CAASE18
The Conference on Advancing Analysis & Simulation in Engineering
June 5 - 7, Cleveland, Ohio
Co-Hosted by NAFEMS DE Digital Engineering

Enabling Democratization By Engineers, For Engineers

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Vision...

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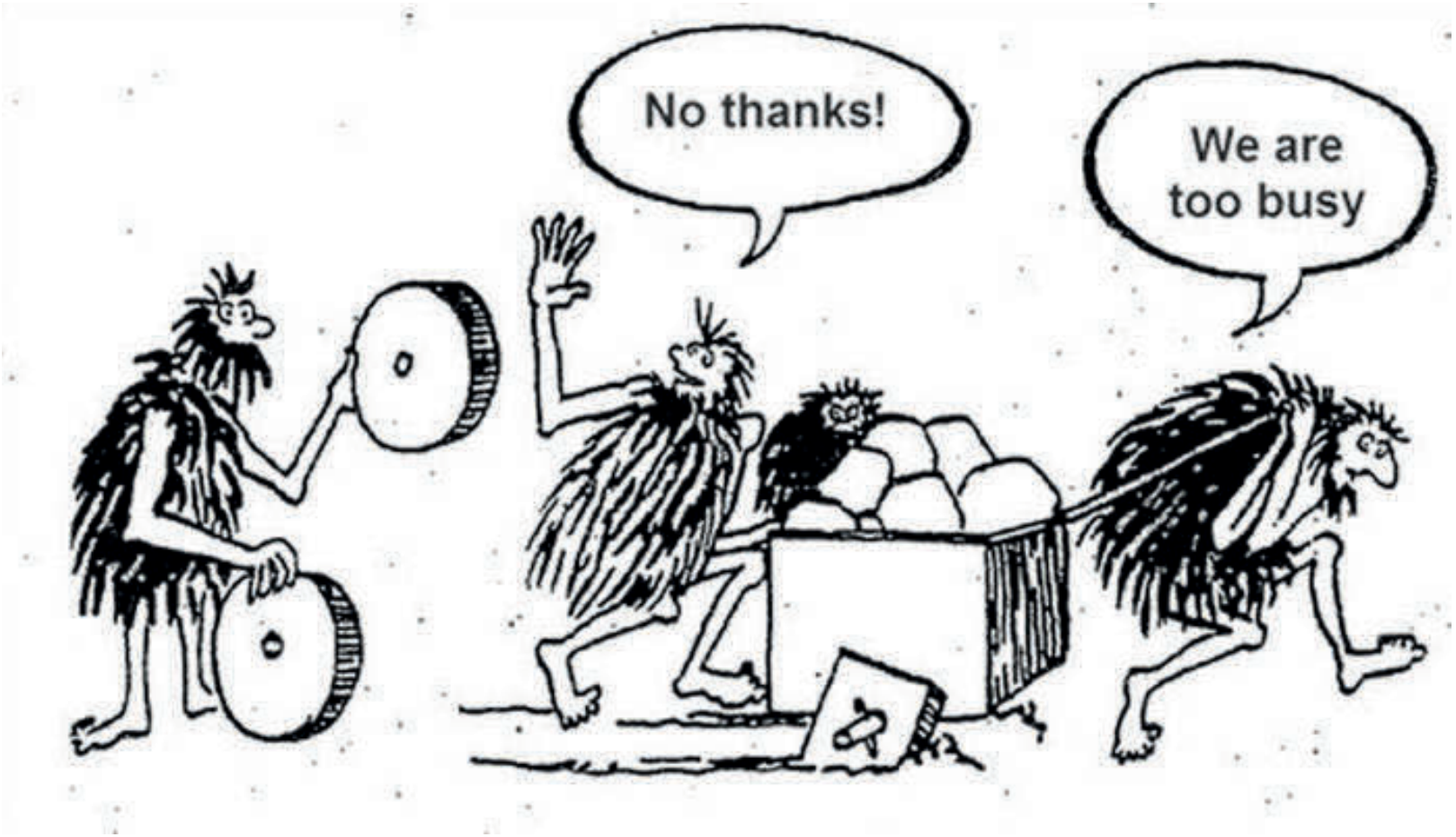
Reality?



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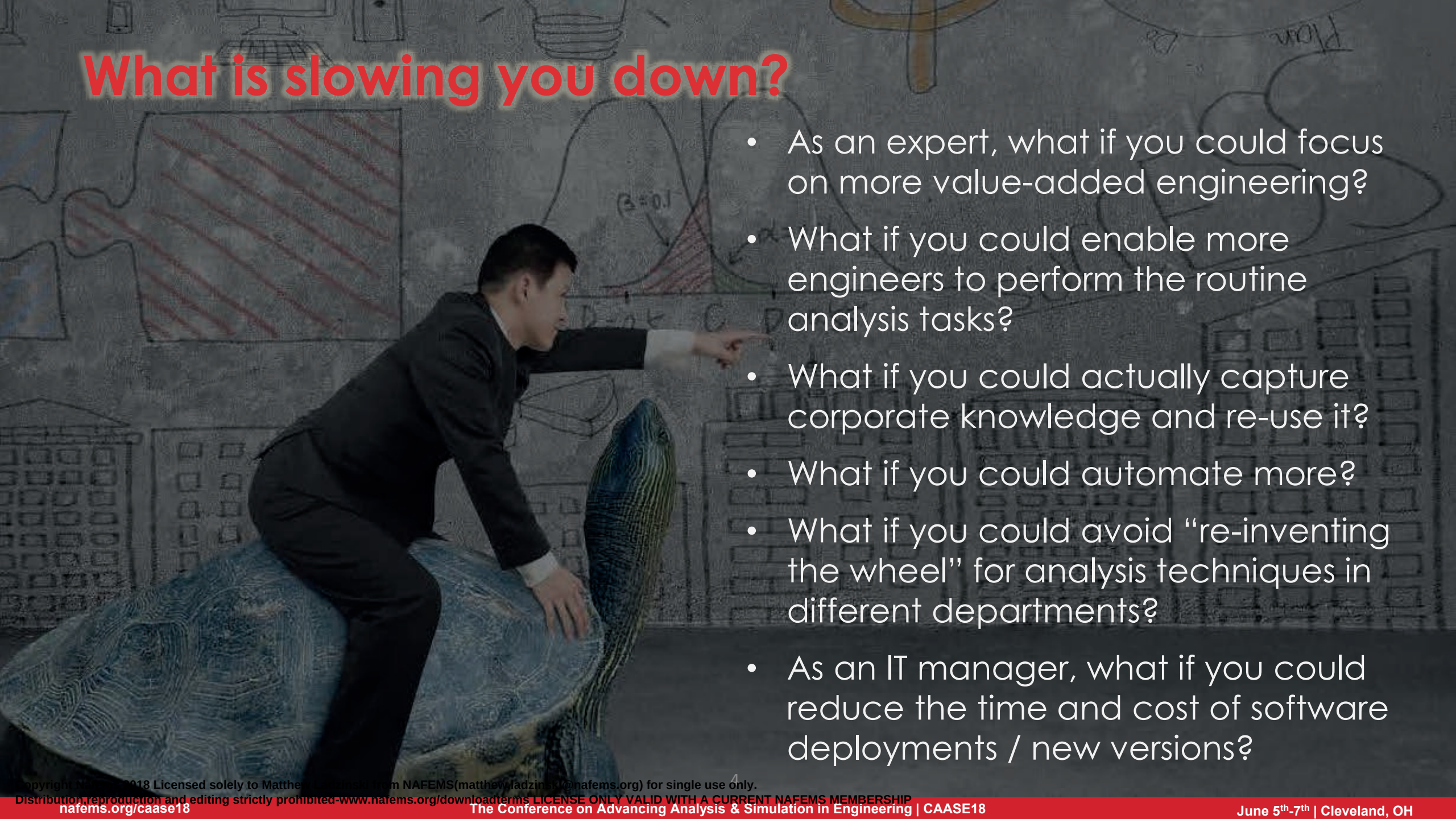
What is slowing you down?



- As an expert, what if you could focus on more value-added engineering?
- What if you could enable more engineers to perform the routine analysis tasks?
- What if you could actually capture corporate knowledge and re-use it?
- What if you could automate more?
- What if you could avoid "re-inventing the wheel" for analysis techniques in different departments?
- As an IT manager, what if you could reduce the time and cost of software deployments / new versions?

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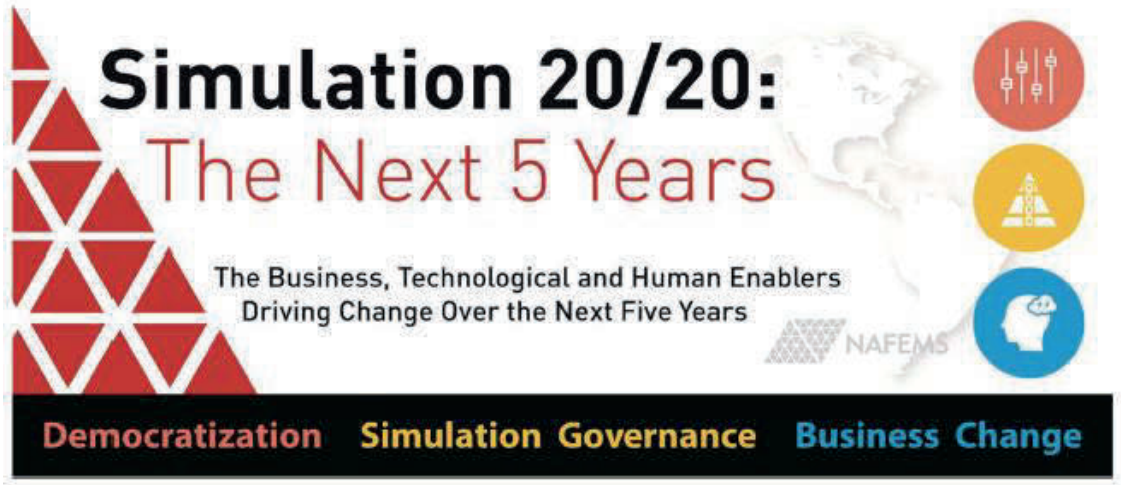
Democratization



NAFEMS Simulation 20/20 Vision, 2015
https://www.nafems.org/about/regional/americas/events/2020vision/democratization/

- Expert knowledge capture & re-use
- Usability
- Accessibility

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What people want from software…

FedEx *FAST*

Disney FRIENDLY

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Democratization Example

- **Client:** Commercial vehicle suspensions
  - Many varied applications
  - Many suspension models
  - Many suspension configurations
- **Challenge:** How to quantify the life of the suspension for a given application.
- **Solution:** A quicker tool to guide the product team without needing to use an analyst every time.

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Engineering Tool for Product Team

- Inputs Include
  - Trailer Type
  - Axle Weight Rating
  - Expected Duty Cycle
- Outputs Include
  - Estimated Life (miles)
  - Summary Report

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So what's the problem…?

- Why is democratization not more widely adopted?

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My App… version 1

- Firstly, need to agree the infrastructure, software framework, who is going to create it, incorporate analysis & simulation tools, test it, then deploy it to relevant employees.

- But creating the app is only the start.

- **What happens next?**

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Democratization in Practice

- New versions of simulation tools are regularly released
- New simulation tools are sometimes added
- New projects may require modified functionality - enhancements
- Problems are reported – bugs need to be fixed
- Updates to apps must be tracked and version controlled

- **Who** is going to do all this?
  - Internal IT?
  - External vendor?

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Democratization in the Hands of Engineers

- Democratization becomes a reality when engineers themselves are able to create apps without requiring custom IT projects or software development skills.

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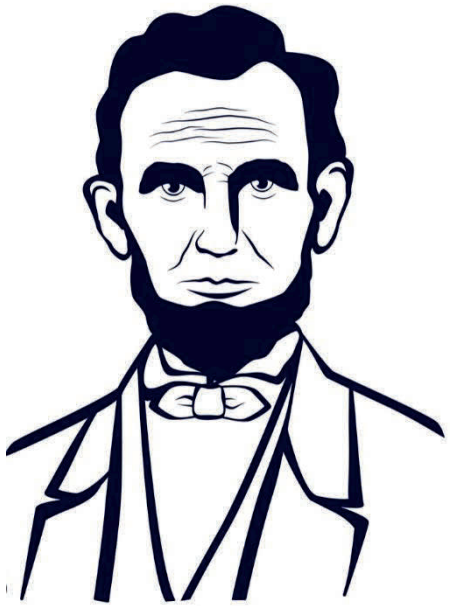
Democratization in the Hands of Engineers

- Democratization becomes a reality when **engineers** themselves are able to **create apps** without requiring custom IT projects or software development skills.

- "…**by the people, for the people**"



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Process of creating an app

Define inputs & outputs

Define execution of analysis / simulation

Test & validate app

Design interface pages & reports

Add advanced logic with scripting (if needed)

Share app

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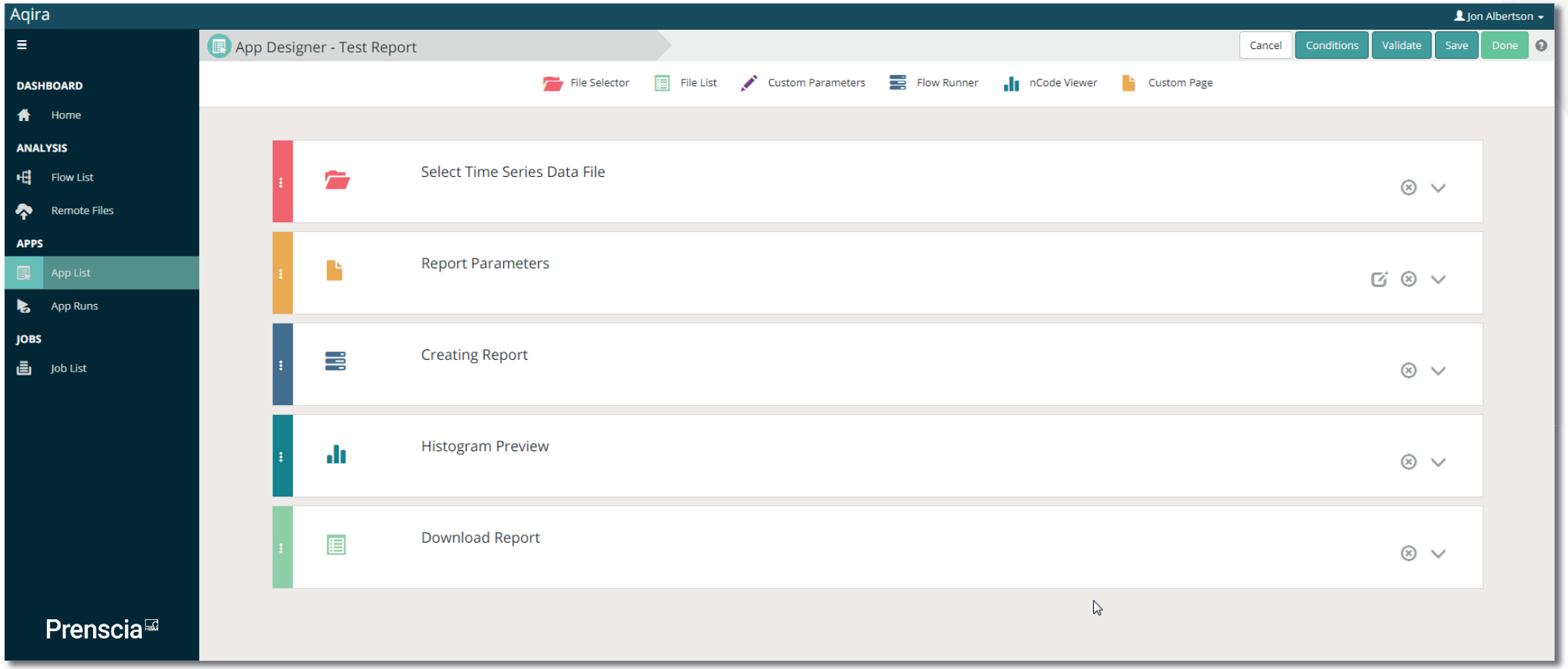
Example software: Designing App



- Example using Aqira showing a drag and drop interface to define the App contents and logic

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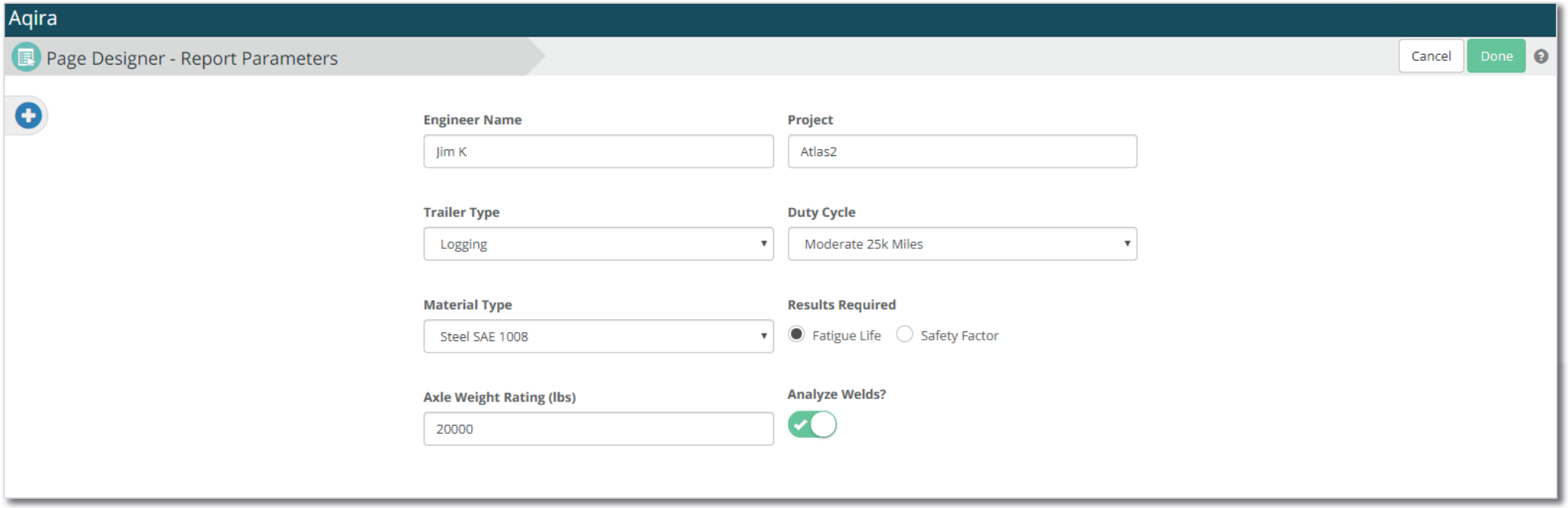
Example software: Designing Interface



- Example using Aqira showing a drag and drop interface to define the App pages

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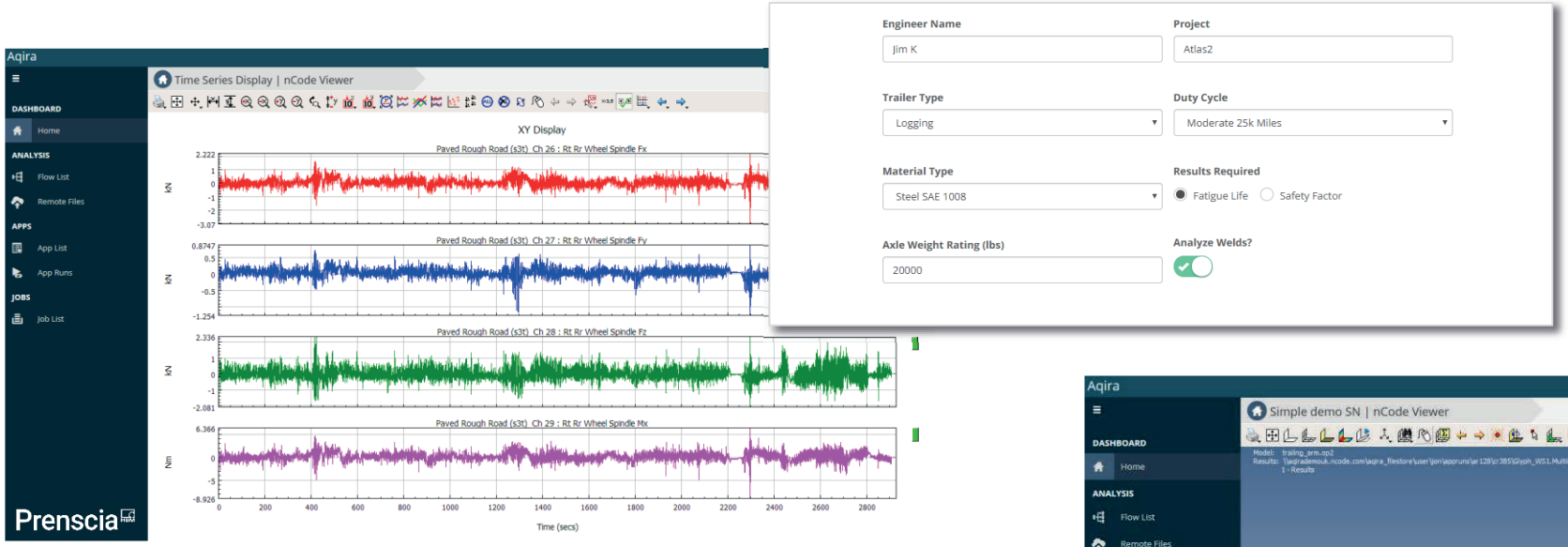
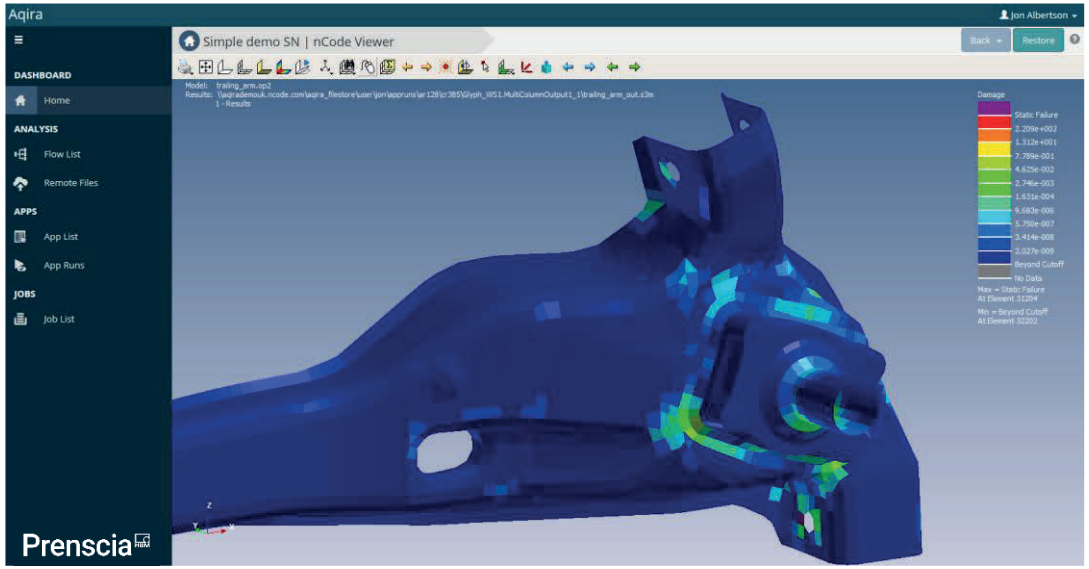
Example software: Running App



- Select inputs



- View results

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Democratization using a Platform for Engineering Apps

- Access
  - Web-based platform means access from anywhere
  - Mobile device enabled
- Share
  - Control who has access and permission to do what
- Manage
  - Version control
  - Draft versions for testing and validation
  - Retiring versions
  - Notifying users of changes

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Democratization using a Platform for Engineering Apps

- Job execution
  - Built-in job management for server side processing
  - Scalable addition of more compute resources
  - Links to HPC workload management tools
- Results management
  - Store results and inputs used for traceability
  - Links to SDM and PLM

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Summary

- Democratization must **overcome some real practical challenges** in order to become a broadly adopted reality.
- Democratization must be **in the hands of engineers** themselves - “by the people, for the people”.
- Democratization **requires a platform for engineers** to create and share easy-to-use engineering apps.

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Thank You!

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