

# Simulation in the Cloud

*Challenges, Tools and Mindset*



Manoj Mahendran  
Lead Application Engineer



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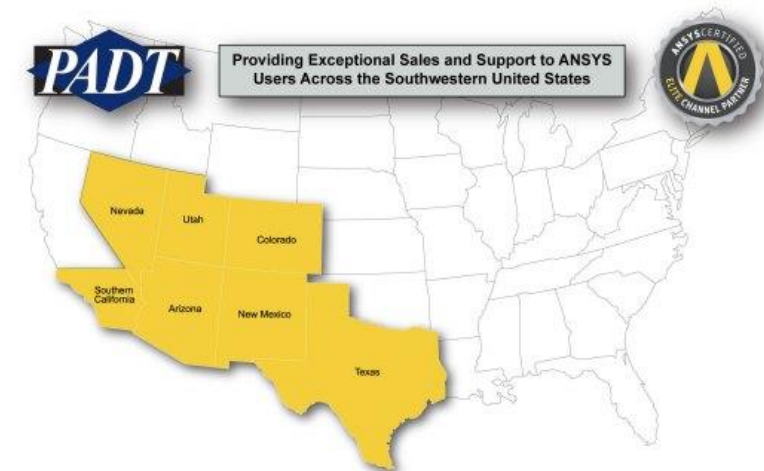
# PADT

- PADT is an Engineering Services Company

- Engineering Products and Services
- Founded in 1994 by 4 Allied Signal Aerospace Engines Engineers
- Based in Tempe Arizona
  - Offices in Littleton, CO; Albuquerque, NM; Torrance, CA; Austin, TX and Murray, UT
- Provide Simulation, Product Development and 3D Printing in the Southwest US
- Reseller for: ANSYS, Stratasys, Flownex, Geomagic, Desktop Metal, ZEISS
- Our own Products: CUBE Simulation Computers, and SCA 3D Printed Part Cleaners



Business Partner



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# ANSYS

Market Leader Across Individual Physics with Industry-Leading Platform



Structures



Fluids



Electromagnetics



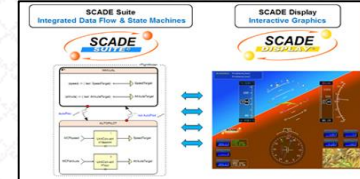
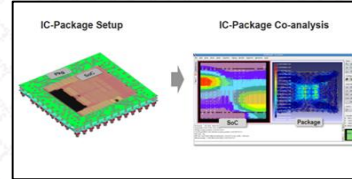
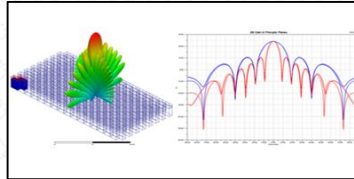
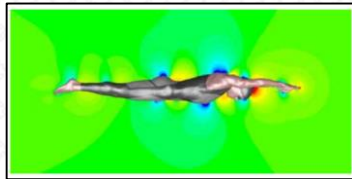
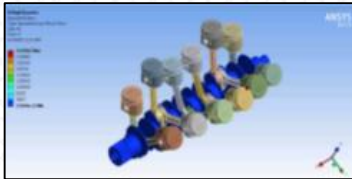
Semiconductor  
Power



Mission-critical  
Embedded Software



Optical



Platform



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# ANSYS Coverage Example

**ANSYS pervasively addresses all aspects of vehicle simulation**

HMIs & Infotainment Systems



Radar & V2X Communication



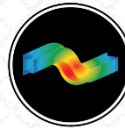
Engine & Powertrain



Electric Machines



Body & Chassis



Battery & Power Systems



Aerodynamics & Thermal Management Systems



ADAS & Autonomous Driving Systems



Brakes & Steering Systems

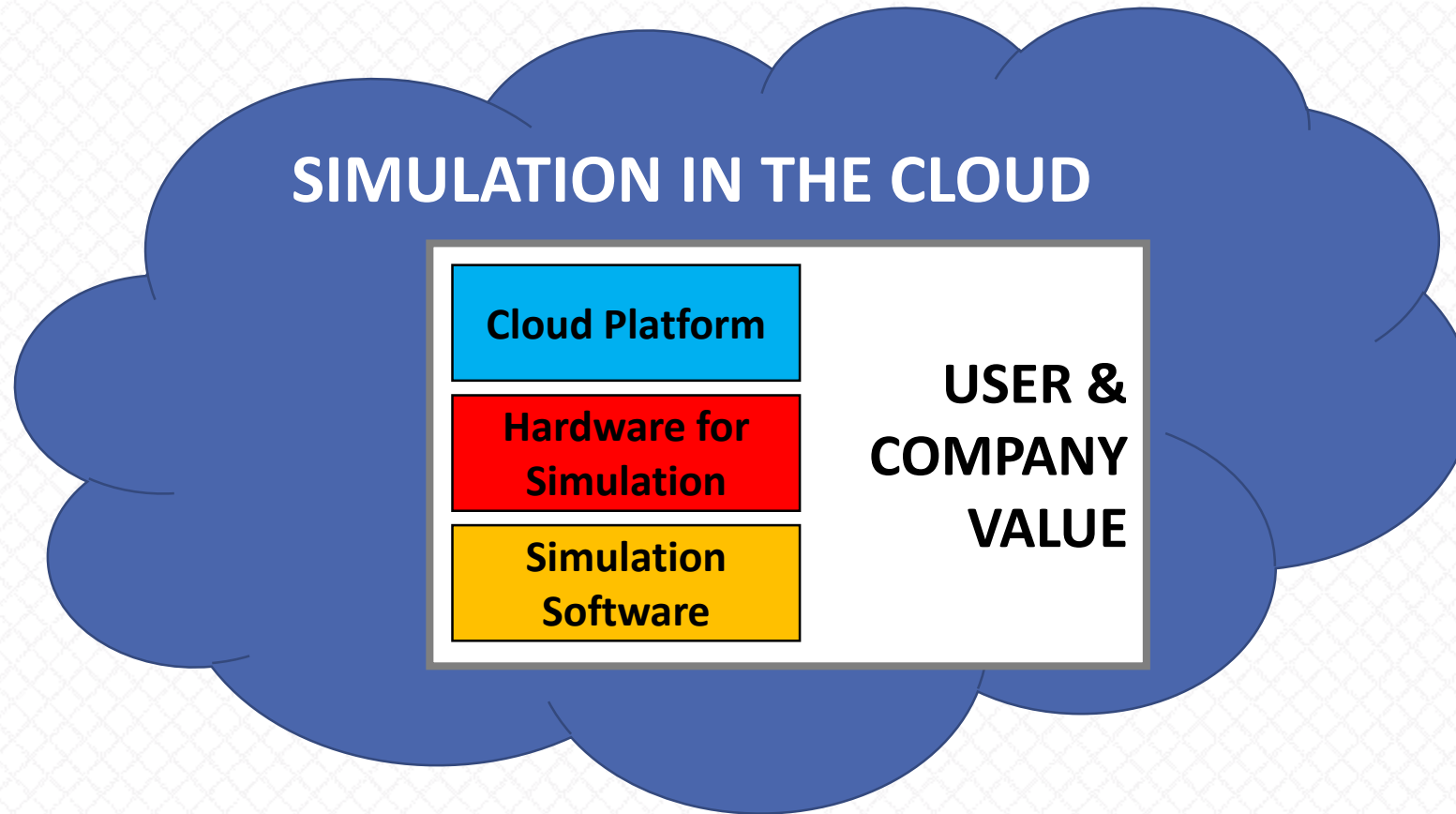


Electronics & Power Electronics





# What are we talking about

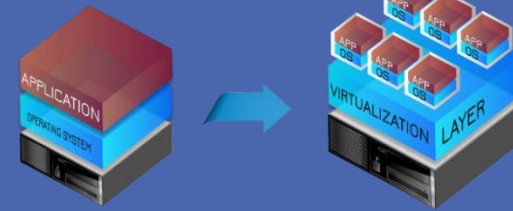


# Challenges with Simulation in the Cloud

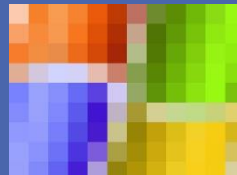
## Data Security



## Virtualization



## Visualization



## Configuration



**BOTTLENECK RATHER THAN AN ENABLER**

# Simulation Software

- Plug in however many cores and hit Go....we wish

- At ANSYS Inc.

*“An ongoing effort designed to remove computing limitations from engineers who use computer aided engineering in all phases of design, analysis, and testing.”*

*It is a hardware and software initiative*

Compatibility across  
Platforms

Scalability across Physics

Efficiency across Cores



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# Hardware for Simulation

- Bare Metal vs Virtualization
- Different hardware configuration needs

Structures

Electromagnetics

Fluid Dynamics

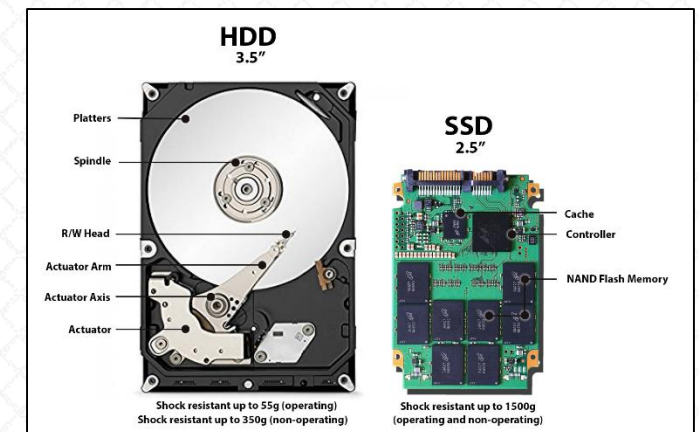
GPU

CPU Frequency & RAM

# of CPU Cores & RAM

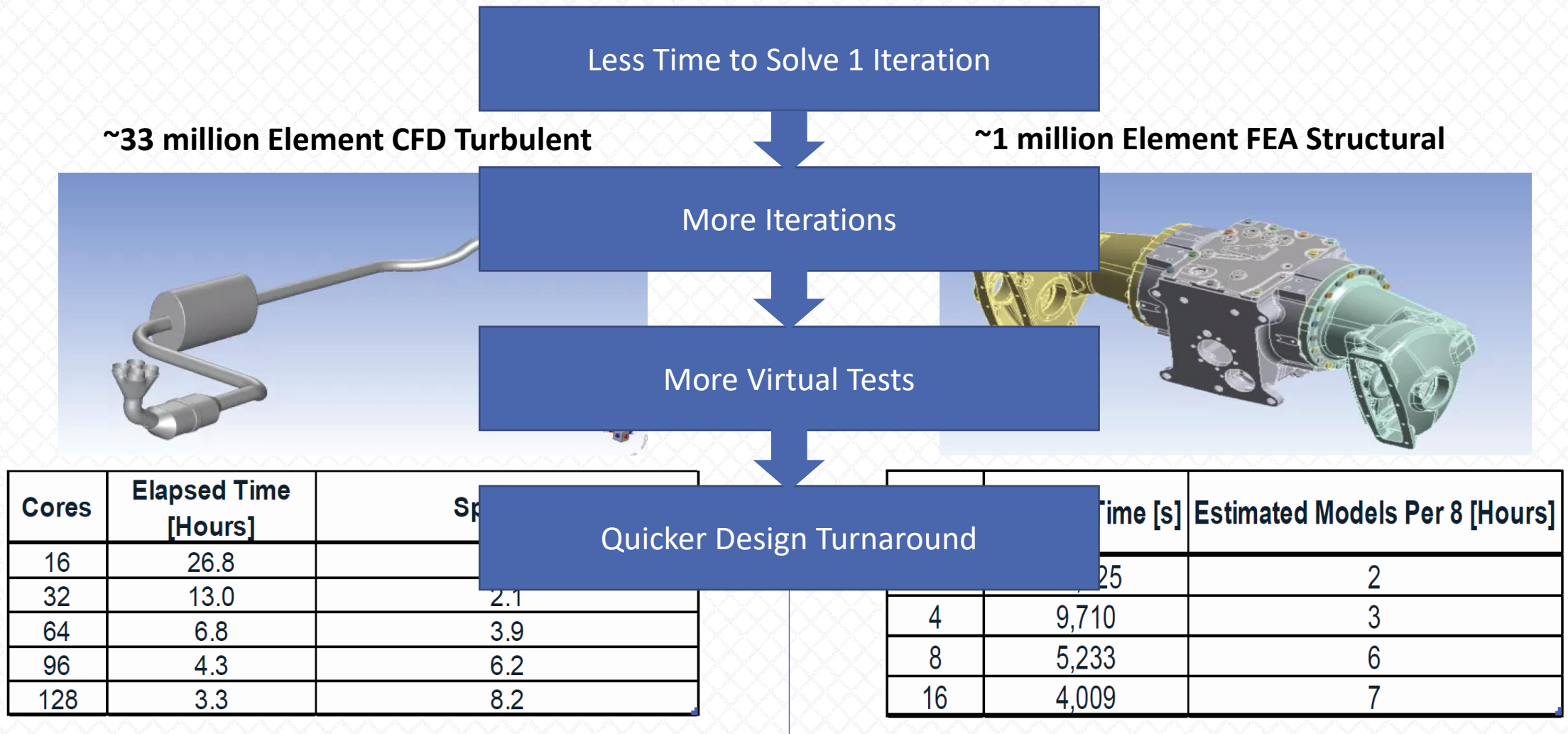
	Bare Metal Server	Virtual Server
Performance	✓	
Security	✓	
Privacy	✓	
Scalability		✓
Flexibility		✓
Price		✓

- Even storage configuration can be critical





# Combining Simulation Software with HPC



# What we need

Breadth and Depth of  
Simulation Capabilities

Flexible Hardware  
Configurations

Pre-configured

**Easy to Access, Easy to Use**



# NIMBIX

*Supercomputing Made Superhuman*




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# NIMBIX Hardware Benefits

- Various hardware configurations for variety of simulation needs
  - More RAM
  - More CPU Cores
  - Multiple GPUs
- Covers the variety of simulations you need to run without sacrificing efficiency and effectiveness

 ANSYS® Platform R19  
From \$1.25/hr + license

×

ANSYS Workbench Platform

Launch interactive Workbench in your browser.

GENERAL

OPTIONAL

STORAGE

PREVIEW SUBMISSION

Machine

Machine type

Cores

Parameters

ANSYS Version

16 core, 128GB RAM (GPU for interactive GUIs) (nc3)

16 core, 128GB RAM (GPU for interactive GUIs) (nc3)

16 core, 512GB RAM (GPU for interactive GUIs) (nc5)

20 core Intel Skylake , 192GB RAM(accelerated OpenGL on master) (nc9)

8 core, 64GB RAM (CPU only) (n2)

16 core, 128GB RAM (CPU Only) (n3)

16 core, 256GB RAM (CPU Only) (n4)

16 core, 512GB RAM (CPU only) (n5)

20 core Intel Skylake, 192GB RAM(CPU only) (n9)

2 core, 16GB RAM (CPU only) (n0)

4 core, 32GB RAM (CPU Only) (n1)

2 core, 128GB RAM (CPU only) (n32)

4 core, 128GB RAM (CPU Only) (n34)

8 core, 512GB RAM (CPU only) (n58)

20 core Intel Skylake, 192GB RAM(CPU only) (n9\_padt)

16 core, 128GB RAM, NVIDIA M2090 GPU (ng2)

4 core, 32GB RAM, NVIDIA K40 GPU (ng4)

4 core, 32GB RAM, NVIDIA K80 GPU (ng5)


4 core, 32GB RAM, NVIDIA M40 GPU (ng7)

16 core, 128GB RAM, dual NVIDIA M2090 GPU (ngd2)

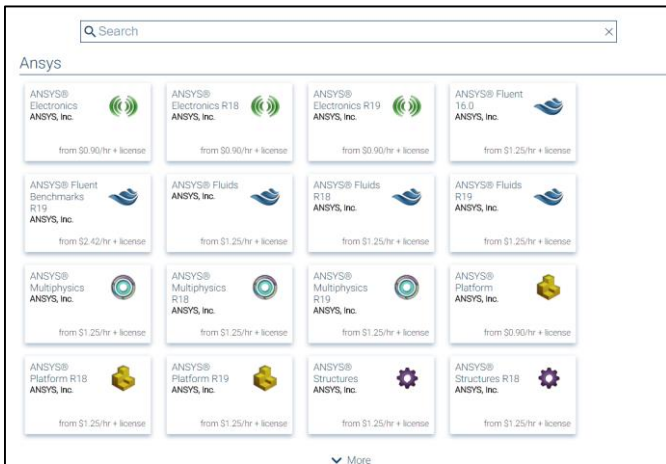
16 core, 128GB RAM, dual NVIDIA K40 GPU (ngd4)

SUBMIT

ANSYS®  
Platform R18  
ANSYS, Inc.



# ANSYS on NIMBIX



Entire ANSYS Platform

ANSYS is Preconfigured

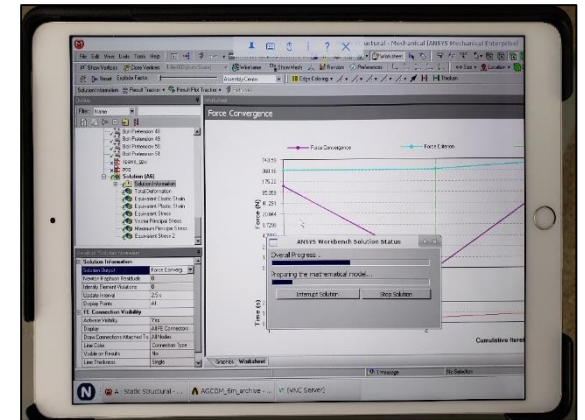
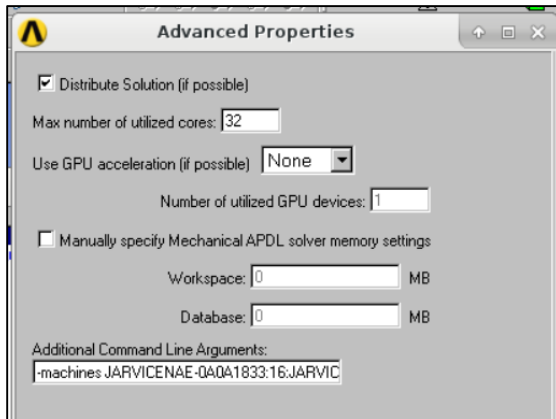
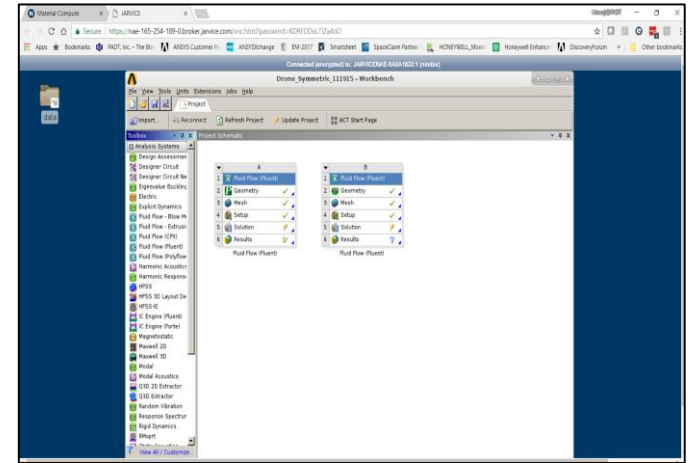
Available through any Platform



User can focus on Simulation

No Company Maintenance

Value of Efficient Hardware Use



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# Demo



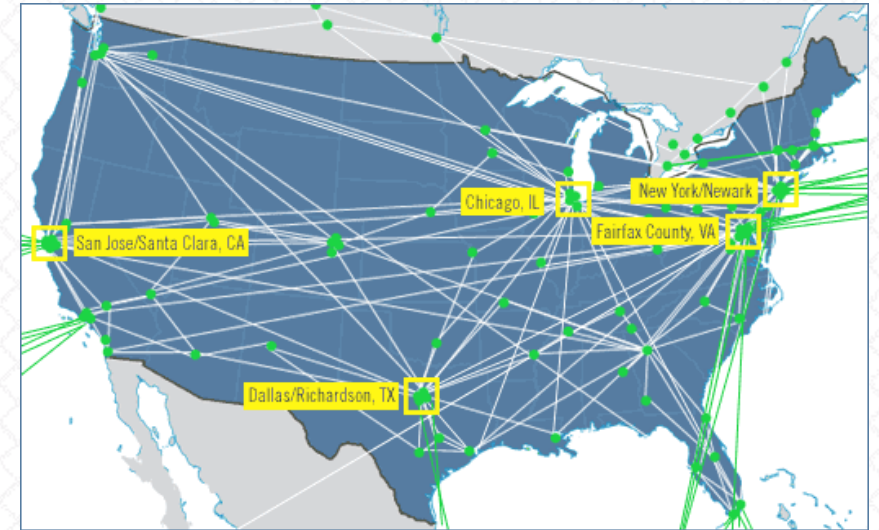
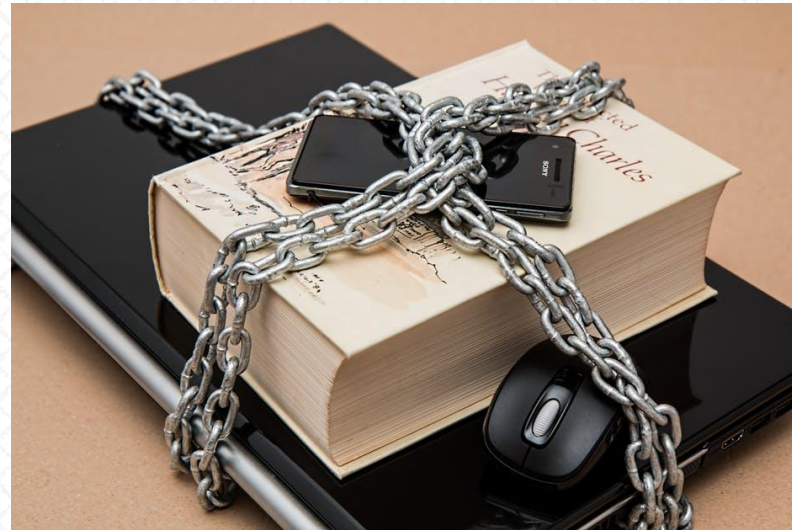
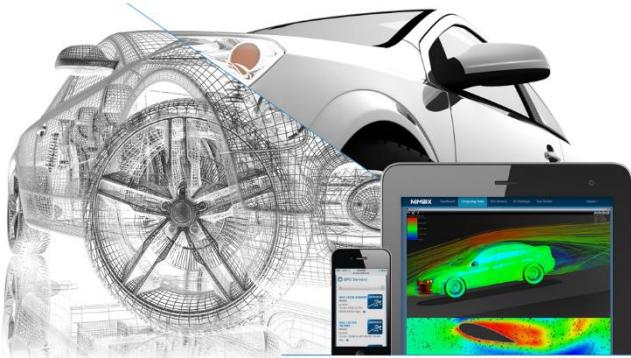
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# Conclusion

- Simulation in the Cloud is much more practical today
  - The right platform with the right tools
  - Data security will always be a concern
  - Bounded by infrastructure

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# Mindset

A photograph of a chalkboard with a lightbulb placed in the center. There are several chalk-drawn circles and short horizontal lines on the board. Two blue text boxes are overlaid on the image. The background of the slide features a subtle diamond-patterned grid.

New tools, Same methods is fine but...

New tools, New methods can work out better



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