL”**

GEORGE E.P. BOX

**WITHOUT
OBSERVATIONS YOU
CAN'T KNOW HOW
USEFUL YOUR
MODEL IS**

What we know

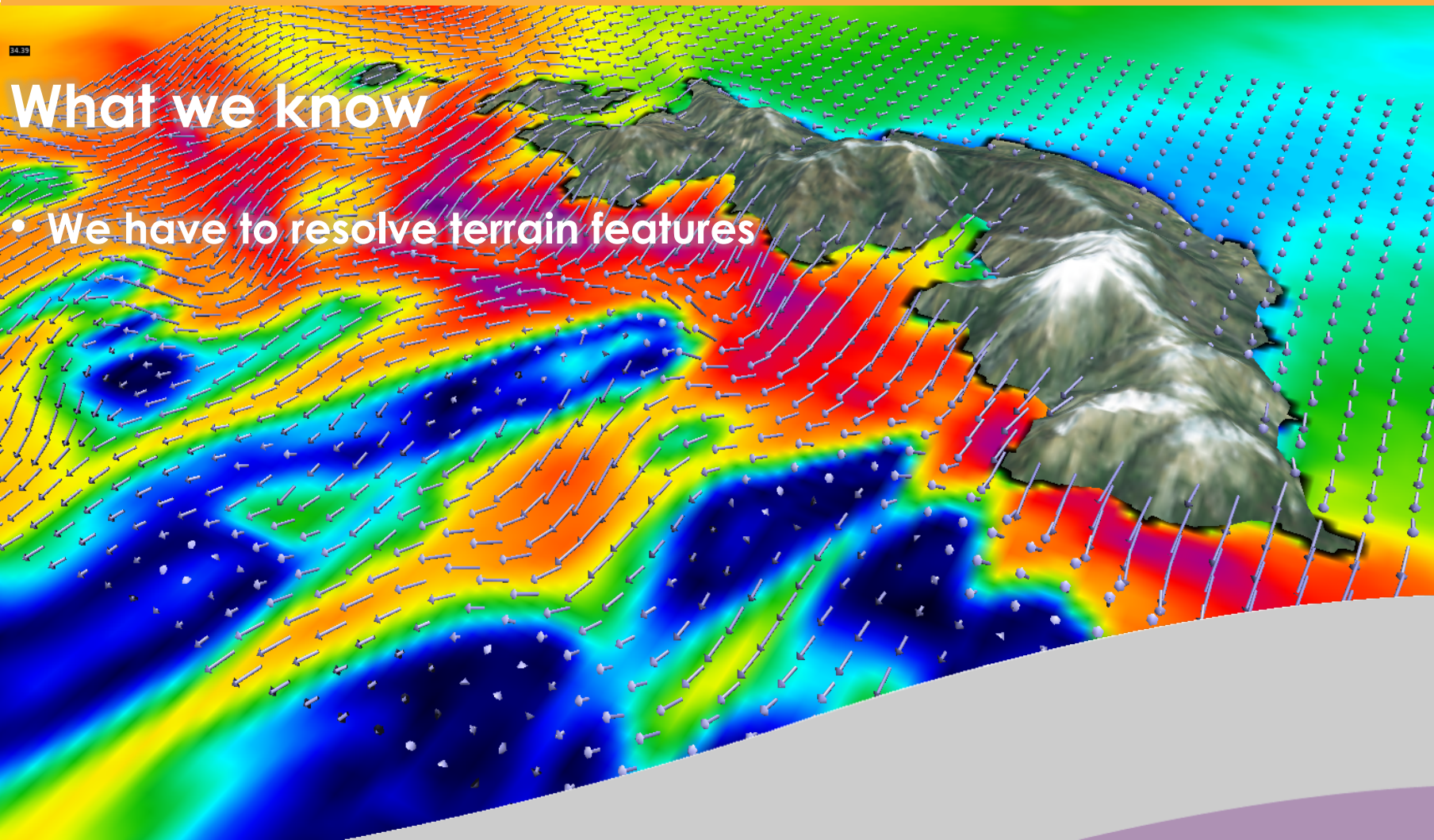
- **Begin with observations**
- **Implement a mesonet**
- **Design the model on what you want to forecast**



Designing your model

What we know

- We have to resolve terrain features



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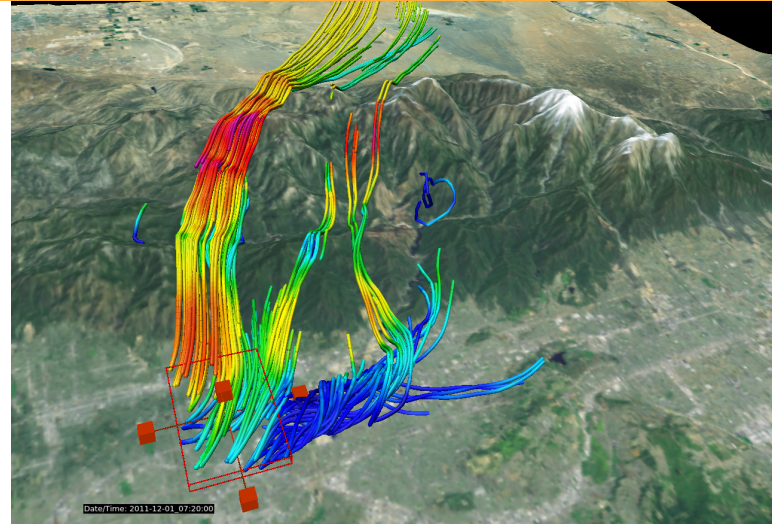
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Designing your model

What we know

- Other influences to model design include territory size, forecast length, model complexity...



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What we may not know

- ...and **COMPUTING HARDWARE**



Designing your HPC solution

We require specialized hardware

- Millions of calculations across the territory
- Many of which must be done in parallel



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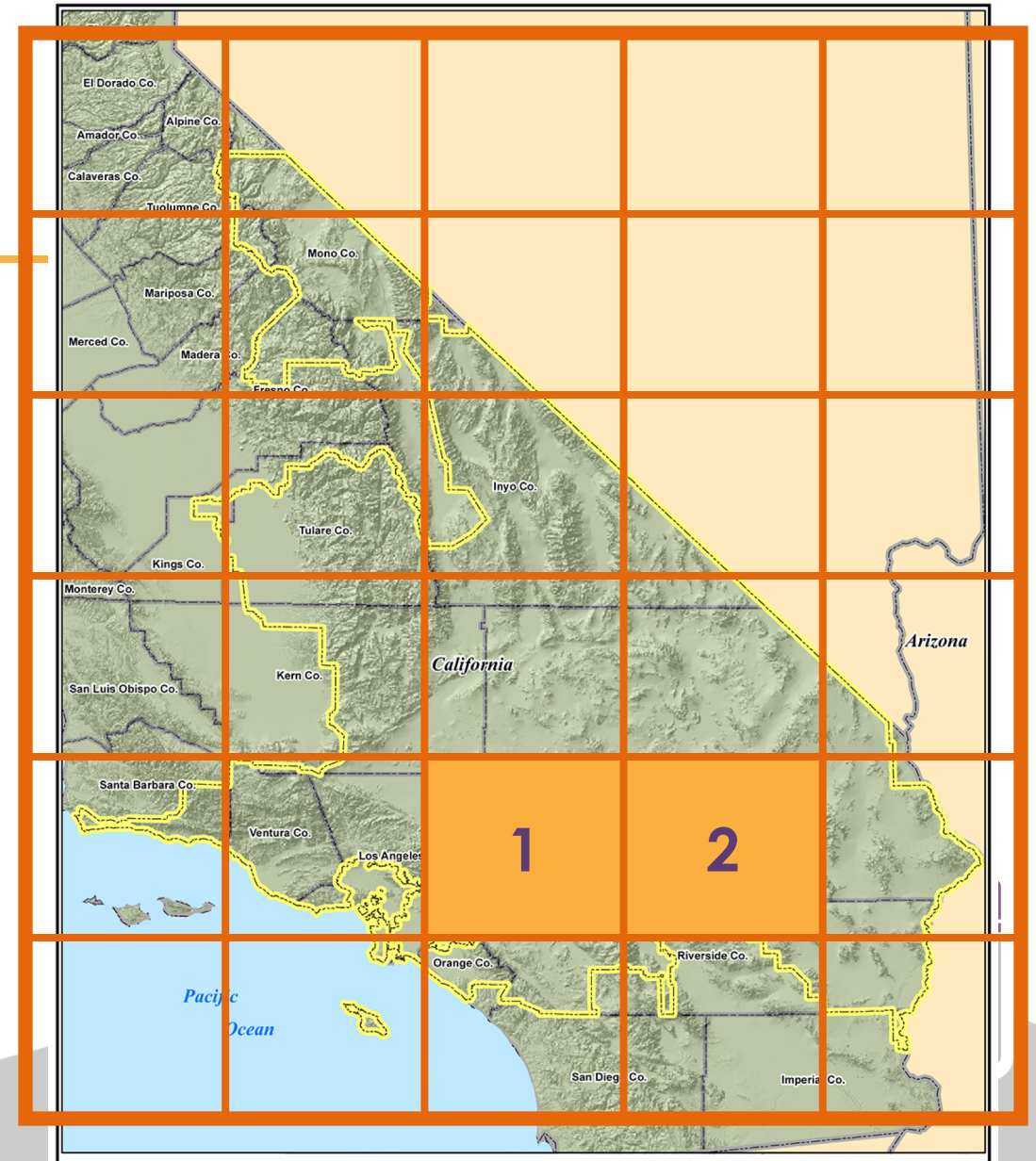
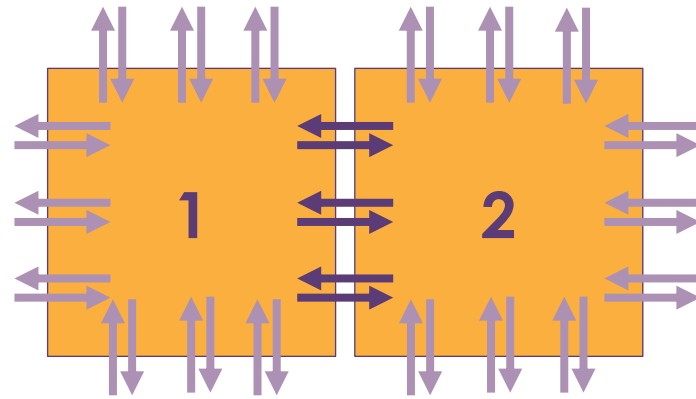
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Designing your HPC solution

Simple WRF domain decomposition illustration

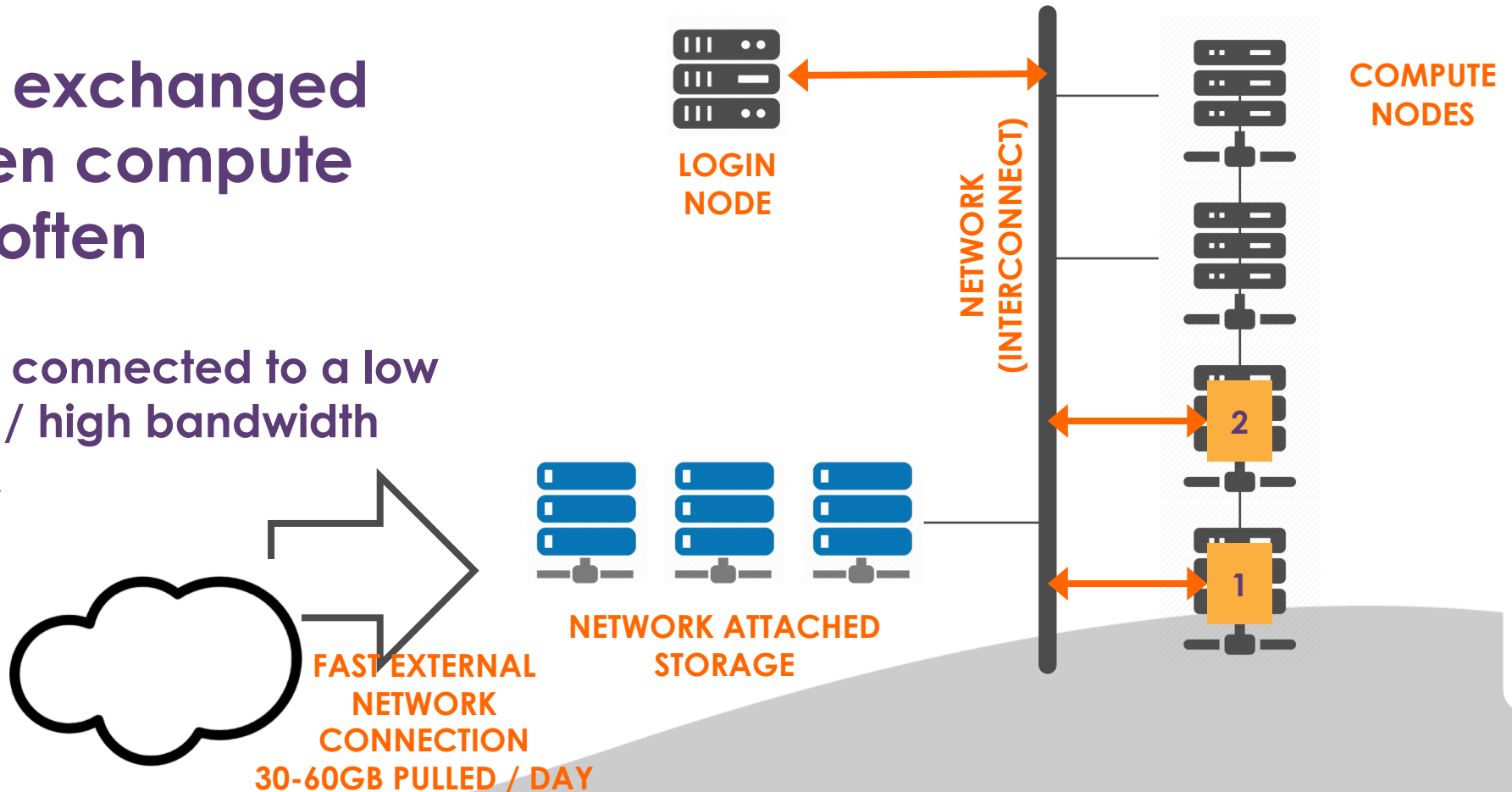
- Model domain is decomposed into patches; distributed among processors.



Designing your HPC solution

Data is exchanged between compute nodes often

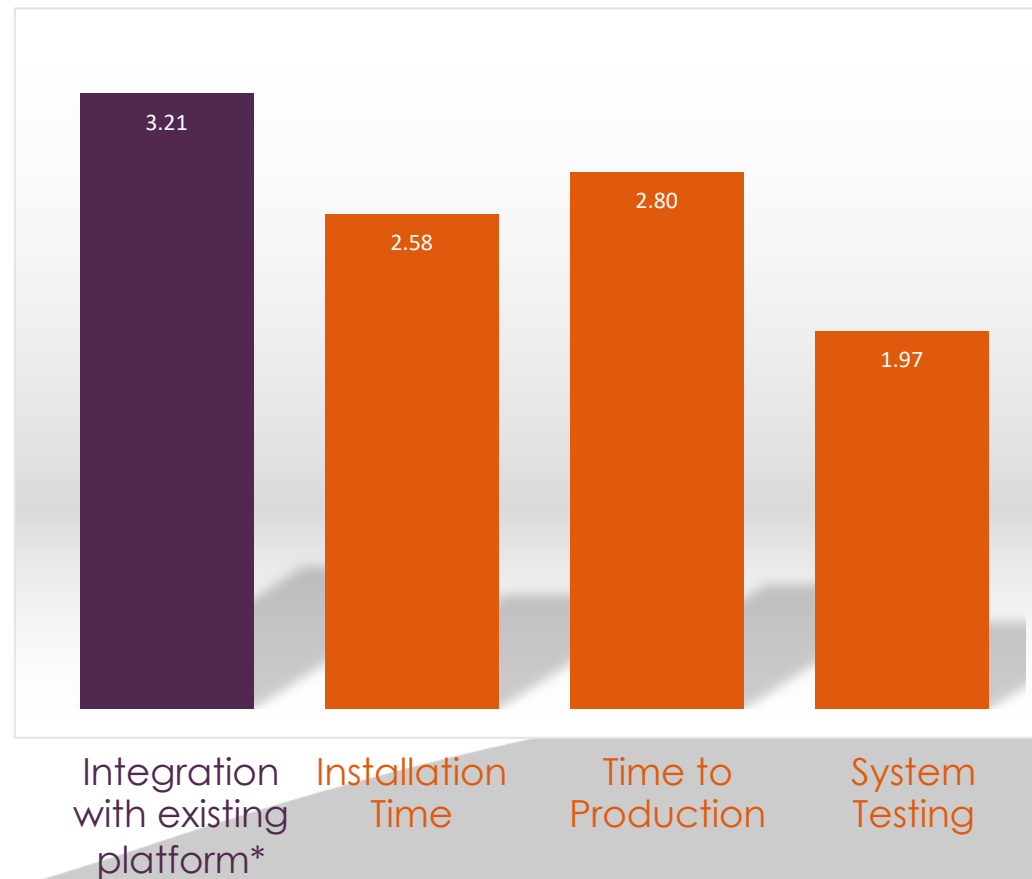
- Must be connected to a low latency / high bandwidth network



Efficient system integration is **critical** to your success

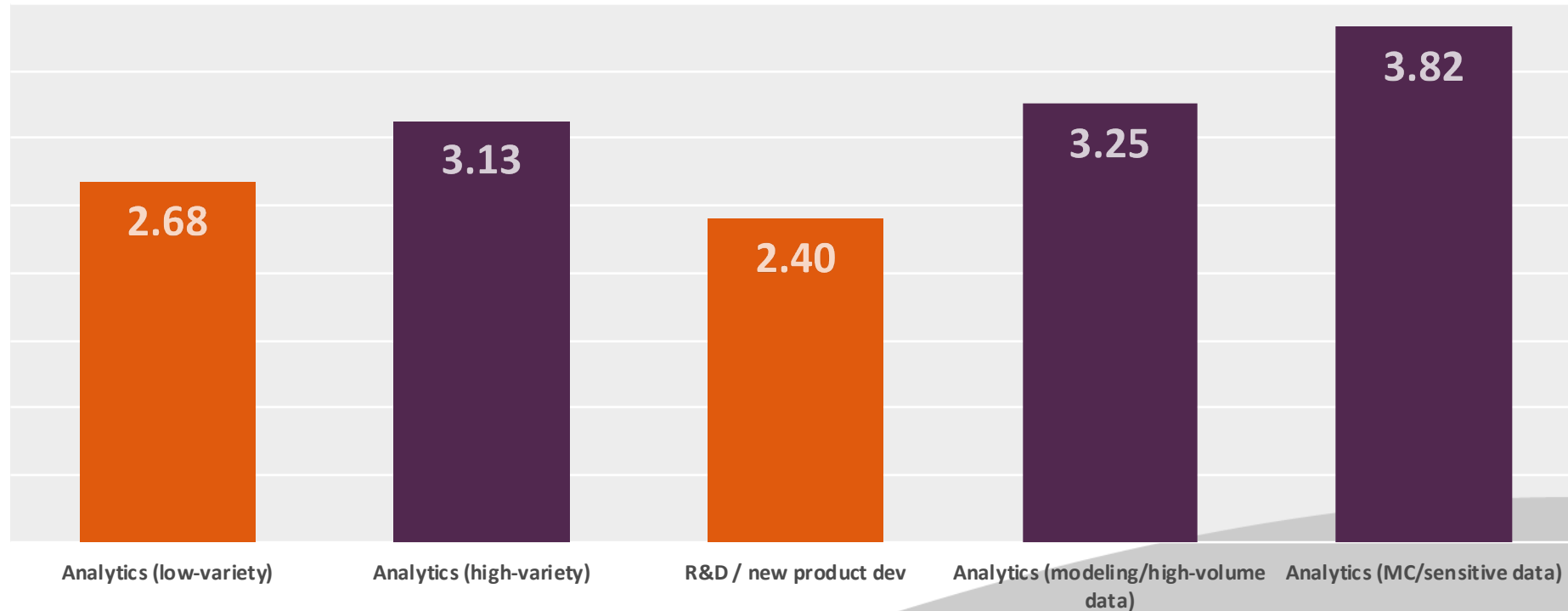
Focus on your work.

We'll do the rest.



Cloud vs. On-premises

On a scale of 1 (could be all cloud-based) to 5 (should be all on-premises), please rate the following types of work for cloud vs. on-premises deployments.



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