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hybrid event

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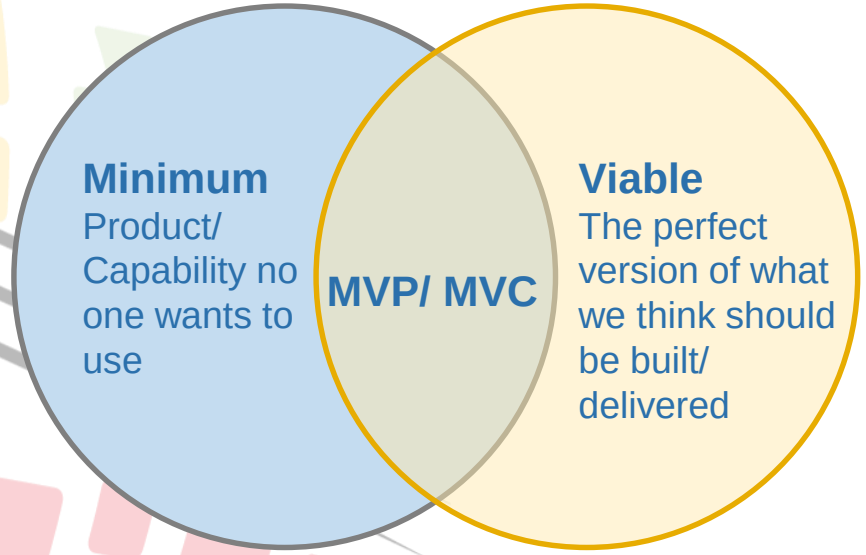
Presenter: Kerry Lunney

Is the Journey to the End of the Rainbow a Minimal Viable Capability (MVC)?

What is MVC?

- Initially from the Commercial world
- Minimum Viable Product (MVP) is
  - "a development technique in which a new product or website is developed with sufficient features to satisfy early adopters. The final, complete set of features is only designed & developed after considering feedback from the product's initial users" (Techopedia)

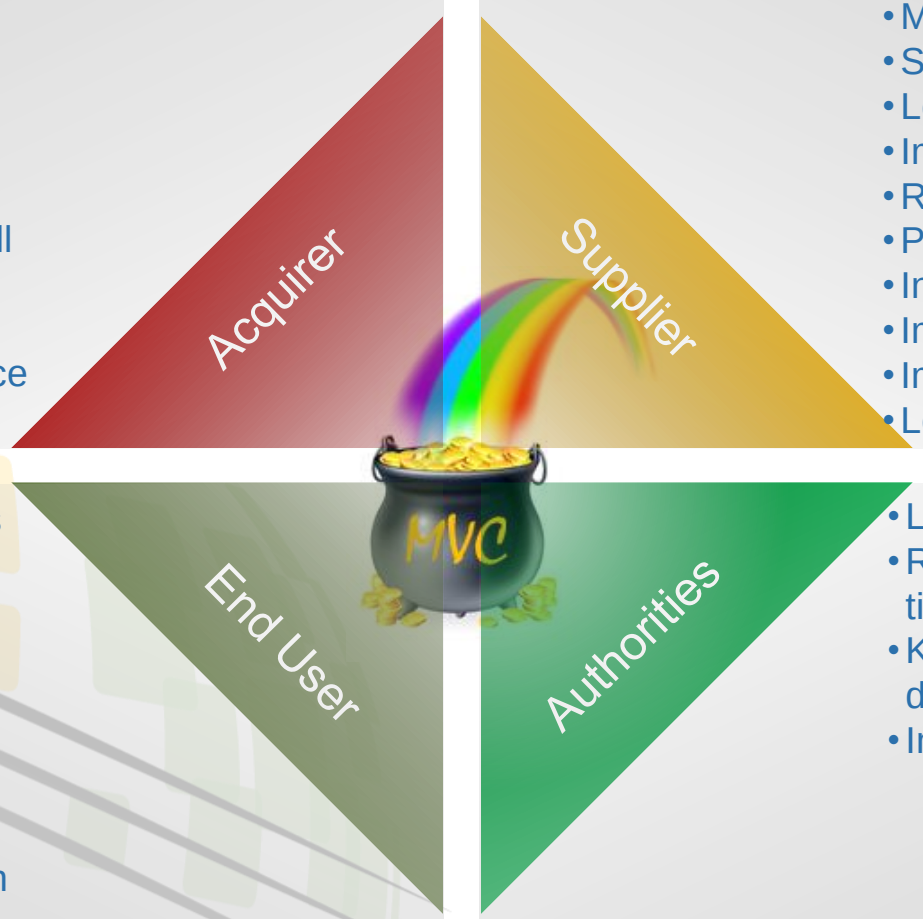
- In the Defence world
- Minimum Viable Product (MVP) is
  - "an accountable item, or group of items & related assets, that can successfully achieve or enable the lowest acceptable level of performance in a required time"
- Minimum Viable Capability (MVC) is
  - "a capability (inclusive of *FIC) that can successfully achieve the lowest acceptable level of the directed effect in the required time, able to be acquired, introduced into service, & sustained effectively" (Vice Chief of Defence Force (VCDF), Australia)



*FIC = Fundamental Inputs to Capability

The Value of MVC

- Earlier acquisition of capability
- Timely feedback to supplier
- Spread financial spend
- Opportunity to re-orient the needs
- Focus & direction adjustable across full capability lifecycle
- Increased confidence in reaching full capability
- Increased data transfer / sharing
- Greater potential security & resilience
- Good story for media

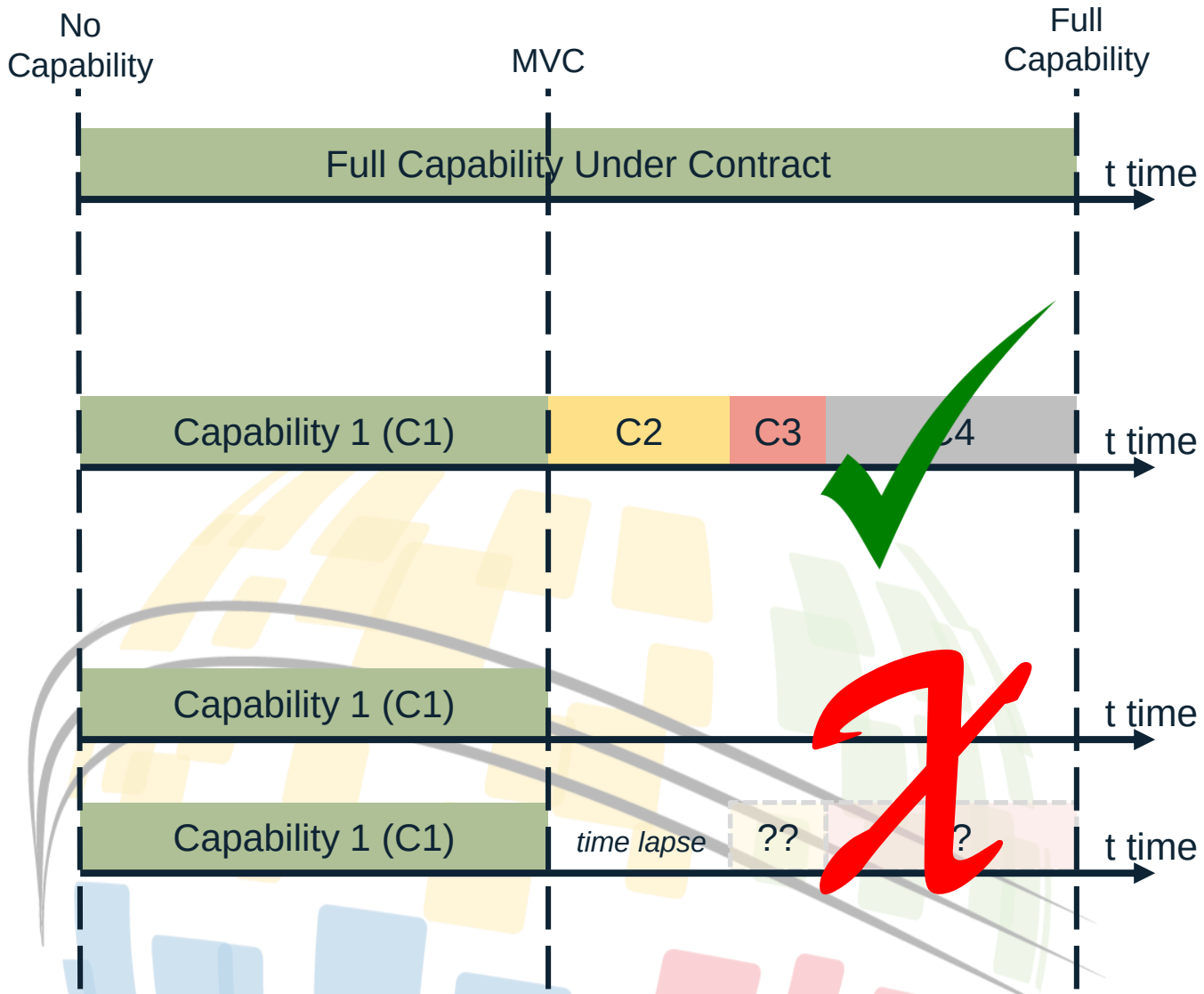


- Iterative design & development
- Manage long lead items
- Staged work
- Less churn
- Improved workforce profiles
- Responsive to changing market needs
- Progressive training delivery
- Innovation barriers reduced
- Improved cash flow
- Improved risk sharing profile
- Lower barriers for SME entries

- Capability in the hands of end users ASAP
- Reduced “platform” downtime
- Increased operational availability
- Timely feedback to supplier on real operation results
- Responsive to “threat” levels
- Better management of availability schedule for change implementation
- Incorporation of new missions

- Longer certification timeframes
- Realistic compliance auditability timeframes
- Keeping up with technology development pace
- Improved change efficiencies

When MVC is Misapplied

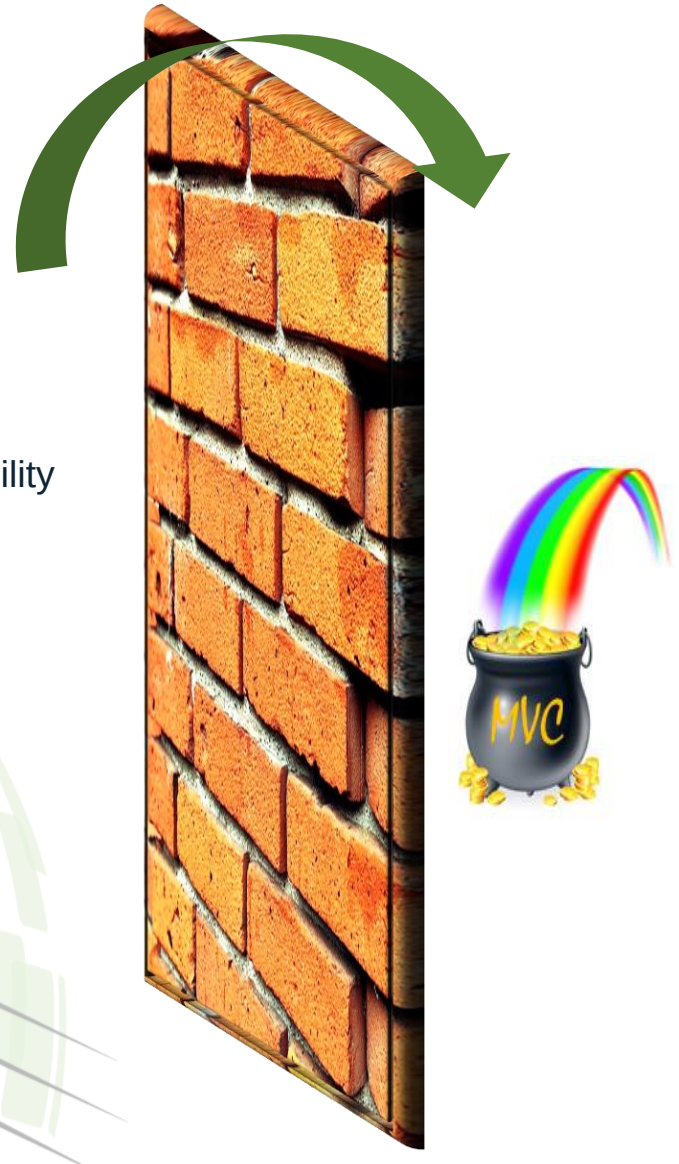


- MVC is
  - Delivering capability with further capability to be delivered
  - Further required capability is known at the time of striking a MVC approach
  - Full or final capability may change over time with each delivered capability(ies)
- MVC is not
  - De-scoping a project
  - Delivering initial capability with no known plans for delivering further capability(ies)

MVC Blockers & Treatment

Blockers

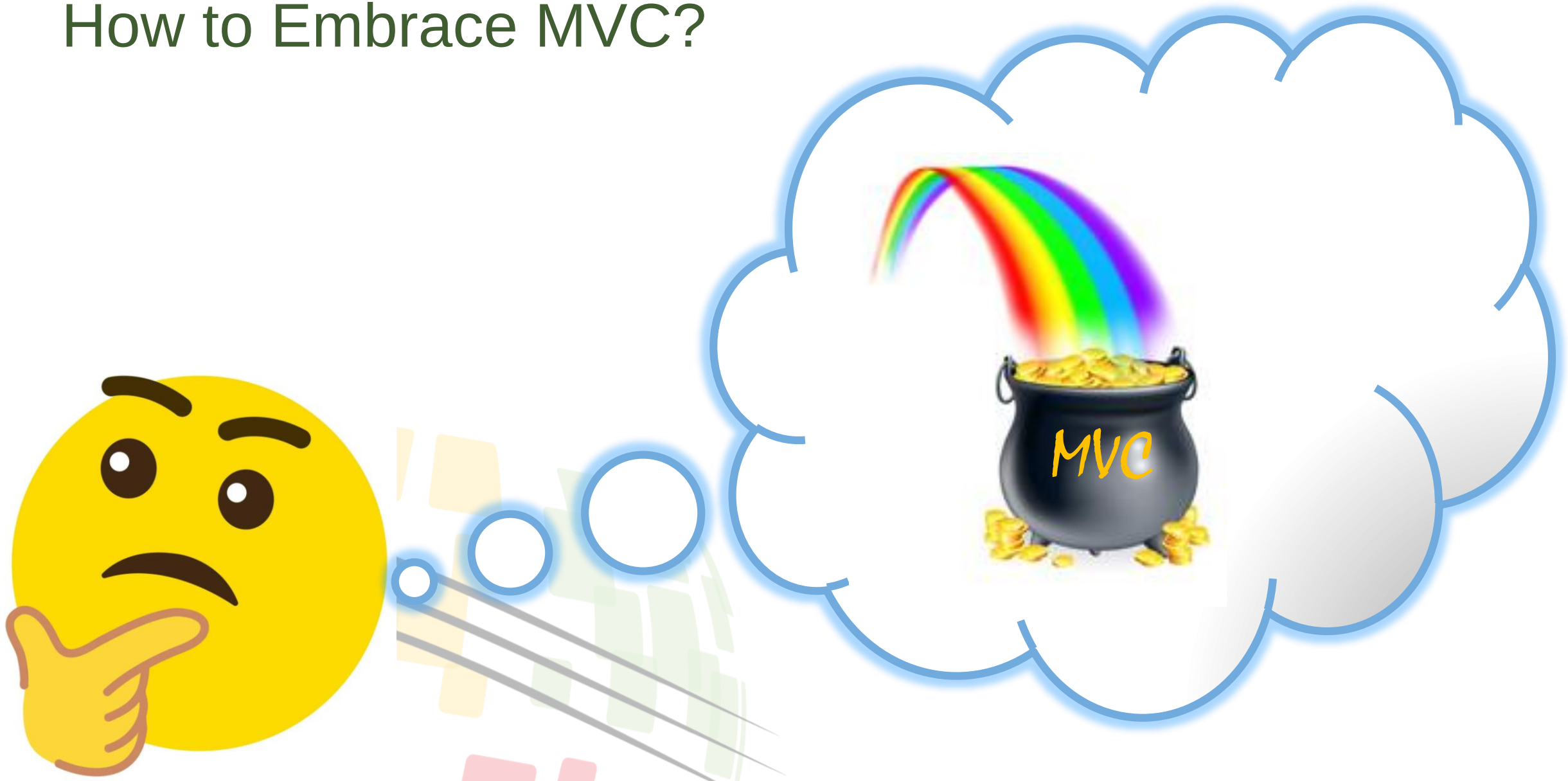
- Delivery framework
  - Unsuitable “classical” contract framework
  - Applying same processes & practices
  - Inconsistency in needs & operational concepts
  - Cost & schedule pressures
- Culture & communication
  - Misunderstanding what MVC is
  - Lack of communicating what is the MVC vs full capability
  - Cultural disposition to risk aversion
  - Fear of change
- Organisational structure
  - Cumbersome decision-making process
  - Strong vertical hierarchy



Treatment

- Educate …
  - Acquirers & end users on MVC
  - Acquirers & suppliers on being agile
- Tailor …
  - Processes & practices
  - Holding only judicious reviews
- Collaborate …
  - By creating an environment with close working relationship between major stakeholders
  - Through more flexible contractual agreements
  - On operational concepts matching MVC
  - On roadmap to full capability

How to Embrace MVC?



Steps to Successfully Adopt MVC Approach

Systems Thinking — *Adopt a holistic vision*

Lifecycles — *Select the appropriate lifecycle*

Checkpoints — *Streamline checkpoints focusing on collaboration*

Tailoring — *Tailor, tailor, & tailor*

Technology — *Be open to technology changes*

Agility — *Focus on <u>being</u> agile, not <u>doing</u> agile*

Systems Thinking in Practice

- Adopt a holistic vision – MVC is the start, not the end
- Understand what needs to be done beyond explicit requirements
- Use systems thinking to move from ‘studying the parts” to “studying the context & interactions”
- Start with the full capability in mind

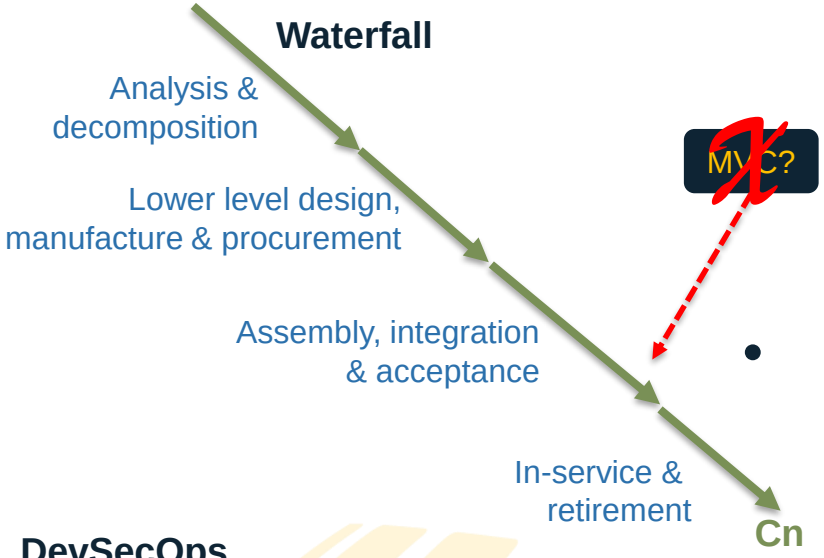
Did you know?

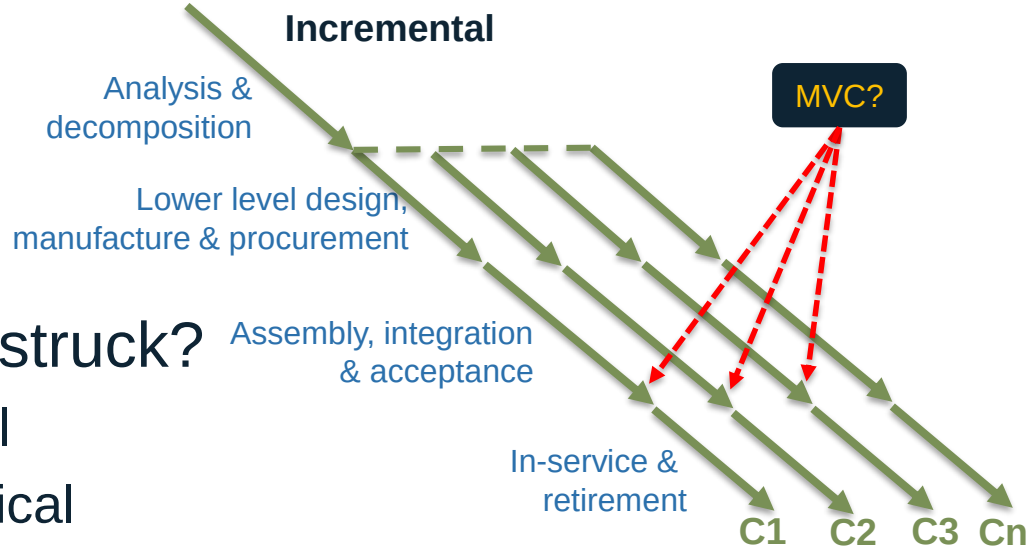
An article from the World Economic Forum 2020 lists Systems Thinking as one of the top skills needed to “face the challenges of our complex world”

- 7 systems thinking skills -

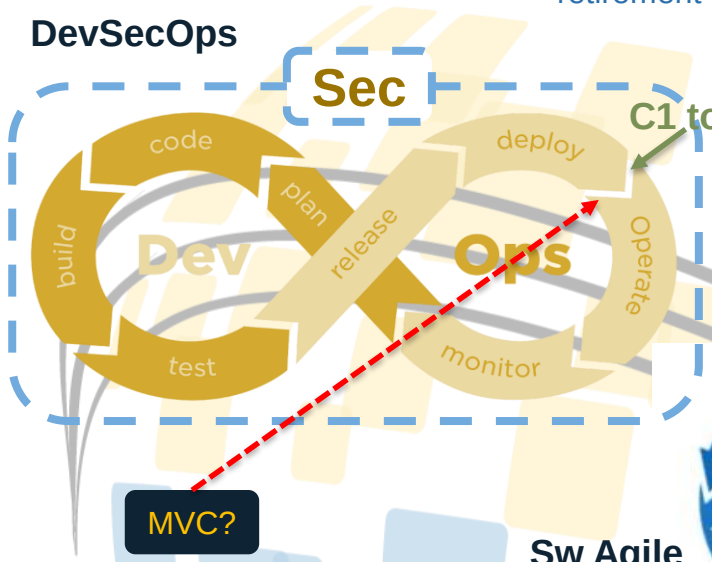
Systems Thinking Skill	Description
Dynamic thinking	Studying issues as patterns of behaviour over time
System-as-cause thinking	It is always possible to see a situation as caused by external forces. What did we do to make ourselves vulnerable to those forces that we could not control?
Forest thinking	The forest is much more than can be observed in individual trees. Focus on similarities rather than differences. Avoid focusing too much on details
Operational thinking	Instead of listing factors that influence, concentrate on getting at causality & understanding how a behaviour is actually generated
Closed-loop thinking	The effect usually feeds back to influence the causes. Causality is an ongoing process, rather than a once-time event
Quantitative thinking	Not synonymous with measurement. Some things cannot be measured, including squishy variables (motivation, self-esteem, commitment, resistance to change). One can always quantify, though one cannot always measure
Scientific thinking	Recognising that all models are working hypothesis that always have limited applicability

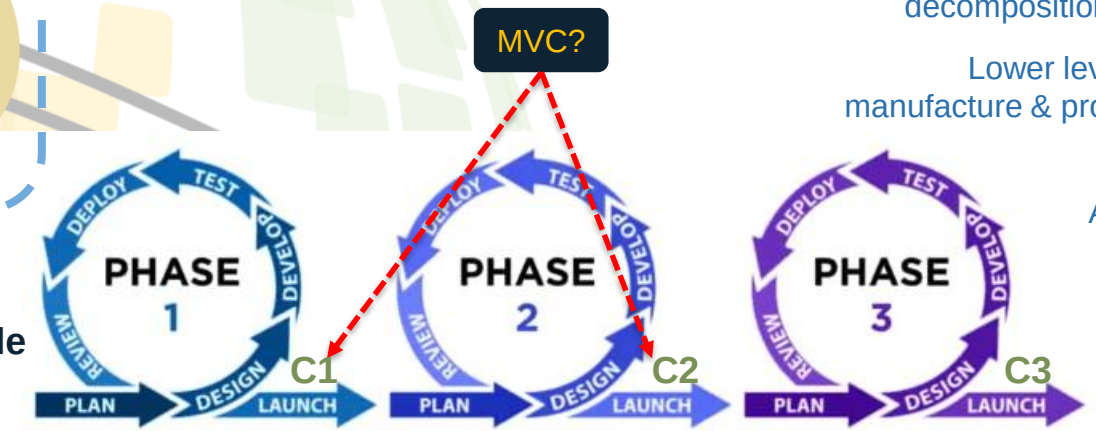
Matching the Lifecycle to the Need

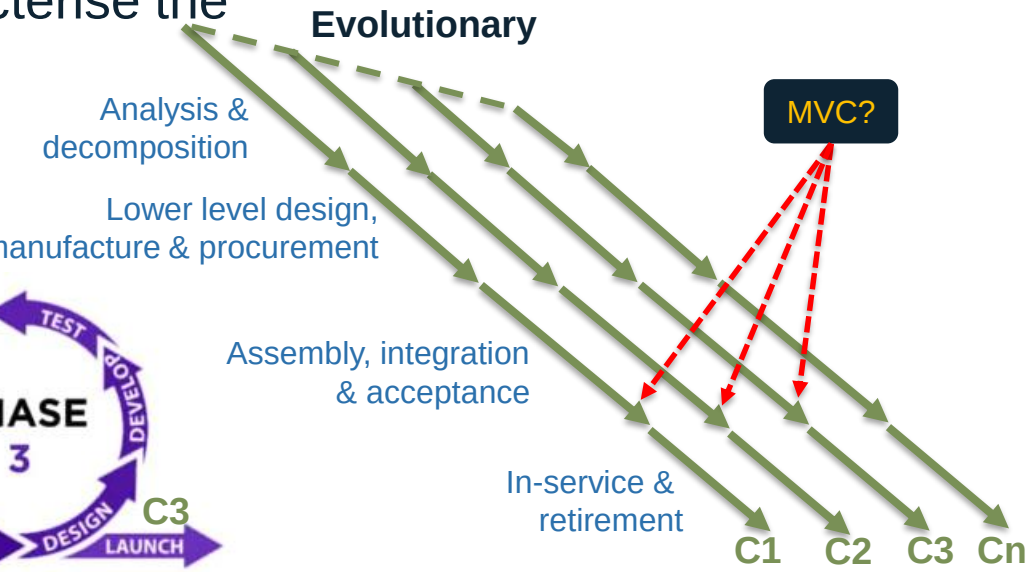




- Where will the MVC be struck?
  - Delivery timing is critical
  - Feedback loops are critical
  - Checkpoints can characterise the type of lifecycle







Collaboration Minimising Waste

Checkpoints

- Focus on showing “needs are being met”
  - Are there new / different stakeholders at MVC vs further capability delivery projects?
- Develop useful artefacts at the right time in the lifecycle selected –
  - For current knowledge
  - For future possibilities analysis
- Conduct only judicious reviews
- Move decision-making closer to the “coal face”
  - Requires strong governance structure
- Inject flexibility into contractual agreements
  - Collaborate on project plans & teaming arrangements
- Share risks as appropriate
- Streamline assurance & compliance practices
- Automate regression testing as much as possible

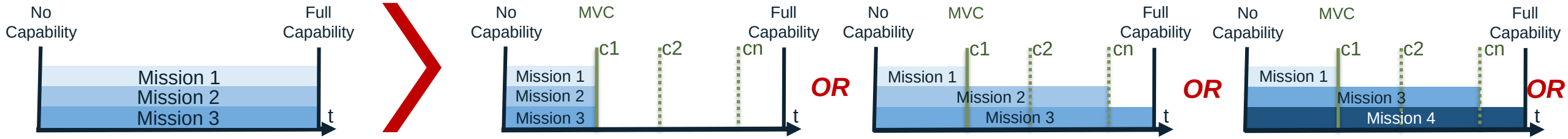
Adapt & Adopt

To guide tailoring, consider -

- Mission needs: these may change between full capability & multiple capability deliveries
- Boundaries: potentially more/new boundaries are introduced with MVC creating greater complexity
- Common vision: “Viable” must equate to “What does done look like”
  - Reset expectations
- Feature sets: identify the features set providing useful capability
- Operations: Understand operational impacts & mission threads with each capability delivery starting with MVC
- Transition & deployment strategies: these are key from MVC to full capability
  - A holistic approach is vital

- Strong tailored Systems Engineering approach bridges the delivery from MVC project to full capability project, incl incremental deliveries of additional capabilities
  - Tailor processes & practices
  - Revisit suitability of toolsets & applications
- Prioritise user needs, not requirements
- Adjust trade-off analysis foci
- Seek to digitalise where possible – both in practice & solution
  - Data is key
- Use models, simulations & other representations
  - Focus on MVC outcomes, while in parallel represent final full capability
  - Tailor to prototype, test & pilot frequently
- When tailoring - Supplier leads, not acquirer

Examples of MVC Impacts on Mission(s)

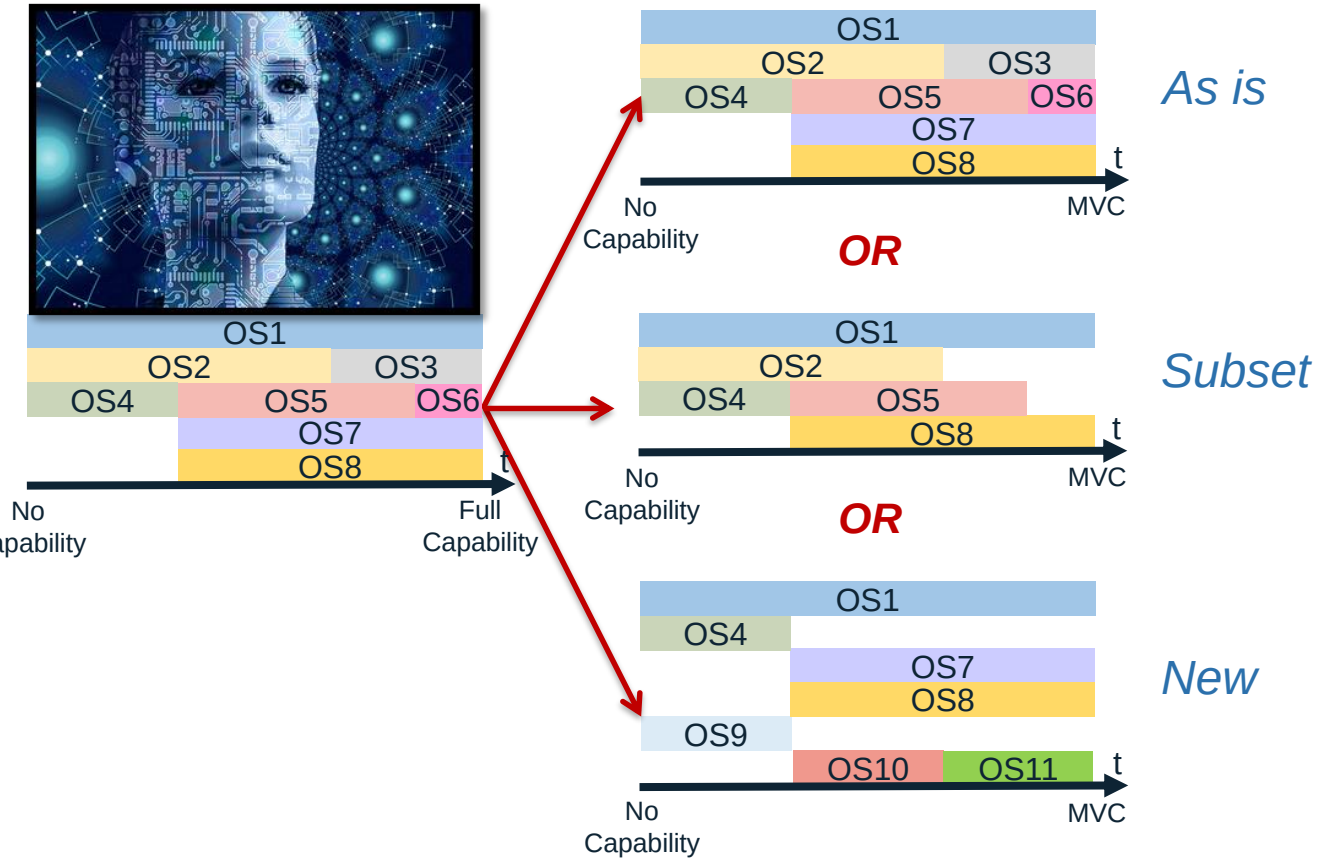


Advance with Technology

Technology

When implementing MVC projects -

- Undertake technology horizon scans for future proofing
- Align capability needs to technology roadmaps & vice versa
- Be prepared for evolving standards & regulations
- Look to gain benefits from architectures that are modular, scalable, & flexible
  - Eases incorporation of new technologies in future capability deliveries eg AI, gene technology, human-computer interfaces, extended reality (XR), 3D printing
- Embrace digital transformations
- Adopt recycle & re-use strategies
- Limit bespoke solutions / modifications
- Plan for obsolescence / refresh programs during later capability deliveries

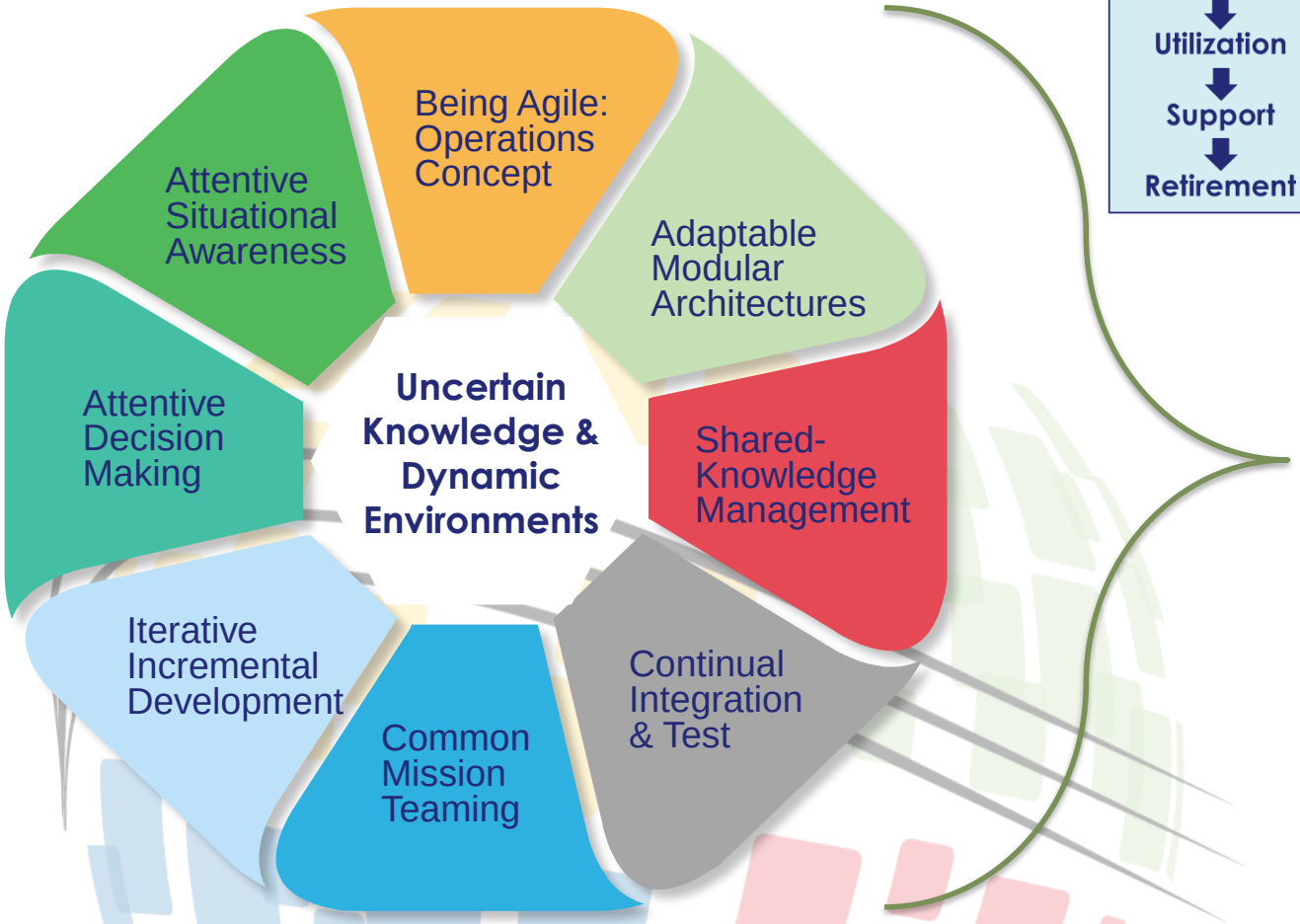


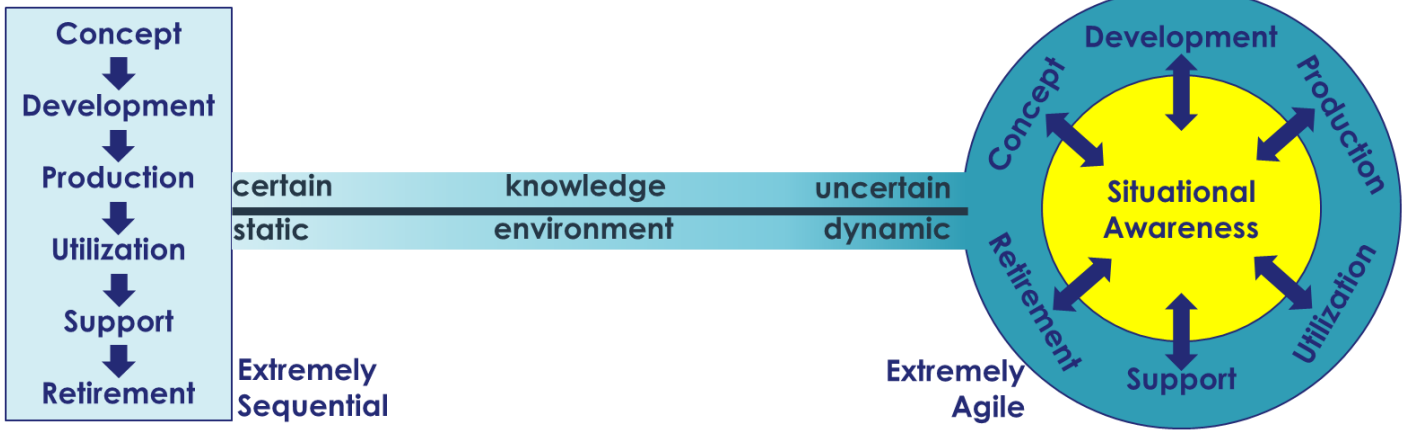
Examples of Operational Scenarios (OS) Impacts

Be Agile!

Agility

- Agile SE leverages situational awareness in driving continual evolution
  - The evolution can start with the MVC

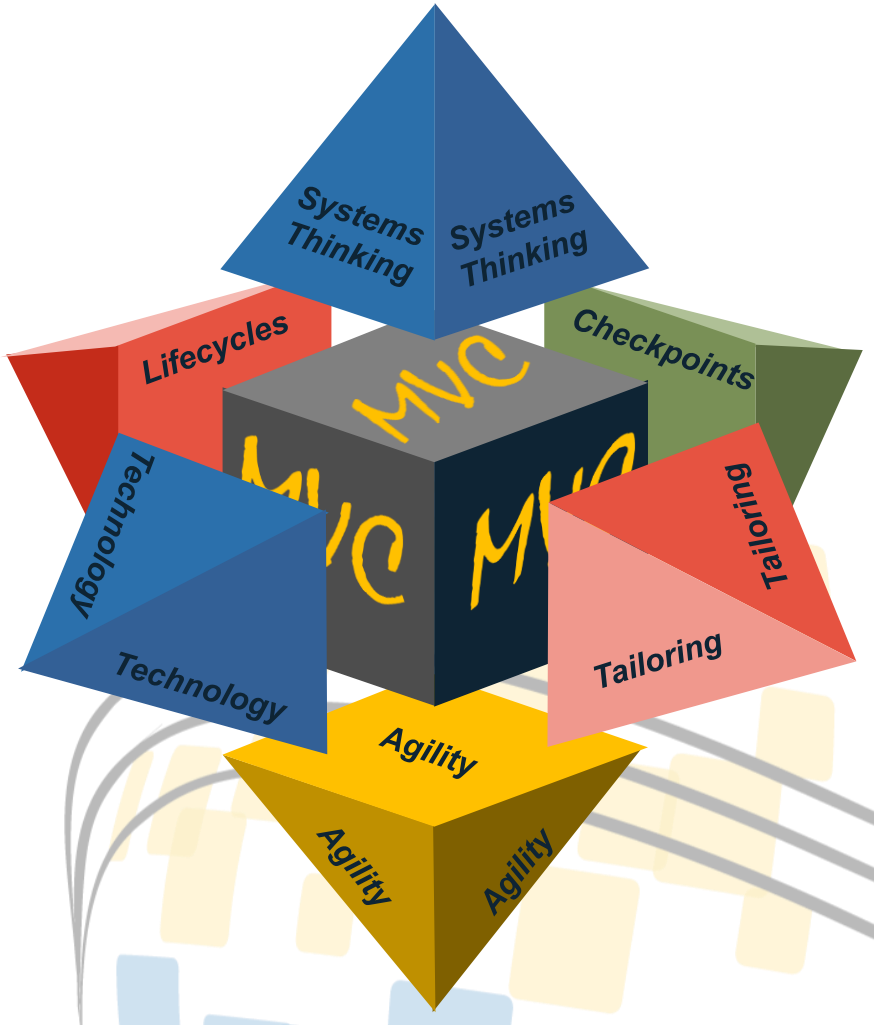


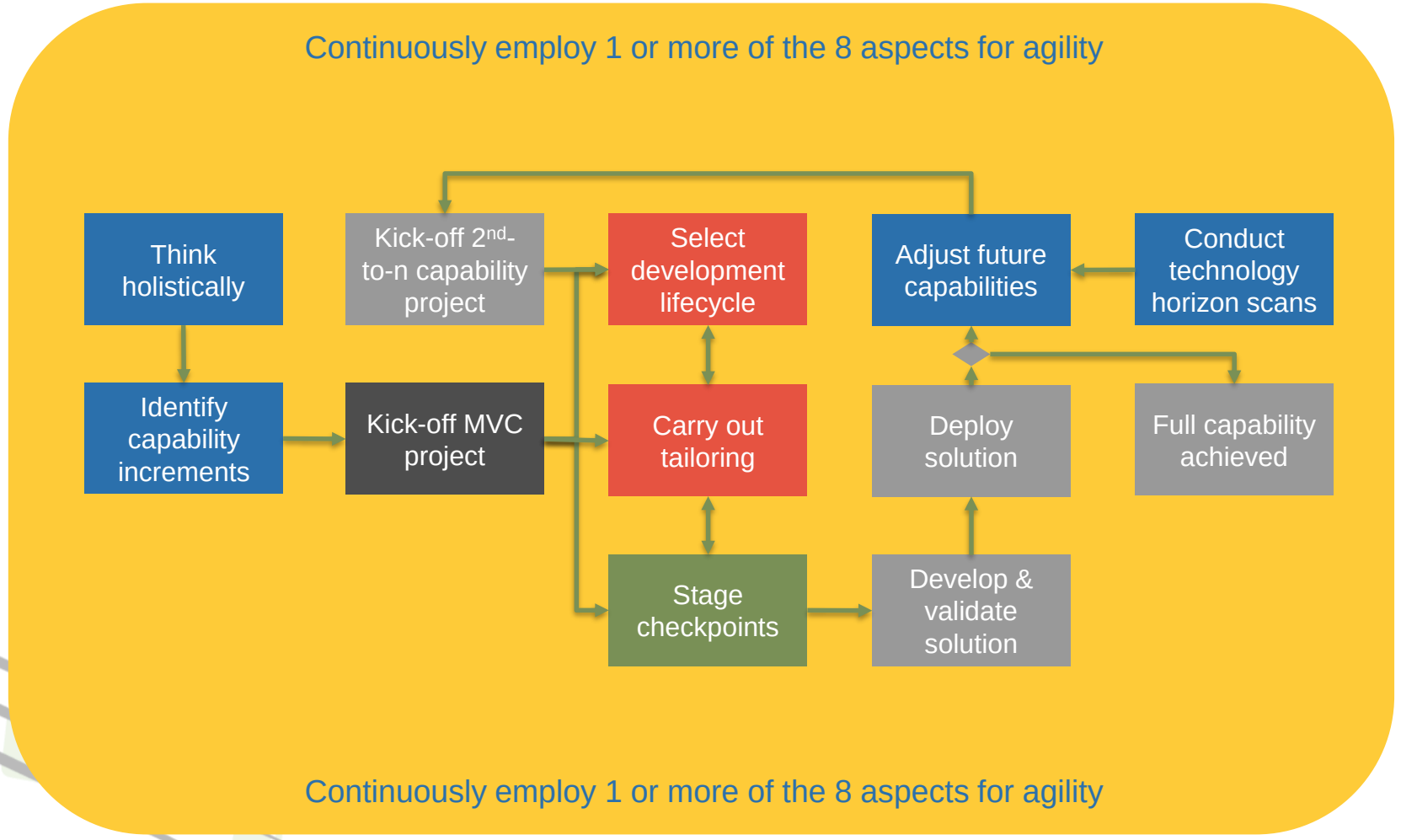


- **Be agile**, not do agile
- The goal is to reduce the adverse effects of uncertain knowledge & dynamic environments
- Different methods can be adopted, adapted or crafted
- Eight strategic aspects for agile SE
  - Each aspect can individually improve capability by multiple aspects operating in concert will improve agility

Source: Paper: "Agile Systems Engineering – Eight Core Aspects", authored by Rick Dove, Kerry Lunney, Michael Orosc, Mike Yokell, INCOSE 2023 proceedings

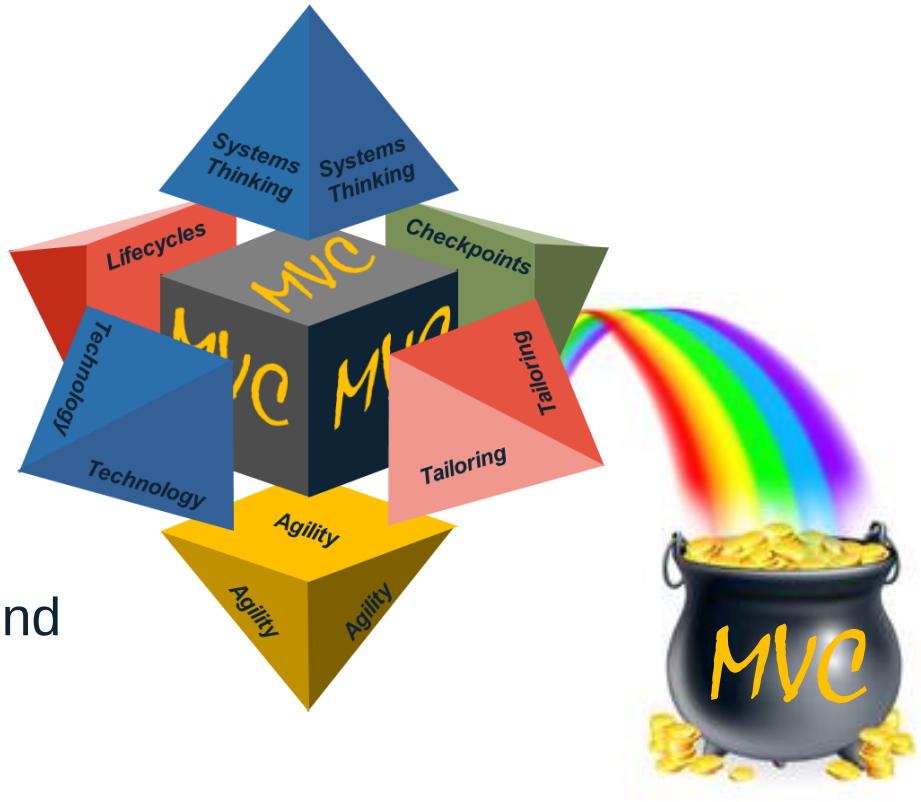
MVC Building Blocks





Summary

- MVC is “a capability that can successfully achieve the lowest acceptable level of the directed effect in the required time, able to be acquired, introduced into service, & sustained effectively”
  - It is not de-scoping a project
- Implementing MVC project requires change
  - From acquirer to supplier, to in-service support & end users
- Underpinning MVC approach is <u>being</u> agile



An MVC approach can provide value to all stakeholders

Q&A Time

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