

A Framework and Metrics for Addressing an Agile Enterprise

extending the observe-orient-decide-act paradigm into acquisition

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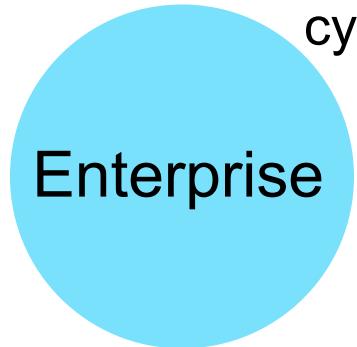
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Survey

Define “Enterprise” and the need for “agility”

Enterprise characterized by continuous operations cross multiple scales

At all levels, the enterprise competes with its environment, performing Boyd's Observe, Orient, Decide, Act (O-O-D-A) cycle



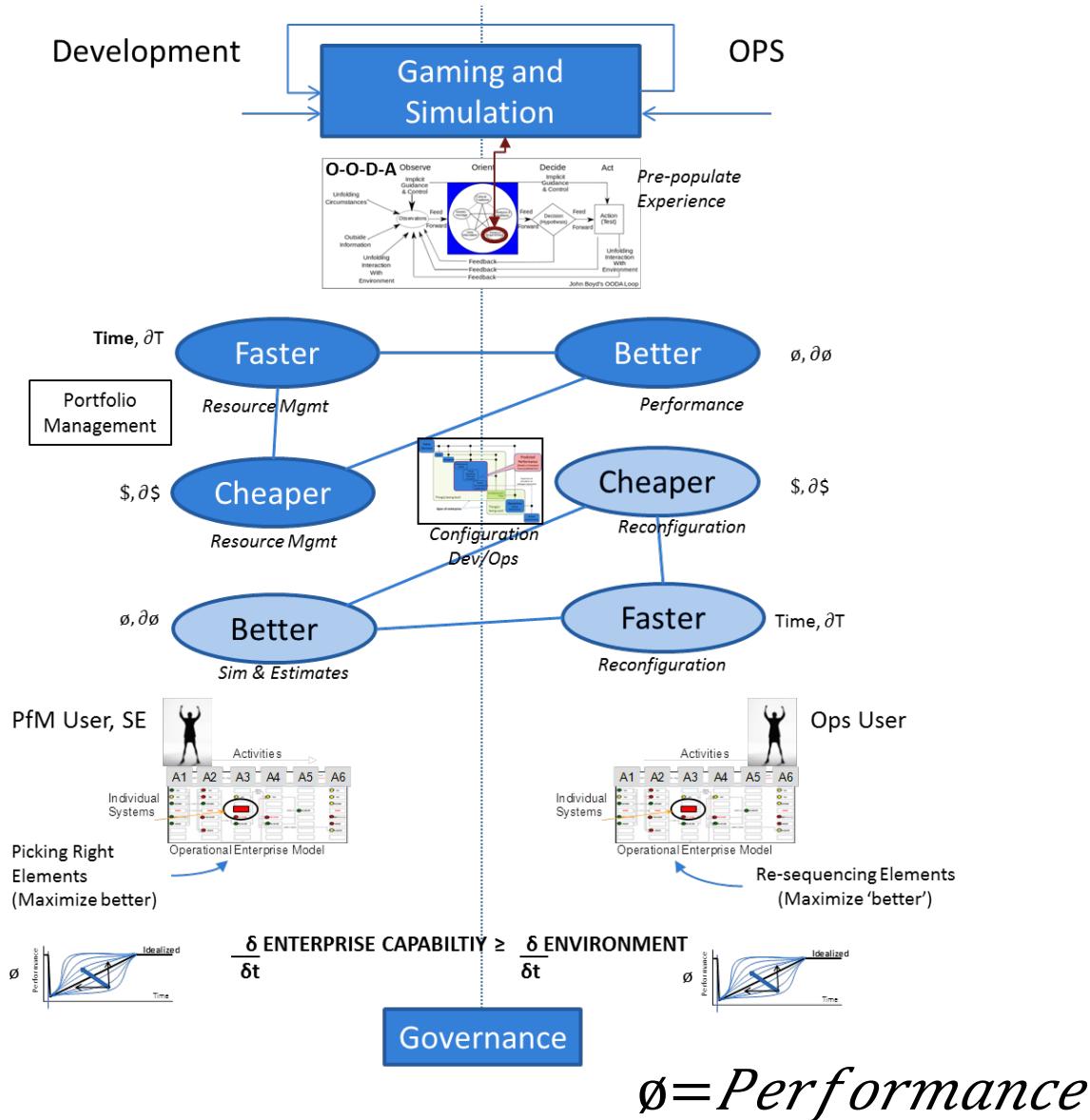
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An entity comprised of one or more organizations, engaged in a mission requiring the development, sustainment, and projection of supporting capabilities in a changing environment.

A broad enterprise approach that “looks into the future” is desired

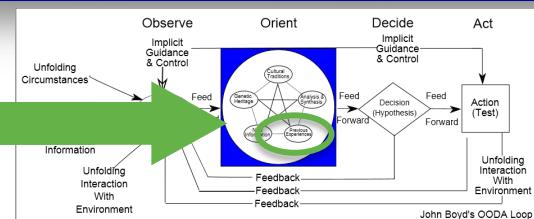
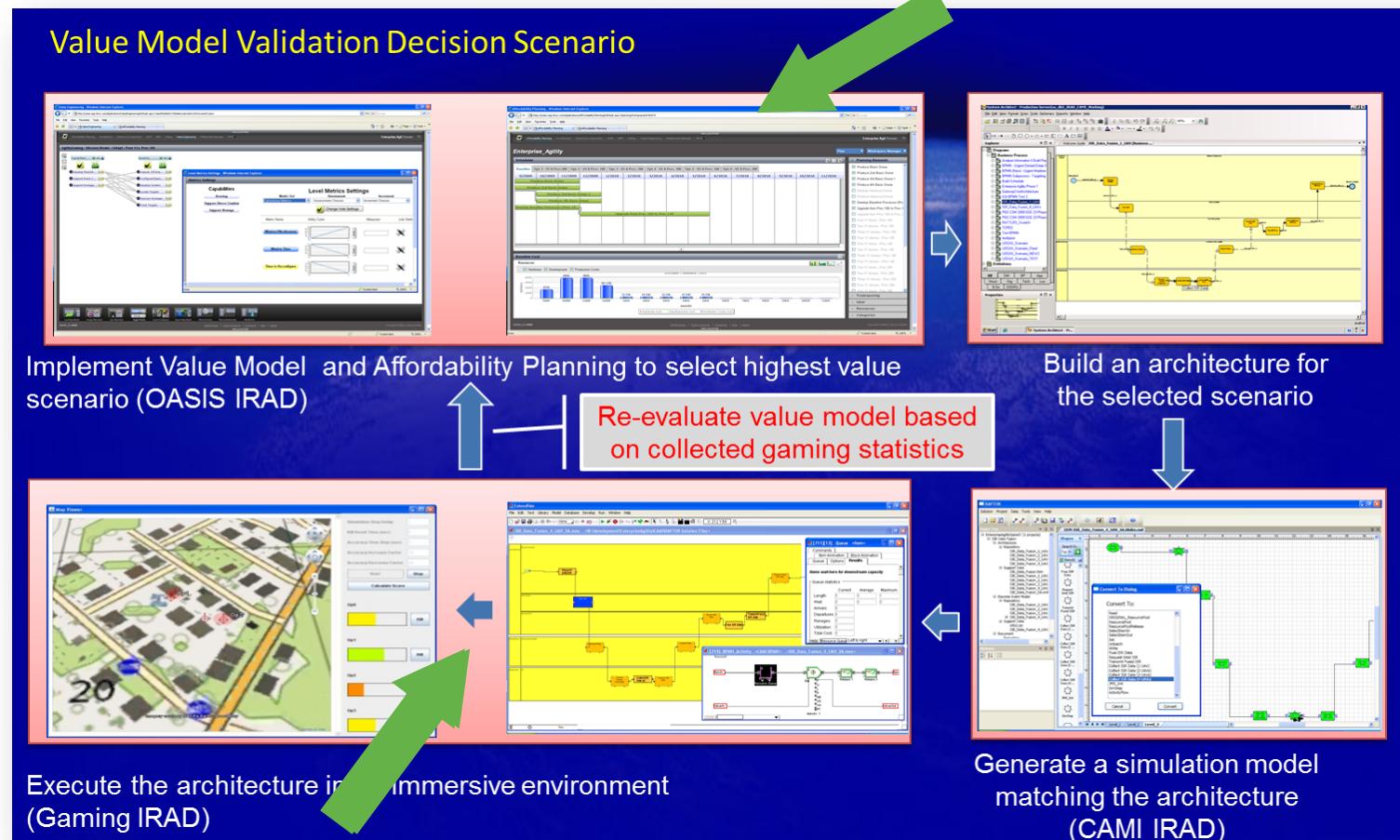
- Augment a static ‘specified environment’ with a ‘pseudo’ or ‘virtual’ environment in which the system(s) under development are expected to operate and succeed
- Design principals to operate across a range of future cases, rather than tightly specified design rules.

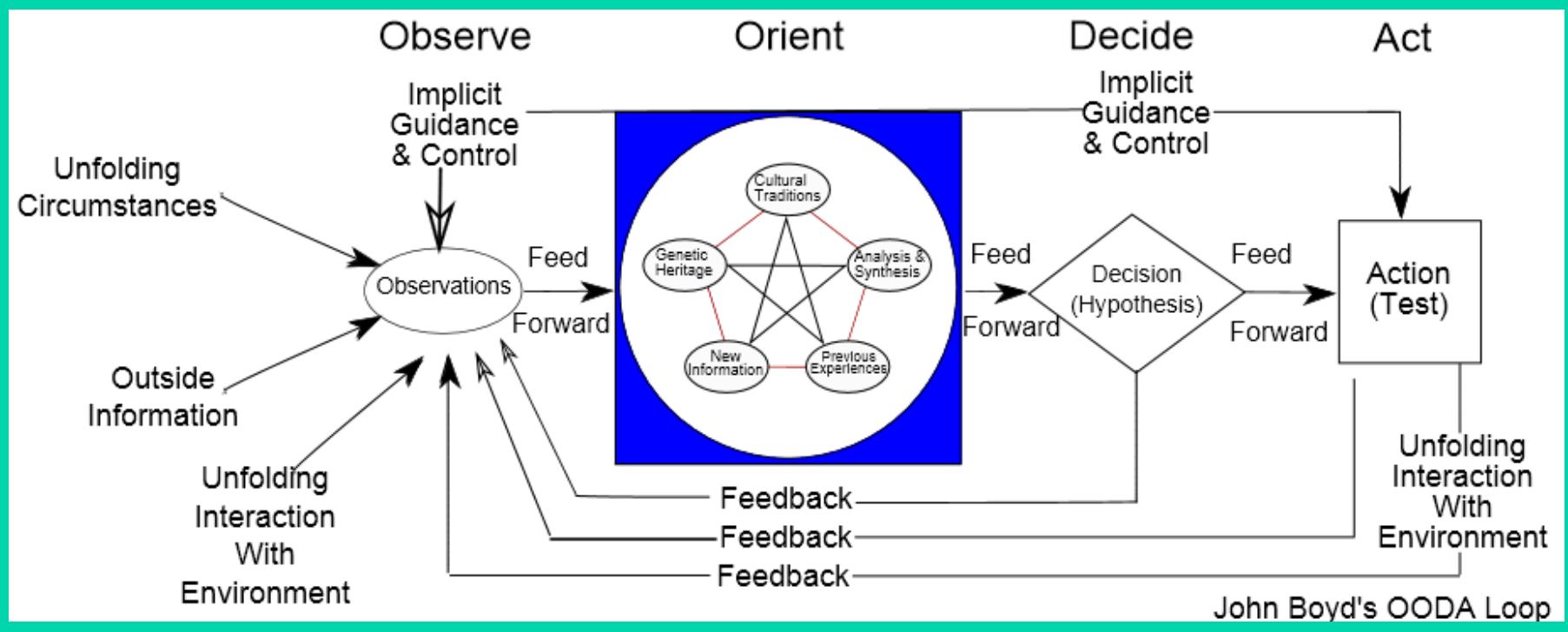
Identifies the conceptual relationships between various artifacts, techniques and metrics



Provide tomorrow's feedback on today's decisions

SE Decision making (portfolio management)



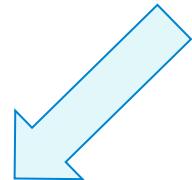


Optimizing for 'something':

static value at minimum cost or schedule or capability/cost

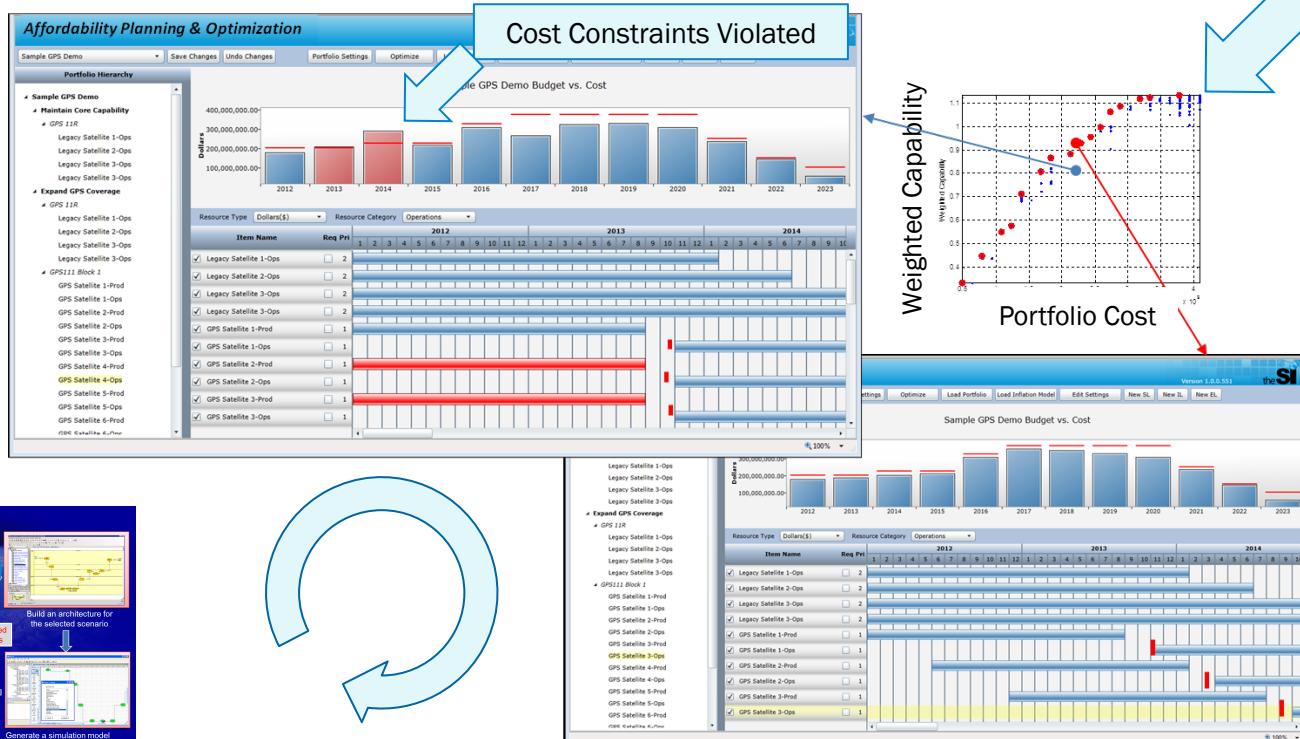
$$\text{or } \frac{\partial \text{ change}}{\partial T} \quad \text{or} \quad \frac{\partial \text{ change}}{\partial \$}$$

Pareto front of
Resource-constrained solutions
(via Genetic Algorithm)

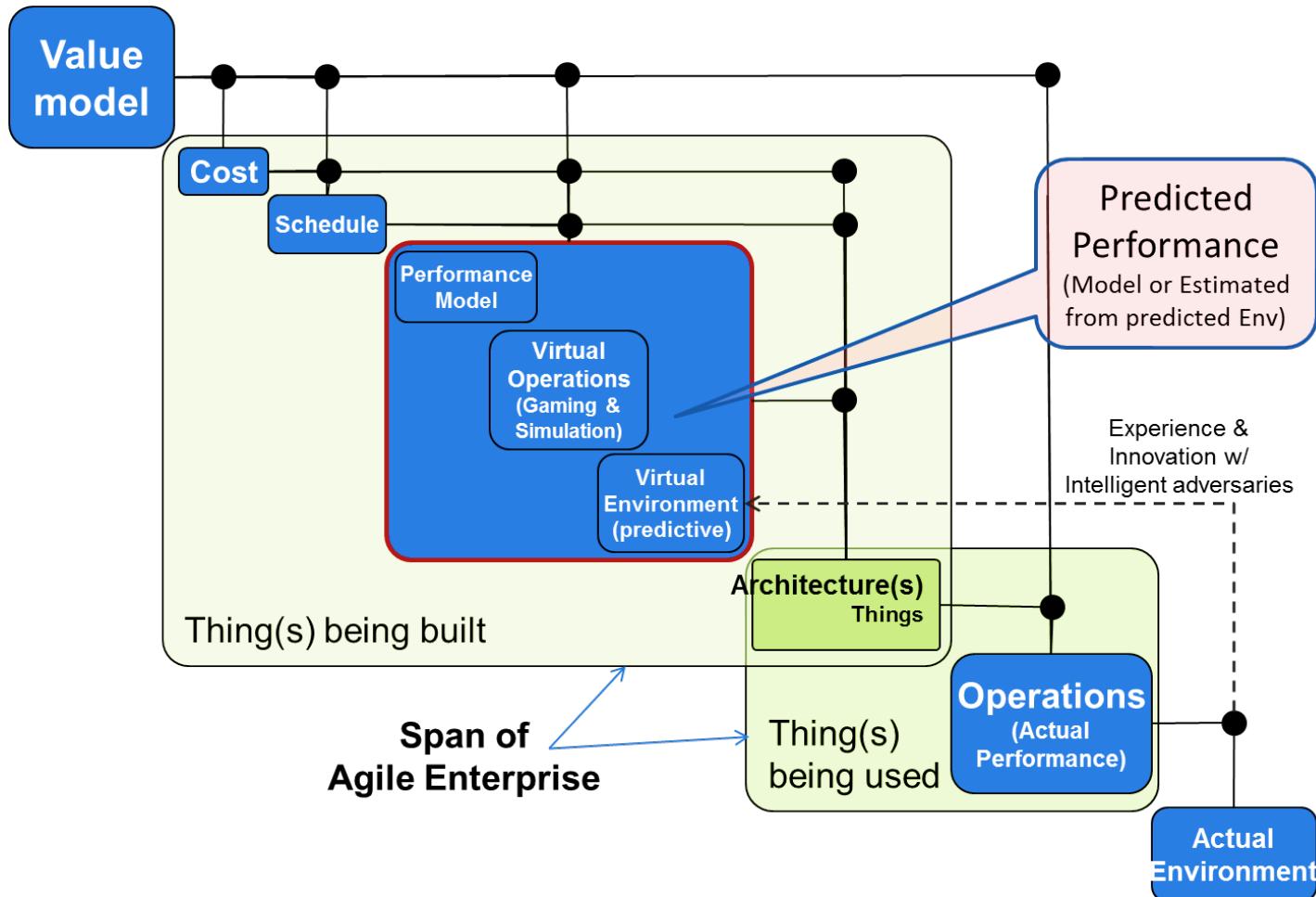


This essentially
gives you...
partial
derivative w.r.t.
cost

$$\frac{\partial \text{ change}}{\partial \$}$$

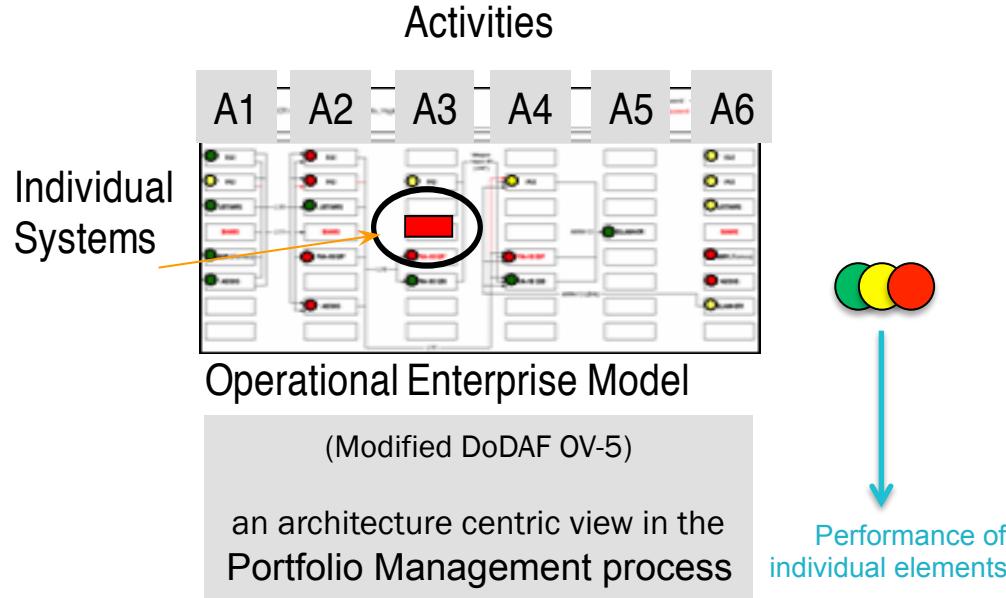


Link models that represent different points in time.



Q: How quickly can this go to “equilibrium”?

understand the units or quanta of change

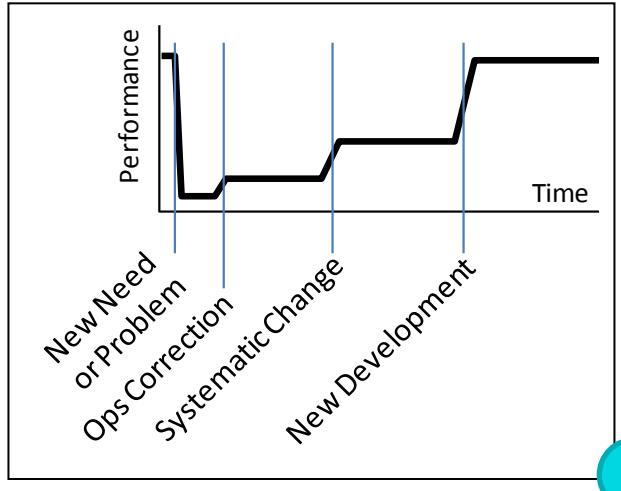


How quickly can this change?

- In Operations (based on engineered solutions)
- In Development or SE space (governance)
- Combined?
- What aspect of DOTMLPF*?

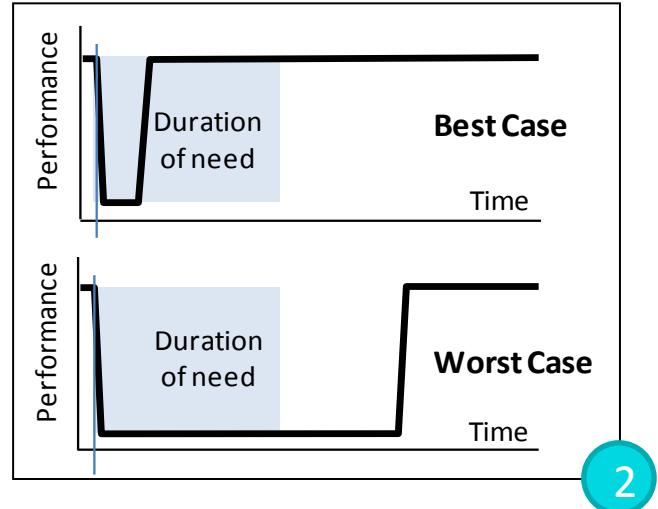
How many ways can it be changed?

- What externals can it deal with?

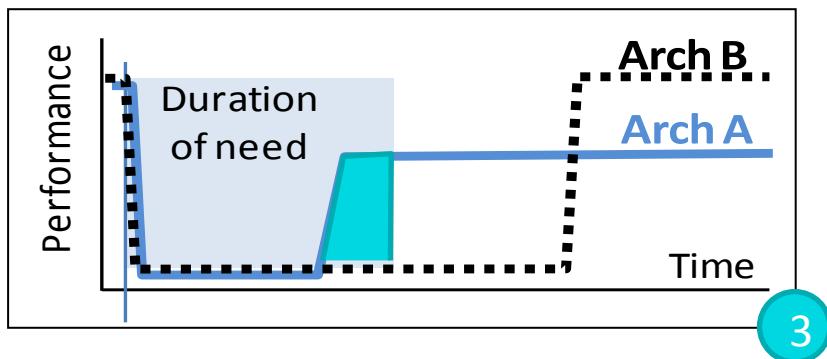


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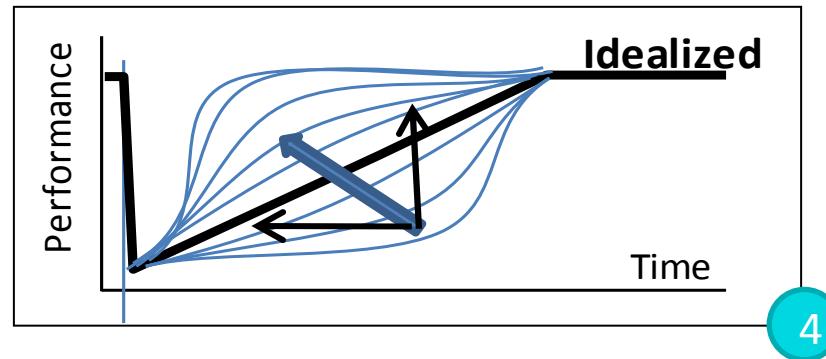
Note: the pre- and post- problem performance axis might be different



2



3

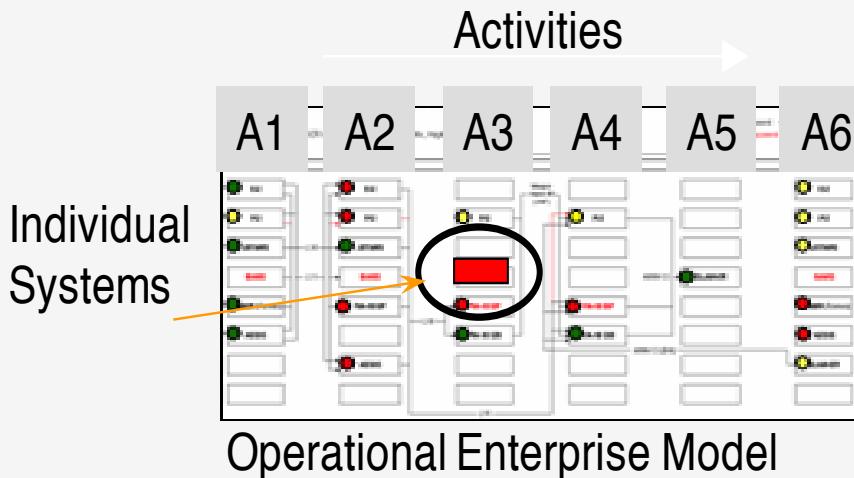


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Improving this metric is a 'design' goal - when the problem is not known *a priori* the only agile feature which can be identified is 'reaction time' (time to change or recover).

Capability

(and the supporting portfolio of assets)



$$\frac{\delta \text{ ENTERPRISE CAPABILITY}}{\delta t} > \frac{\delta \text{ ENVIRONMENT}}{\delta t}$$

**Can your enterprise adapt faster
than the environment can
change?**

If you use the DoDAF OV-5 figure to
define your capability, can it be
reconfigured, or added-to within the
rate of change of the environment?

...or are you going to fall behind?

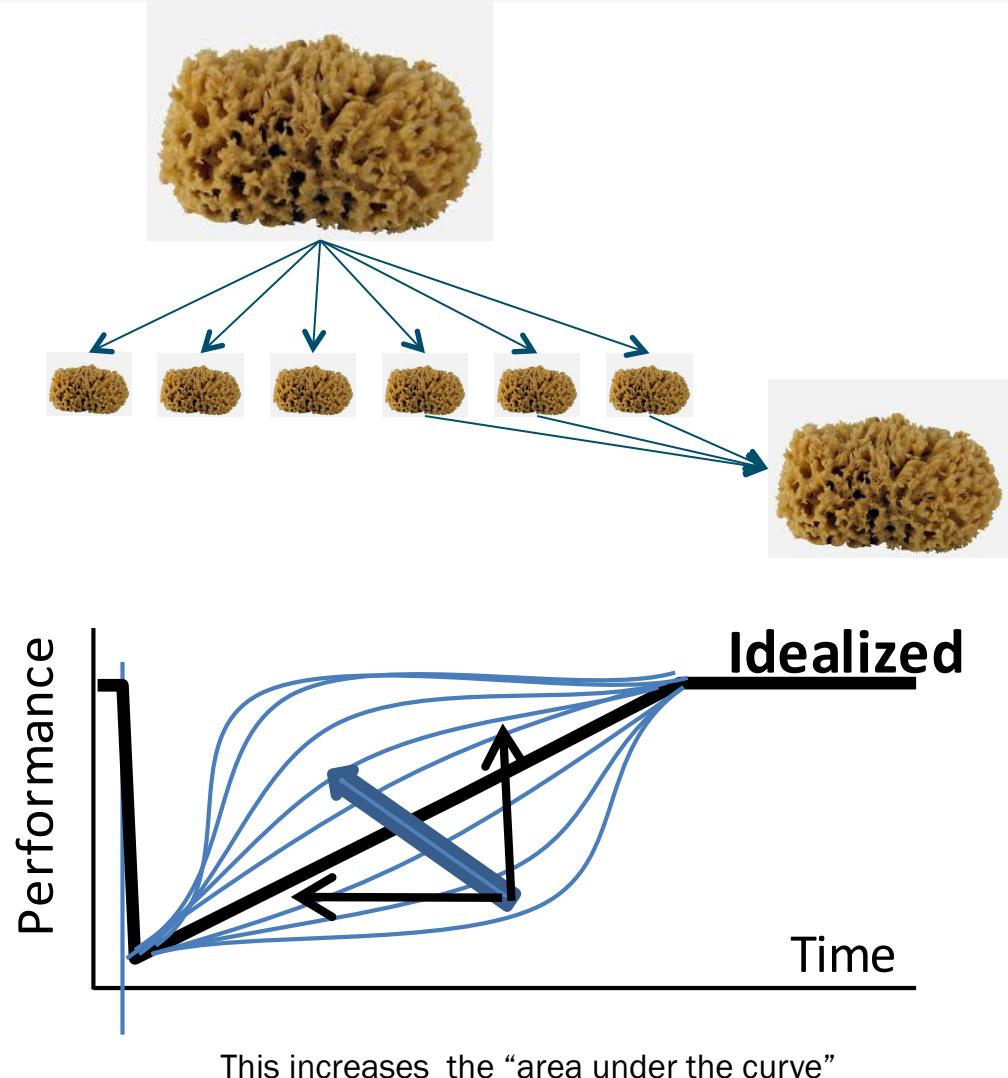
Is your enterprise keeping up?

Is it *capable* of keeping up?

Damage tolerant agility

“Be recursively self-similar (fractal), regardless of scale”

Perform auto-aggregation and auto-recovery from disaggregation



thank you.

Future effort to improve the framework may include:

- Using genetic algorithms which now only adjust cost and schedule to adjust capabilities (system features or entire architectures) while still fitting in cost and schedule constraints (i.e. capability level portfolio management).
- Introducing budget and schedule uncertainty into the above process to drive genetic selection of 'budget agile' enterprises which can sustain capability deployment in funding risk environment.



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