31st Annual INCOSE international symposium

virtual event

July 17 - 22, 2021

Sheard, Bouyaud, Osaisai, Siviy, and Nidiffer

Finding Your SysE Role in 21st Century SW-Dominant Organizations

Agenda

- FAANGs, and SysE place in them
- “Book Club” and book story arc
- Distinguished Engineer
- SW-unique challenges and some potential WG products
- Vision

FAANGs

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- As of 2018, five largest tech giants were collectively worth more than the entire economy of the UK*

*Caveat: Five included **Microsoft** rather than **Netflix.**

*Source: Associated Press via Inc. com https://www.inc.com/associated-press/mindblowing-facts-tech-industry-money-amazon-apple-microsoft-facebook-alphabet.html. Photo source: https://balentine.com/insights/blog/are-currencies-an-investable-asset-class/

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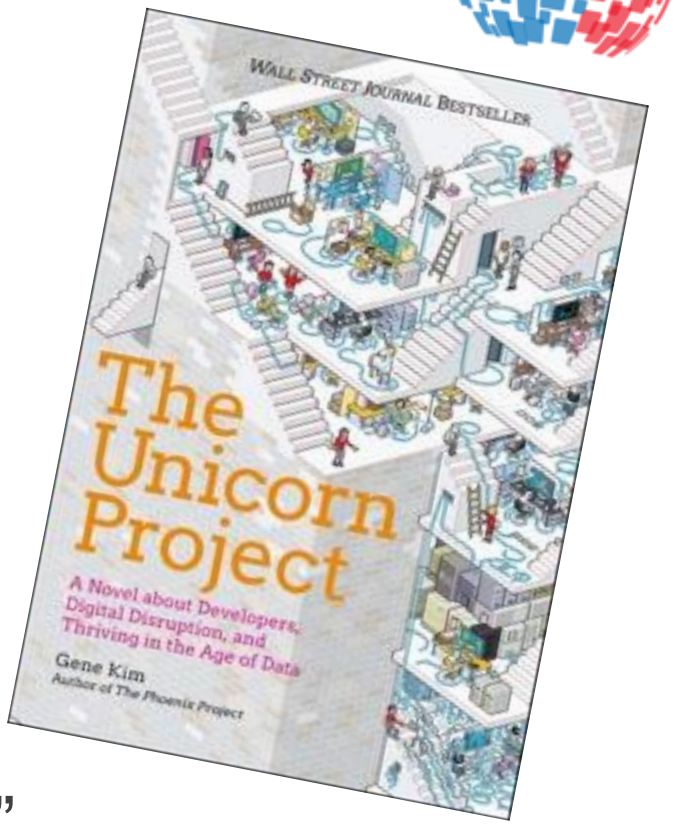
Other answers

- How many people here are from FAANGs? (few, we suspect)
- In Pittsburgh, we could get NO answers to requests from this type of company to present to INCOSE chapter meetings

“Book Club:” The Unicorn Project by Gene Kim



- Professional Development (our 2nd)
- Read the book 1-3 chapters/week
- Kept track of “software jargon” in terminology list
- Modeled things we found confusing

- Fable about software development in a software-intensive organization, with lessons from a “sensei”
- No systems engineers at all
- Architects and managers are suspect

Book story arc

- Beginning: Silos, Management distrust of engineers, communication breakdowns, lots of wait time, inability to make things happen
  - Where have we heard this before? Is it unique to the 2000s? To software?
- Improvement: Start small, start communicating, get things done by doing one thing right at a time, solve problems, doing software-specific improvements, gaining management support level by level and broadening group by group
- Much politicking at upper levels, true to reality
- Rebels eventually get responsibility for important project to make marketing and customers happy for holiday rush
- Financial success of that project ensures company future and team's ability to do it their way…and rebel head gets promoted…

Maxine promoted to “Distinguished Engineer”

Distinguished Engineer	Systems Engineer
Establish and participate in cross-team guilds focused on…security, performance, site reliability	Focus cross-disciplinary activities to ensure system quality
Guide the creation of a governance and architecture review function …	System architect, technical manager
Review important issues that management is concerned about	Glue role (12 SysE Roles, Sheard ‘96)
…risk and assurance, information and e-records, and architecture	Risk Management, Info Mgt Role
Provide technical assistance to any team …	System designer role, Chief engineer
Develop measures to keep governance capabilities …hands-on and relevant	SysE Metrics
Be the company spokesperson to technical audiences …	System designer, Chief engineer
Oversee the architecture, design, and implementation …, the enterprise event-sourcing platform …and timeline to transition all enterprise services	System designer, Chief engineer, Technical manager

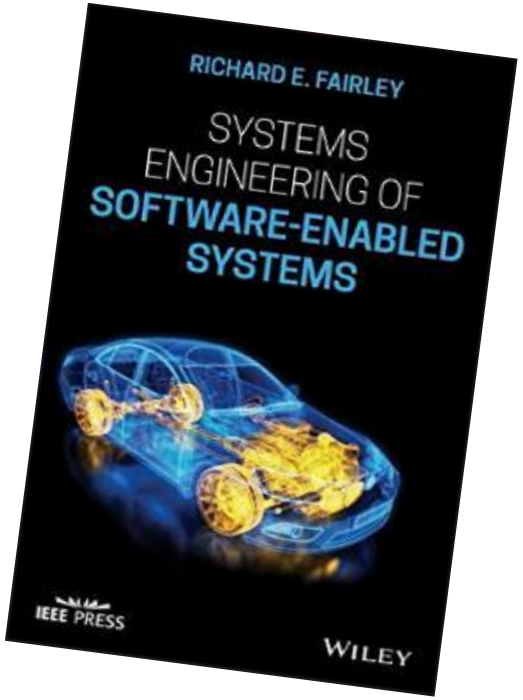
The points being:

- Maxine has invented
  - Systems engineering for her enterprise and for her system
  - Process improvement
- But much knowledge already exists in both these fields

What are the differences for software and software-dominant enterprises?

- Jargon/terminology
- Processes (how software works)
- Model-based
- Also see our book club #1 selection:

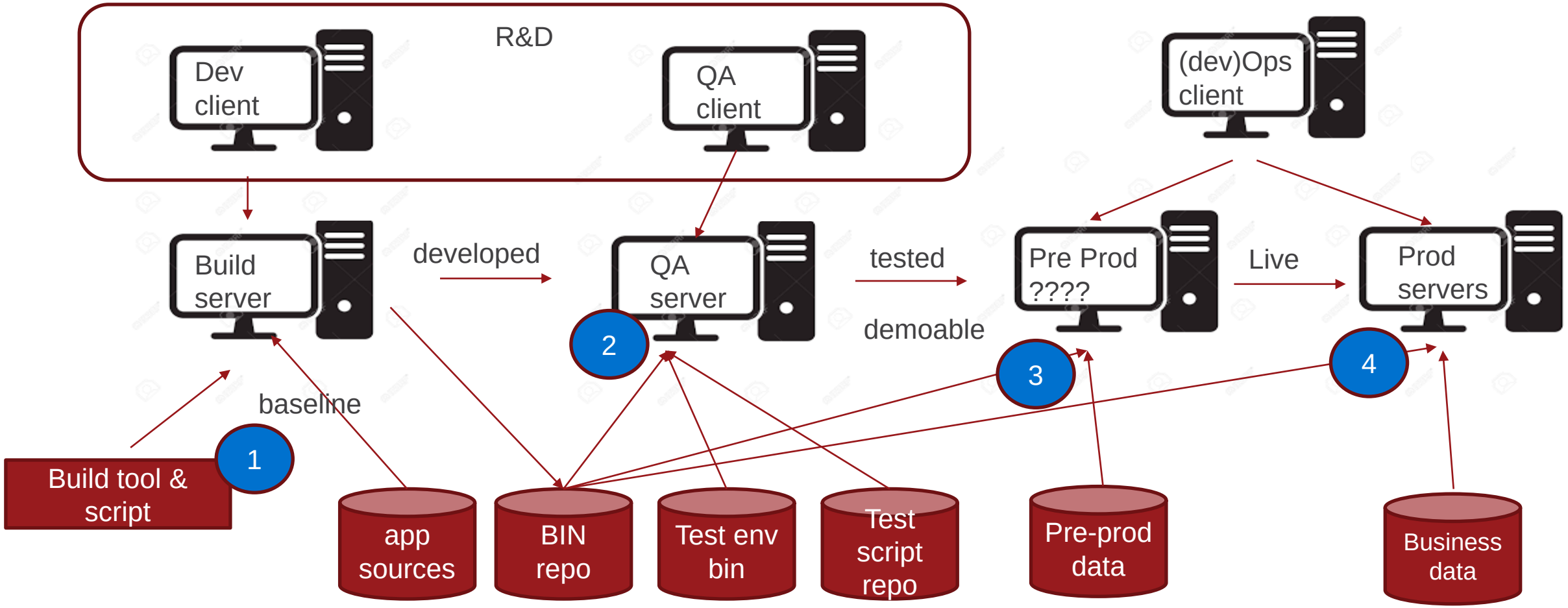
  Systems Engineering of Software-Enabled Systems by Richard E. Fairley (2019)



Terminology *(from the lexicon of the software world)*

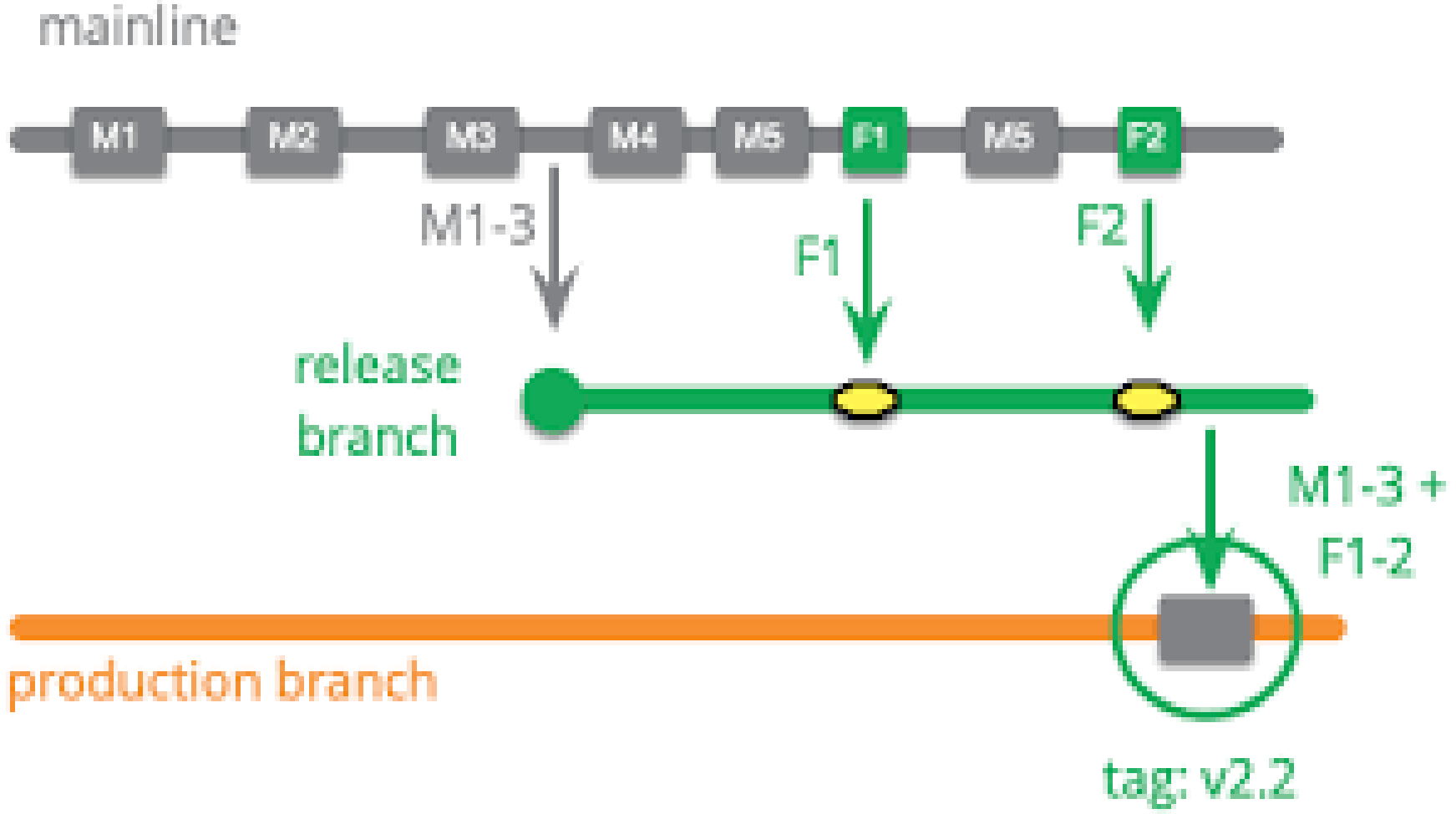
Term	Definition
Environments: • Development *(or "dev")* • Test *(integration, performance...)* • Staging *(or "pre-prod")* • Production *(or "prod")*	Hardware platform & operating system, configured with tools and procedures (think compilers, data sets, etc.), where software is created, and then moved through stages of its life cycle. The environment may replicate (think "simulate") other applications with which the software must interface. Environments are rarely identical. See containers.
GitHub	IT Service Management company that hosts collaborative software development, including access and version management. It is a subsidiary of Microsoft.
Release Management DevOps	Release management is the controlled deployment of new software into production. DevOps spans the culture, procedures and tools to do so at high velocity (near continuously), and tightly coupled development and operations. It leverages Lean and Deming fundamentals and considers concepts of "batch sizing."
Agile & Scaled Agile Framework (SAFe) *(there are other life cycles and methods also!)*	The Agile software development life cycle is an iterative process, where each iteration is intended to produce functional software. It was popularized by the Agile Manifesto (2001) and spans a range of methods, of which Scrum (with related "ceremonies") is popular. One of its challenges is connectivity to broader systems and enterprise concerns. SAFe is intended to guide Agile's scalability, and leverages both Lean and Systems Thinking.
Containers, Microservices	Microservices are an architectural style that entails assembling an application from single-function modules with well-defined interfaces (i.e., self-contained). A container is a unit of software that is bundled to run quickly and reliably from one environment to another. Containers consist of an entire runtime environment, thus transcending underlying operating system and infrastructure.

Unicorn Project Delivery Process



CI / CD automates these phases

Merge and Branch Strategy



Overview of Operational Process Model

- Establishes service specifications for disparate stakeholders – architecture framework
- Describes operational activities and interfaces
- Shows key functions required to achieve system objectives
- Enables early discovery of gaps and redundancy
- Provides the scaffolding for disparate components of the system

SaSIWG Vision: “Everything is a System”

- Software, Data, Digital Transformation: All involve systems!
- Our Vision: Increased relevance of Systems Engineering & Systems Thinking
  - In service of: Resilience and Anti-Fragility in the face of ever-increasing VUCA*
- Achieving this is itself a systems engineering & systems thinking challenge
  - Strategy, governance, people, process and methods , technology (incl. software and data), and business concerns
- We have chartered 8 thought questions to catalyze the creation of guidance and collateral
  - Context, Roles, Processes and Methods, People, Synthesis *(applying our own toolkits and creating models)*
  - Business Case, Business Culture, Industry Trends
- SaSIWG welcomes participation as we advance the cause!
  - We will include collaboration with author Gene Kim and his DevOps and DevSecOps networks

*VUCA = volatility, uncertainty, complexity, ambiguity

Conclusion: We Want to Hear Your Voice

SaSIWG will continue developing useful guidance for Systems Engineering (SysE) and Systems Thinking (SysT) roles in SW- and data- dominant orgs.

Which of the following would most help you, INCOSE, and the industry?

send email to …..Jeannine.siviy@yahoo.com

- ❑ Relevance and value in different settings, and other "business" angles
- ❑ Role definitions
- ❑ Dovetailing processes & methods
- ❑ Cross-training, including terminology
- ❑ Engaging others in model building
- ❑ Relationships with "digital engineering," data science, etc.

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