Agile and Adaptive Coalition Operations - Leveraging the Power of Complex Environments

For 11th ICCRTS

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Sponsored by the OASD, NII Research and Development for the Command and Control Research Programme.

V1.3

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Agenda

- The Approach - Why Agility? Why Complex Systems?
- Current Approach to Provision of 'Capability'
- The “Concept” – Design, Assemble and Run-time (DART)
- Summary / Way Ahead

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Approach - why Agility?

- How organisations can perform can only be determined through an understanding of how they:
  - wish to behave within environments (diverse and dispersed) and
  - shape, and are shaped, by contexts and challenges (largely unexpected)
- Hence, in acquiring 'agile capability', we need to:
  - Describe (the environment):
    - including its components / actors (eg adversaries - that the organisations will have to operate with) and
    - nature (characteristics, stability etc), interactions, interdependencies
  - Describe (the organisations):
    - the components and internal structures (C2 arrangements etc);
    - the behaviours that are required for organisations to achieve their stated purposes / interactions with the environment

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Coalition Issues to Address (1)

- The nature of coalition operations implies the need to rapidly configure incompatible or foreign systems into a cohesive whole. Several key principles apply, that:
  - diverse and disparate 'come-as-you-are' elements are provided by the coalition partners and integrating them requires continuous, pro-active readjustment
  - multiple coalitions may be active at any one time so a decision in one may affect another concurrent operation
  - coalition elements should be supported by appropriate C4I in achieving 'unity of action' and the systems provided must be robust, secure, dynamic and adaptable and must not unduly constrain human actions

Coalition Issues to Address (2)

- Diversity and its consequences should be embraced:
  - "interoperability of the mind" is as important , if not more so, than system interoperability (cultural, social, language etc)
  - most coalitions will have commercial / civilian / NGO elements - they will have diverse infrastructures
  - coalitions consist of loosely connected elements working semi-autonomously, and within their delegated authority, towards a shared purpose and must be free to optimise locally / snatch fleeting opportunities etc
- There is a pressing need to be able to set up coalition organisations / systems rapidly (in order to exert decisive advantage / deal with emerging crises)

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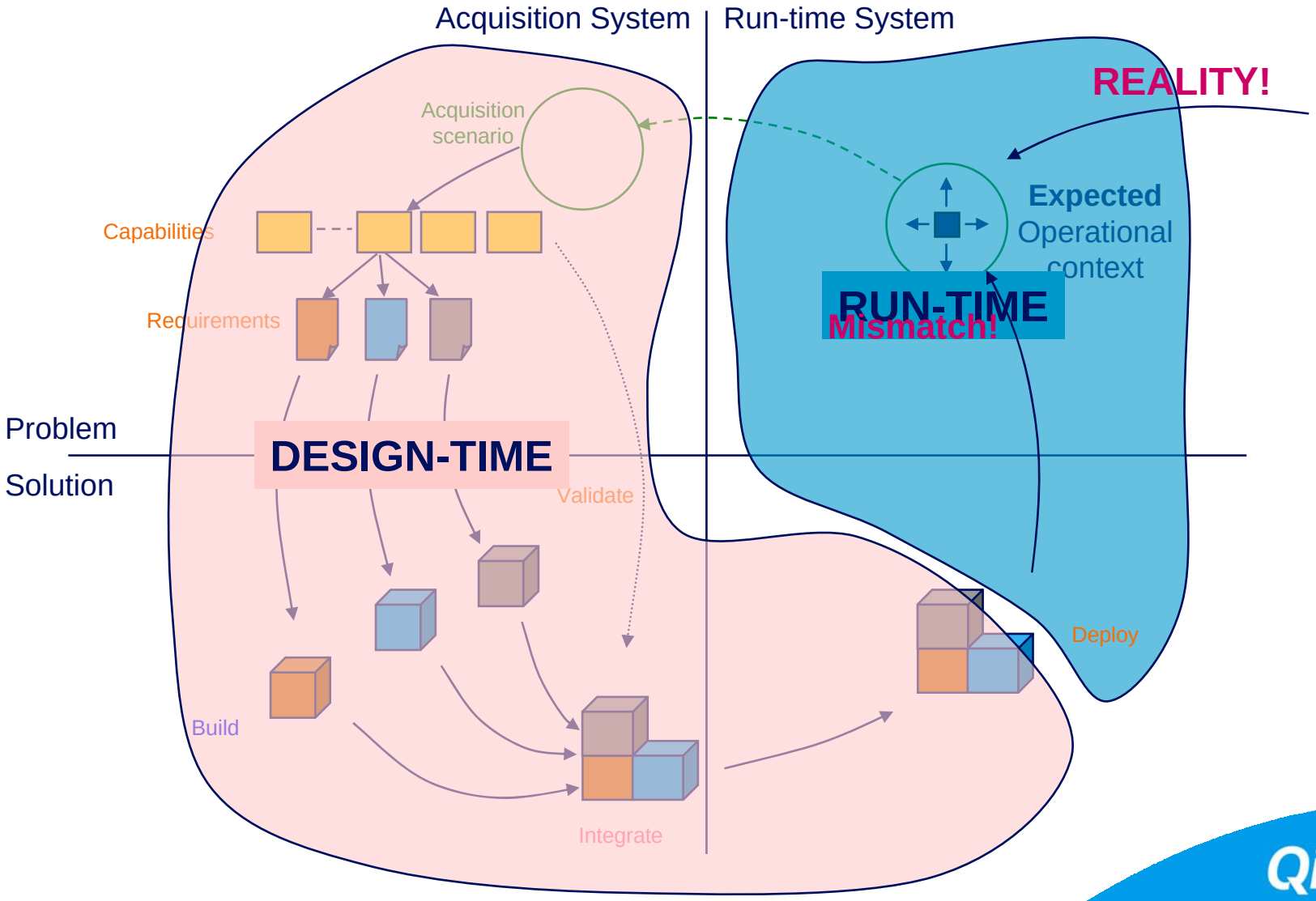
How it Used to be (is!)



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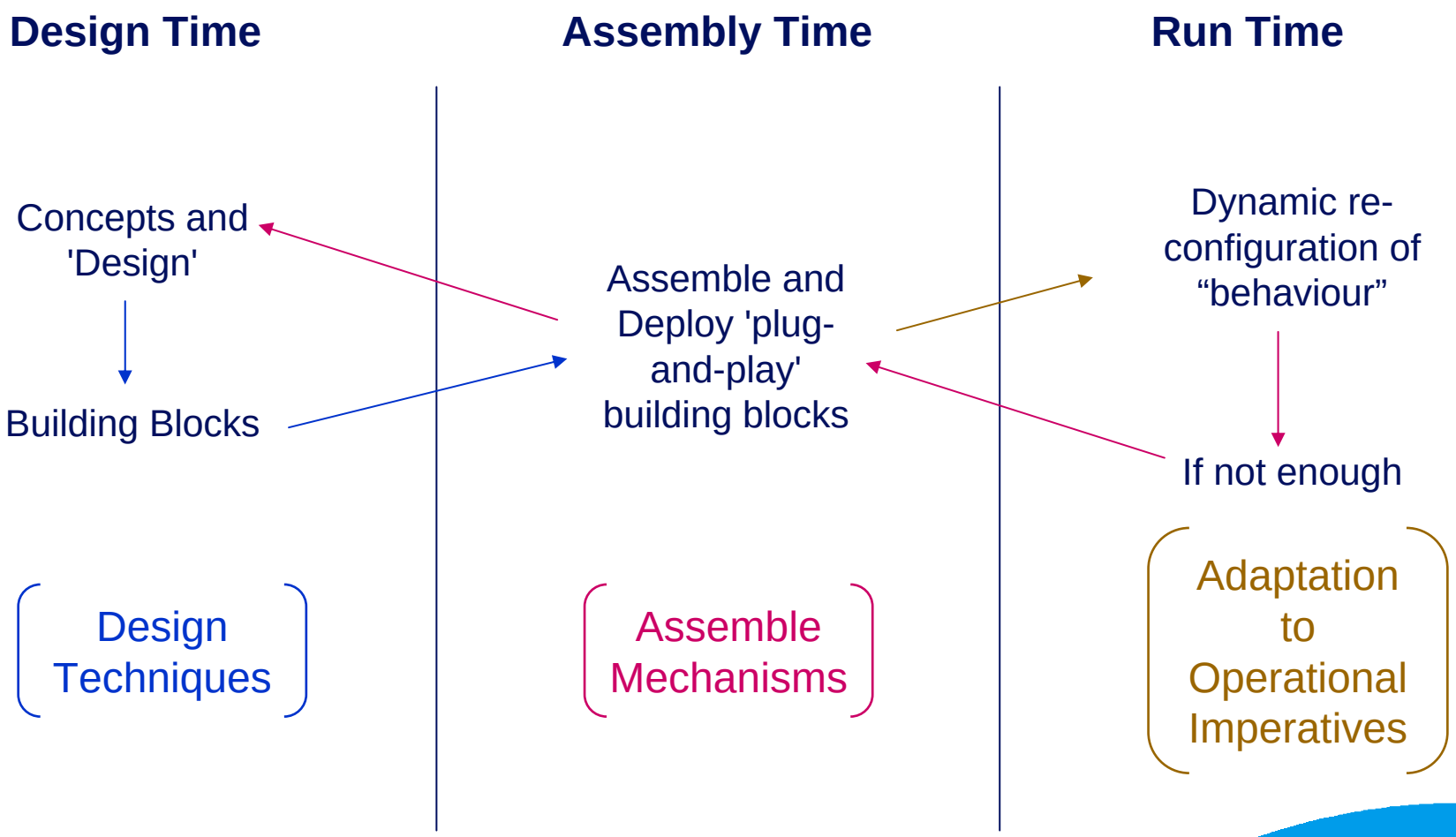
The DART Framework



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A View of the DART Framework

Design-time [Engineer]

'Building Blocks':
- Devices
- Equipment
- Procedures
- Basic units

Features:
- Component level
- Objects
- Bounded
- Closed
- Dormant
- Designed

Instantiate

Decompose

Assemble-time [Build / Structure]

'Functional Units':
- Systems
- Structures
- Interfaces
- Services

Features:
- Individual level
- Capabilities
- Nascent connections
- Open
- Model-able
- Built

Activate

Reconfigure

Run-time [Evolve / Influence]

'Enterprises':
- Communities
- Networks
- Interdependencies
- Agents and actors

Features:
- Social level
- Ecosystems
- Adaptive
- Dynamic
- Purposeful
- Grown

Increasing dynamic adaptability

Increasing predictability

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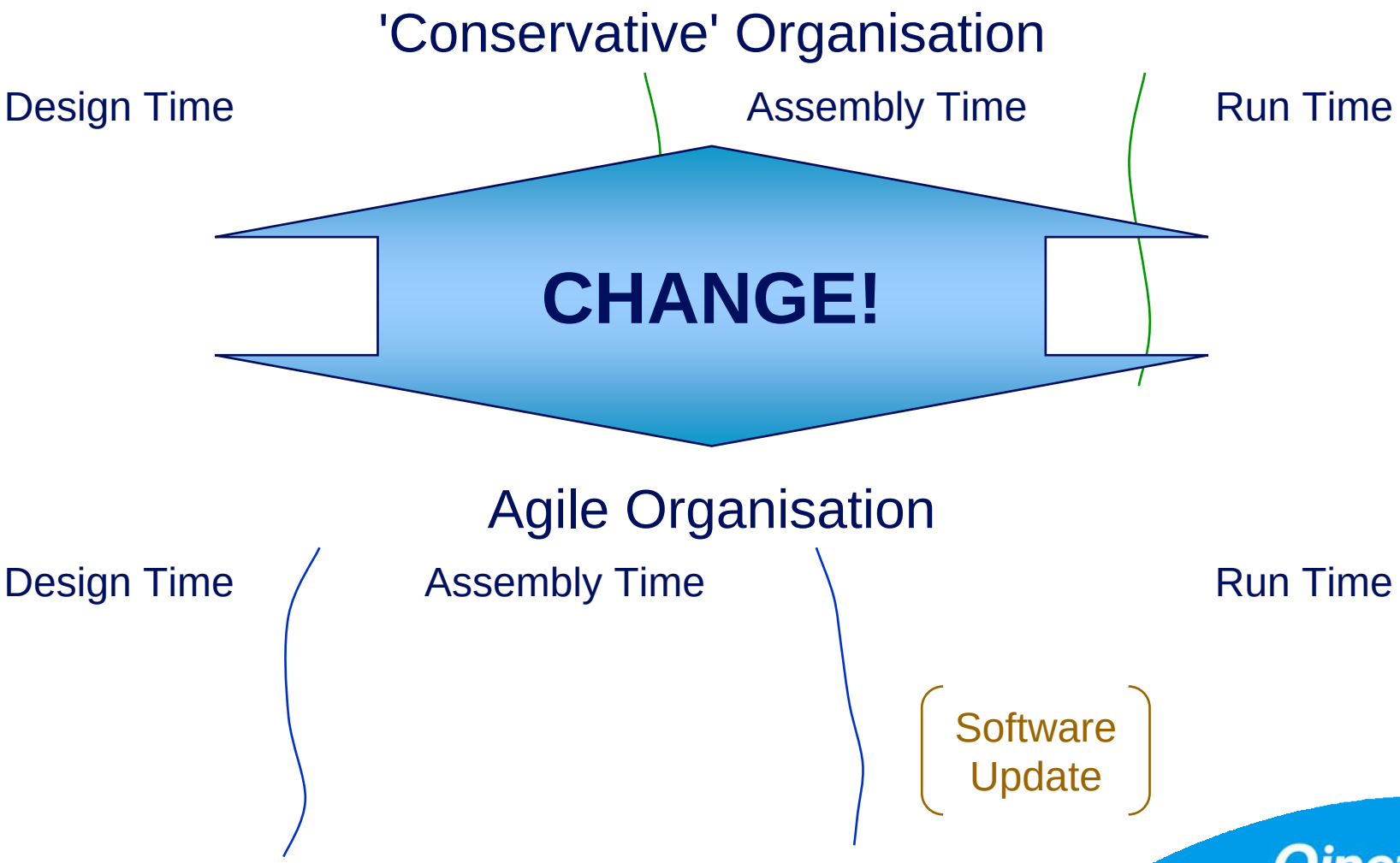
Boundaries Vary - Ability to Change …



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Comms Networks

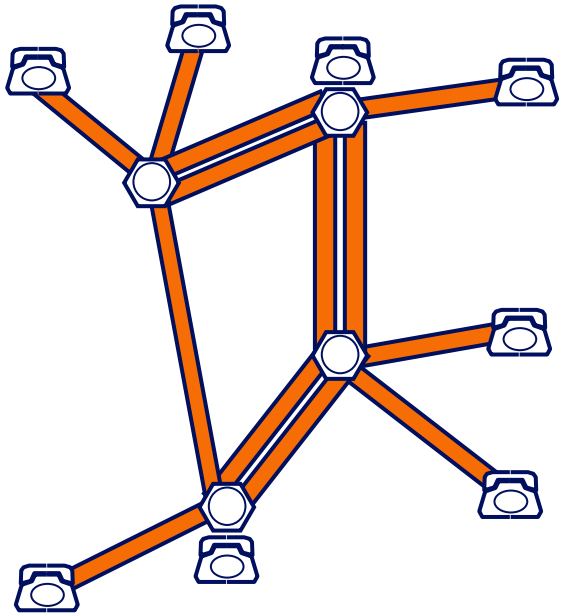
Design Time

User Elements

Router Elements

Comms Elements

Assembly Time



Run Time

Primary Means

- Dynamic network management

Secondary means

- Re-building (going back to assembly-time)

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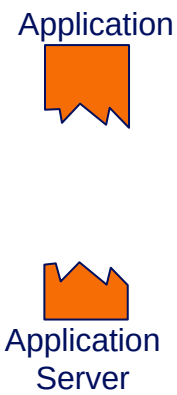
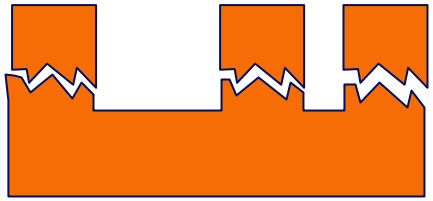
Applications and Services

Design Time



Assembly Time



Run Time

Primary Means

- Dynamic reconfiguration

Secondary means

- Plug and play (Plug and play needed for software upgrade more than agility)

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Organisational Networks

Design Time

RN

- Individual Ships

RAF

-Single large platforms

-Sub-squadron

Army

-???

Assembly Time

Agile Mission Groups

RN

- Task Groups

RAF

- Detachments

Army

- Divisions
- Brigades
- Battlegroups

Run Time

Primary Means

- Construct to meet task??

Primary Means

- Re-tasking
- Re-structuring lines of support (resource sharing)

Secondary Means

- Bringing in new elements
- Physically moving existing elements

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Social Networks

Design Time

- Trained commanders
- Liaison officers

Assembly Time

- Command networks/structure
- Communities of interest
- Informal Groups
- Lines of support

Run Time

Primary Means

- Dynamic COI's
- Dynamic lines of support

Secondary Means

- Change to command networks / structures

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Exploiting the DART Landscape

	Sponsor	User
Problem	Vision / Strategy (Defining & Designing)	Operations (Re-Configuring & Doing and Learning)
Solution	Capability Management (Acquiring & Building)	Experimentation (Trialing & Exercising)

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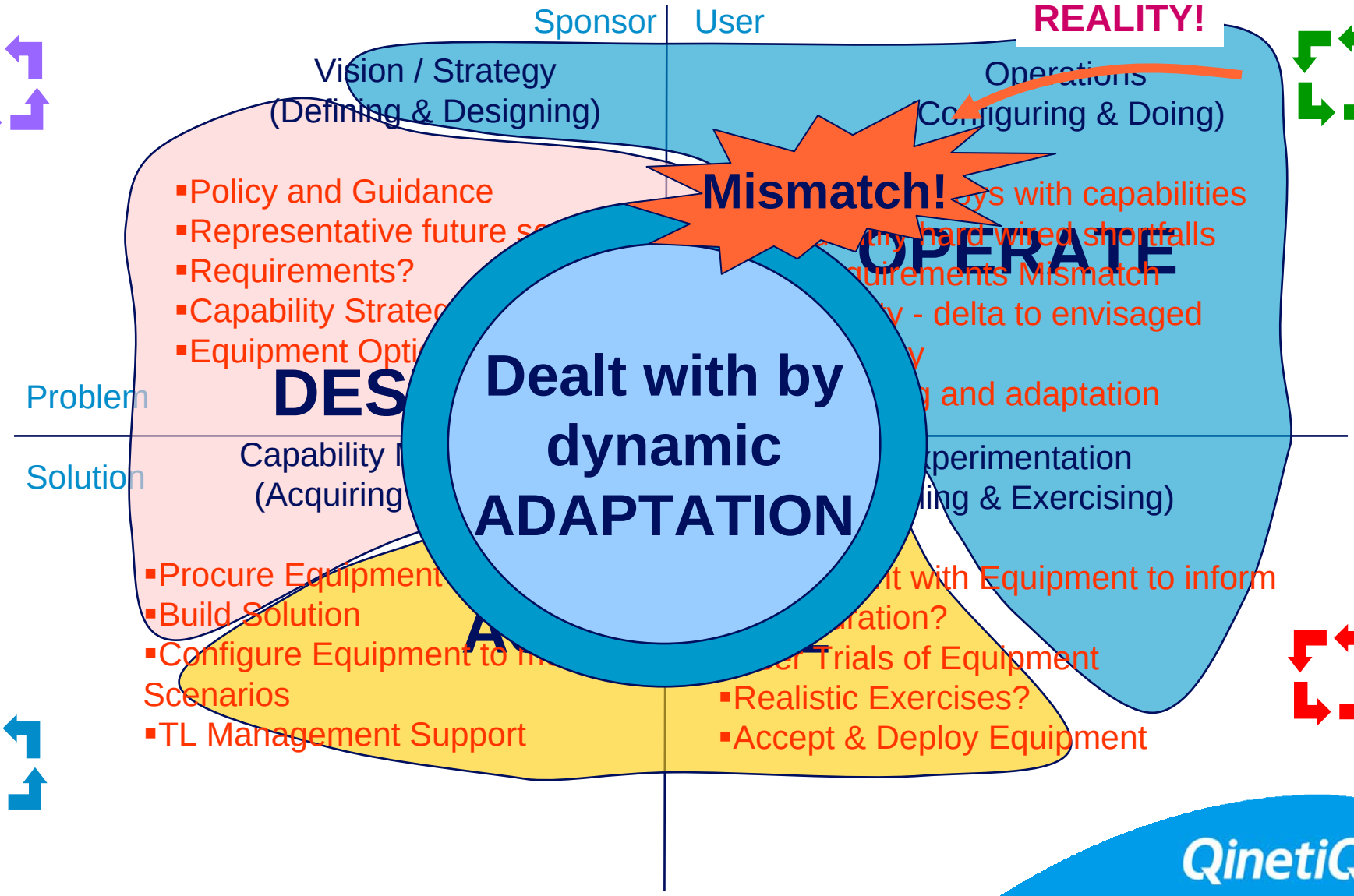
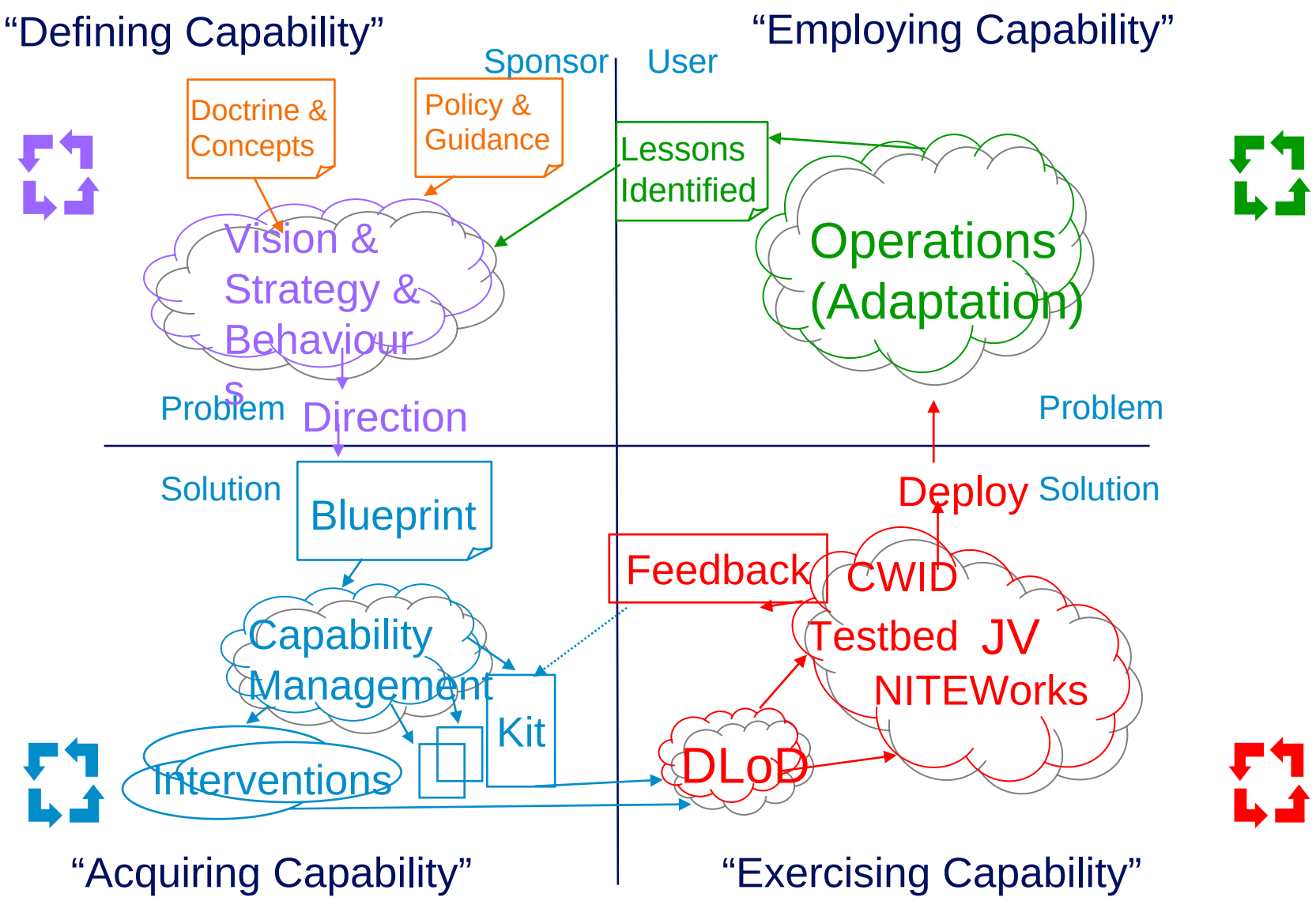
How Should we Do It?




"Defining Capability"
"Employing Capability"
Sponsor
User
Doctrine & Concepts
Policy & Guidance
Lessons Identified
Vision & Strategy & Behaviours
Operations (Adaptation)
Problem
Direction
Problem
Solution
Blueprint
Deploy
Solution
Feedback
CWID
Testbed
JV
NITEWorks
Capability Management
Kit
Interventions
DLoD
"Acquiring Capability"
"Exercising Capability"

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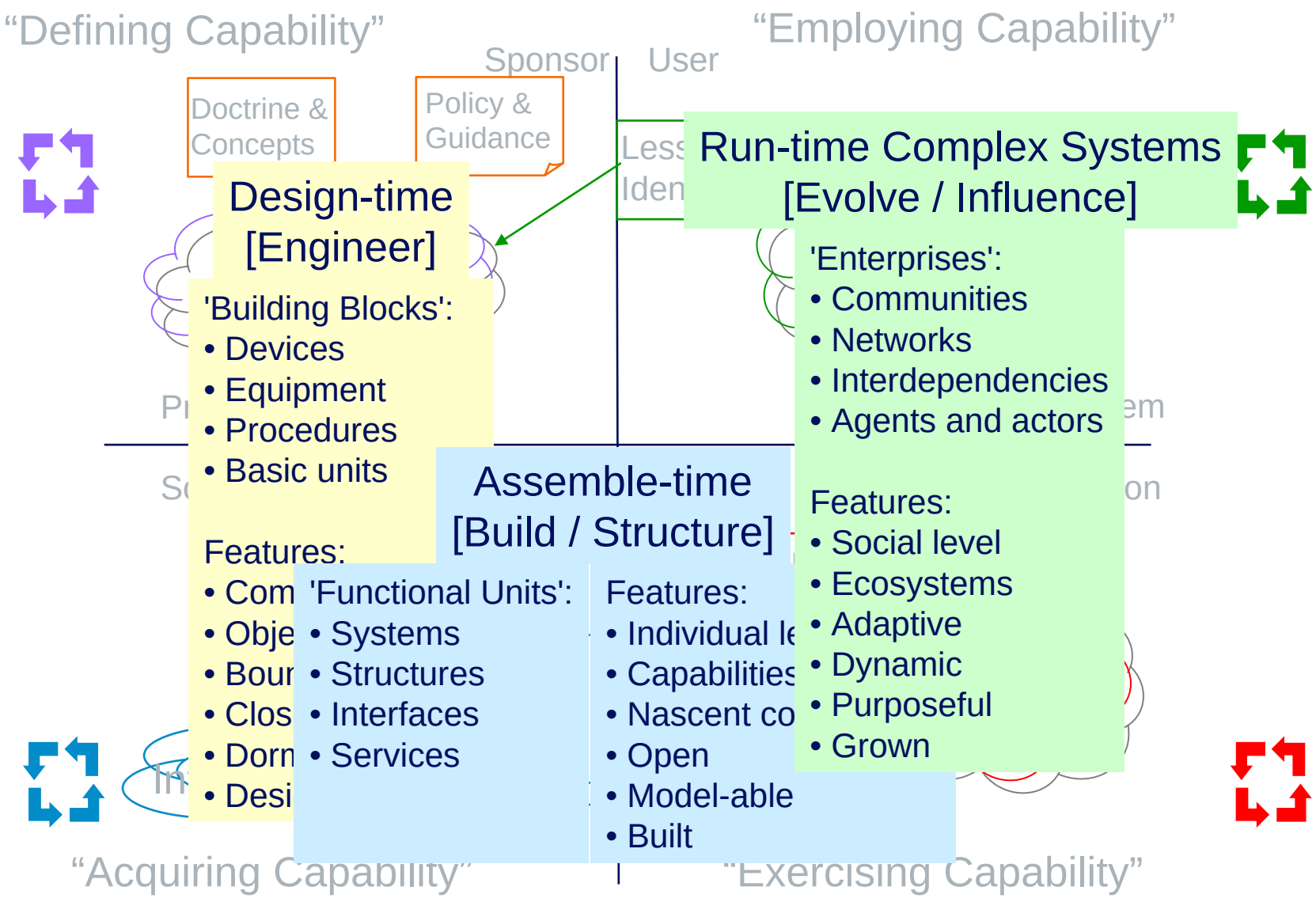
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Summary / Way Ahead

- Agility* is essential to enable operational adaptation:
  - The world is increasingly 'joined up' - boundaries between 'us' and 'them' are blurred - coalitions are the norm
  - 'Conflict' is more diverse and dispersed - the unexpected should be expected - we need to be able to adapt!
- Coalition contexts (especially adversaries) are great teachers ..
- We should exploit complexity in relation to Agile Coalition / Edge Organisations:
  - Build on existing complex systems work - embrace adaptation
  - Employ Design, Assemble, Run-time concepts and mechanisms
  - Change the way we carry out experimental campaigns

* Agility includes: robustness, resilience, responsiveness, flexibility, innovation, adaptation

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Questions?

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2. The Confrontational Environment

The multi-actor environment

Sensing and changing the environment

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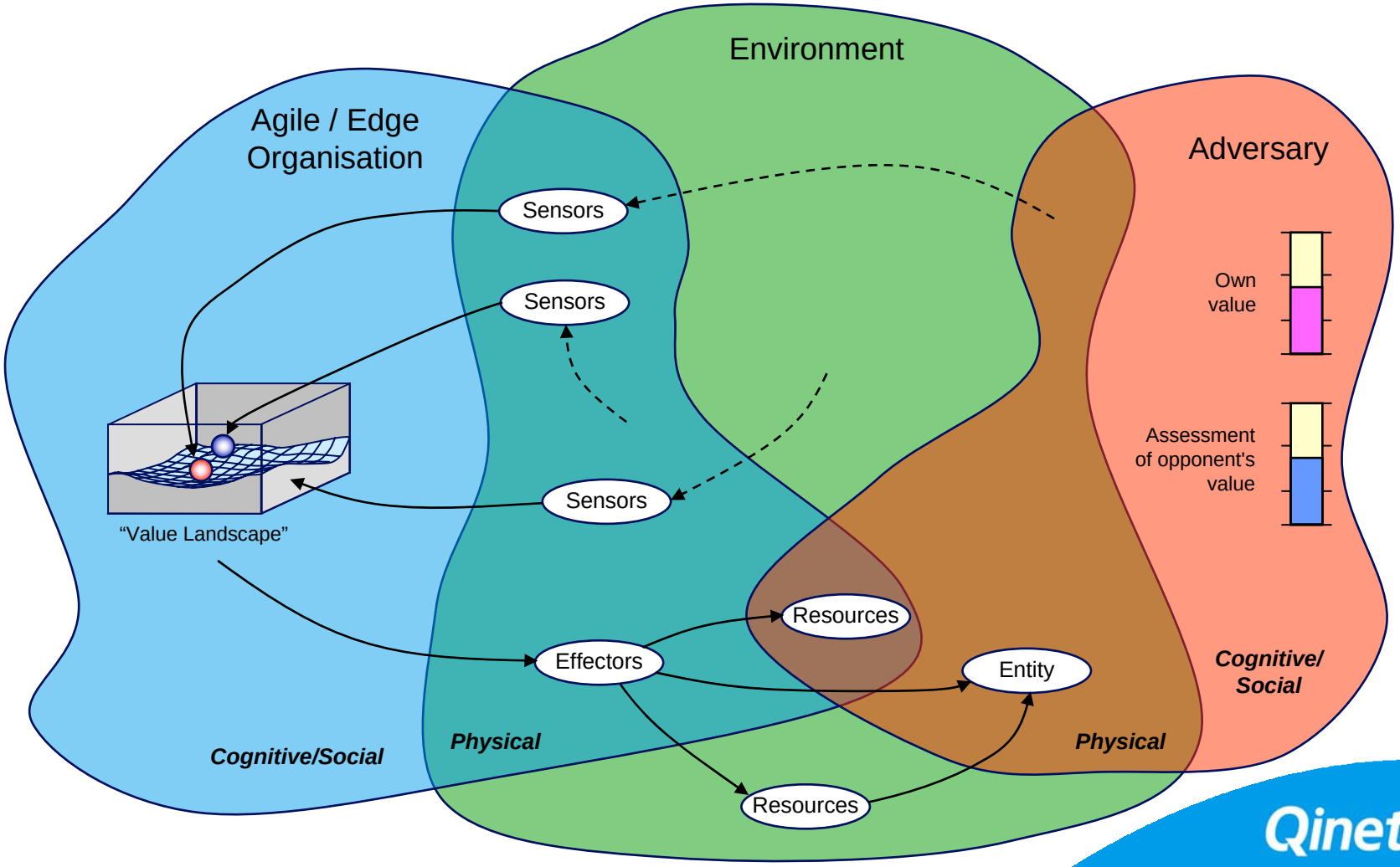
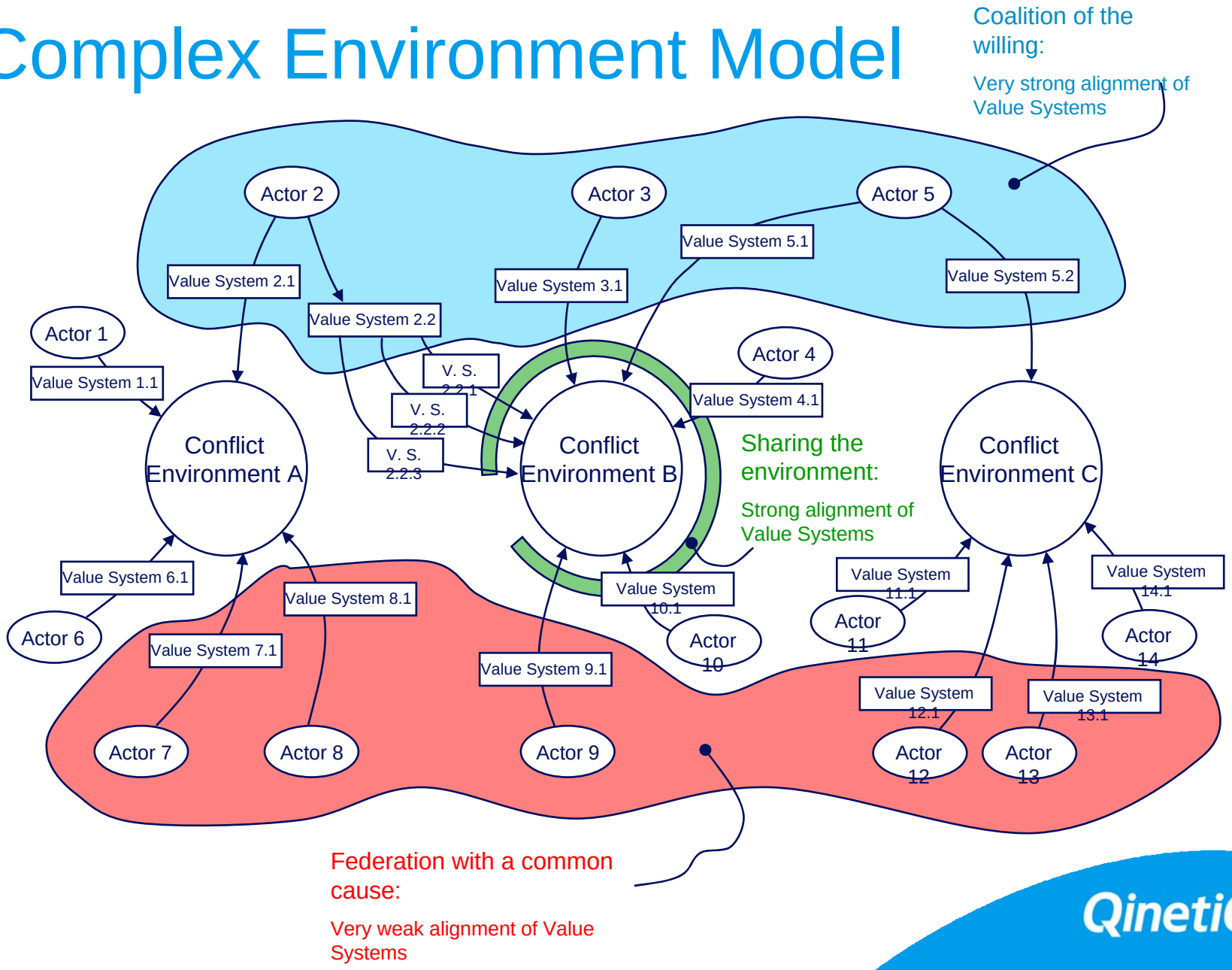
Why Reality is Complicated



Complex Environment Model



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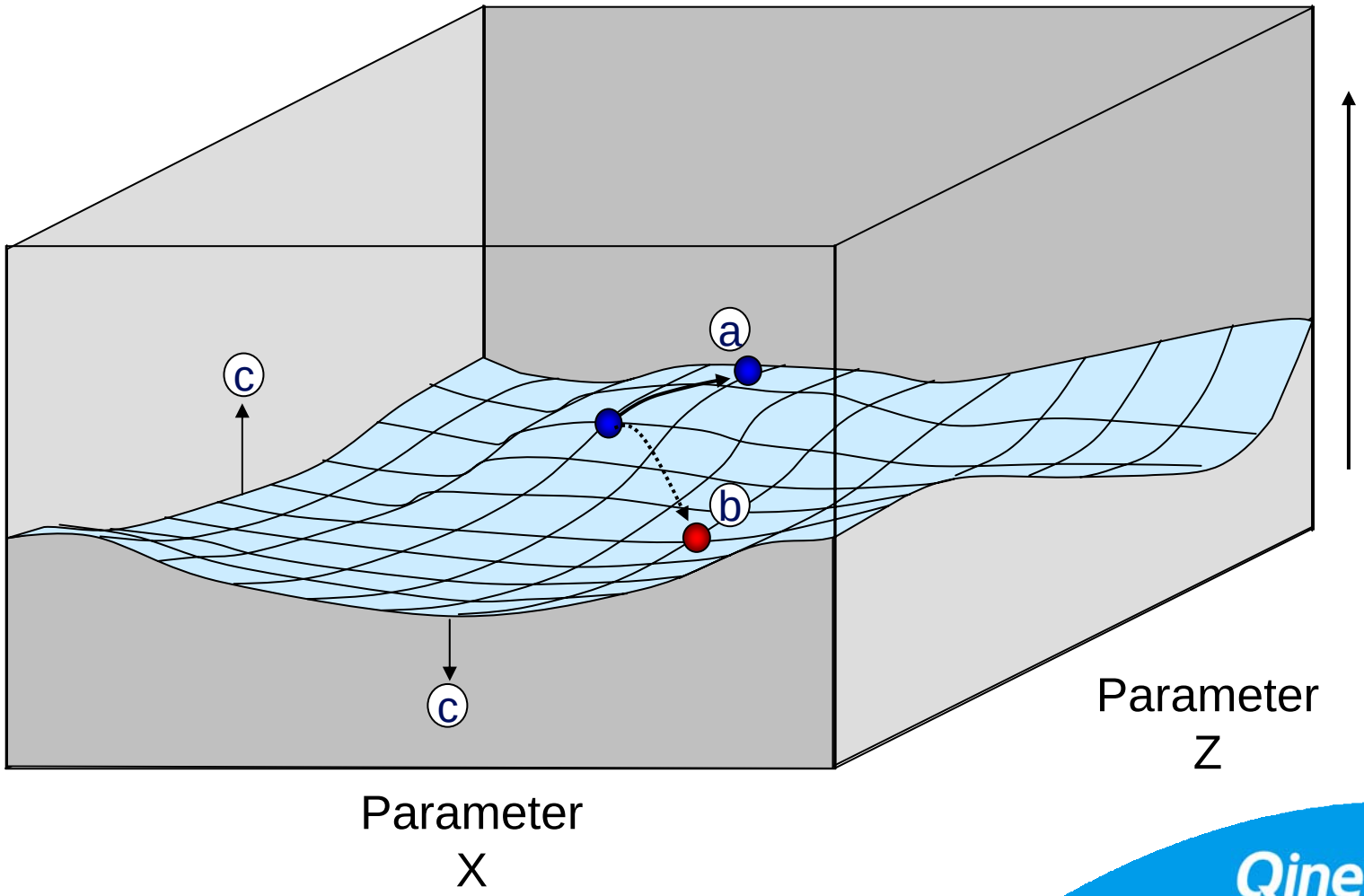
Value Landscape



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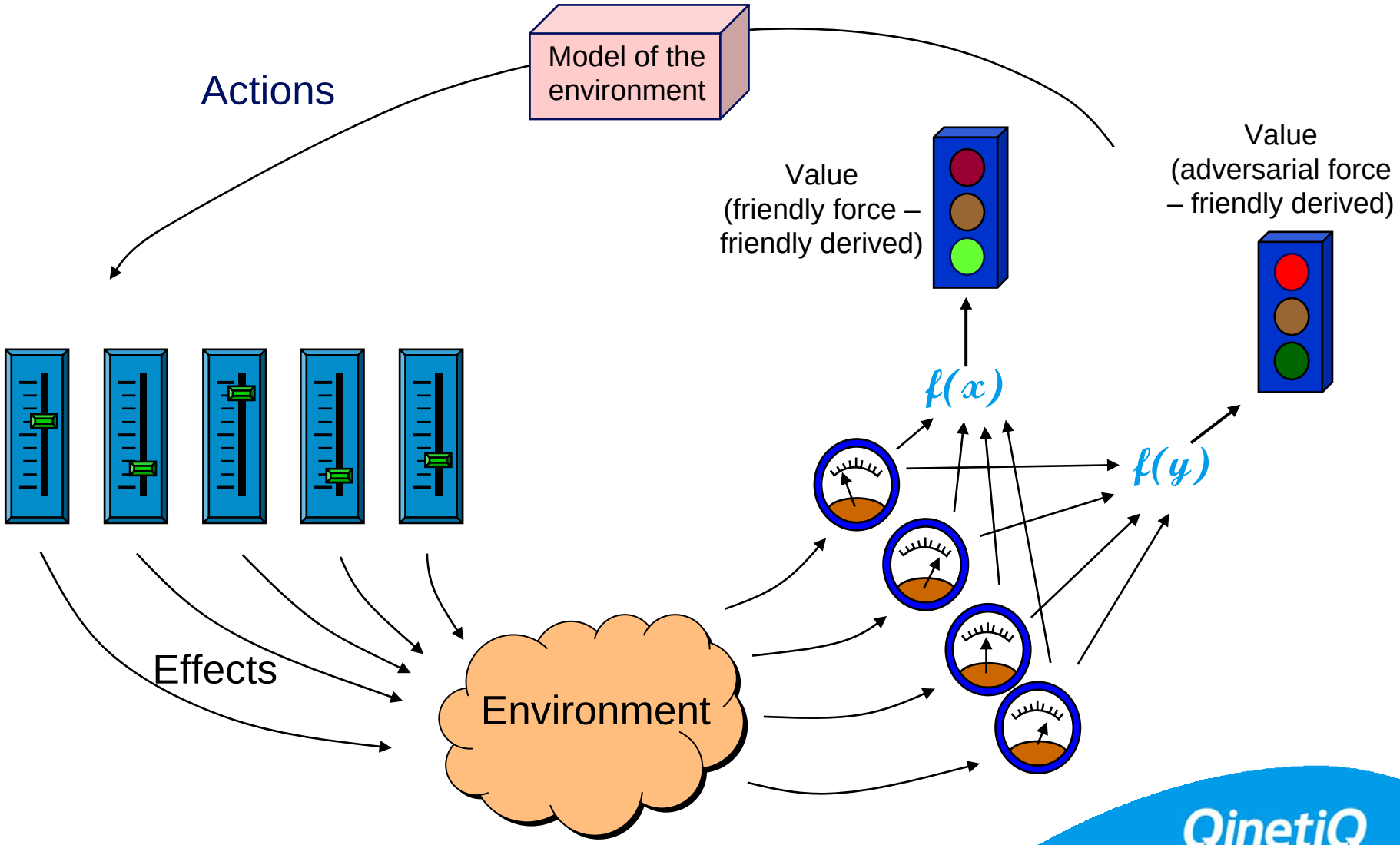
“Levers and Gauges Diagram”



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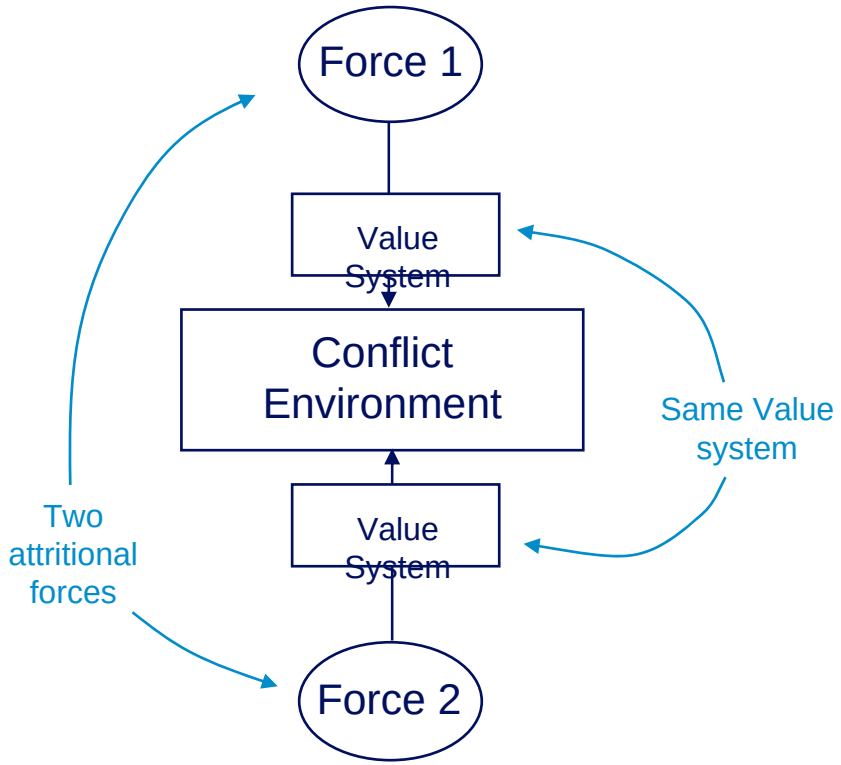
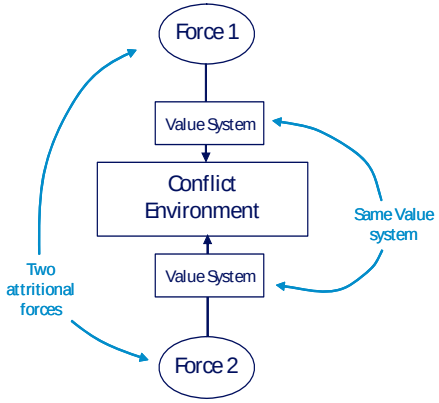
Environment model



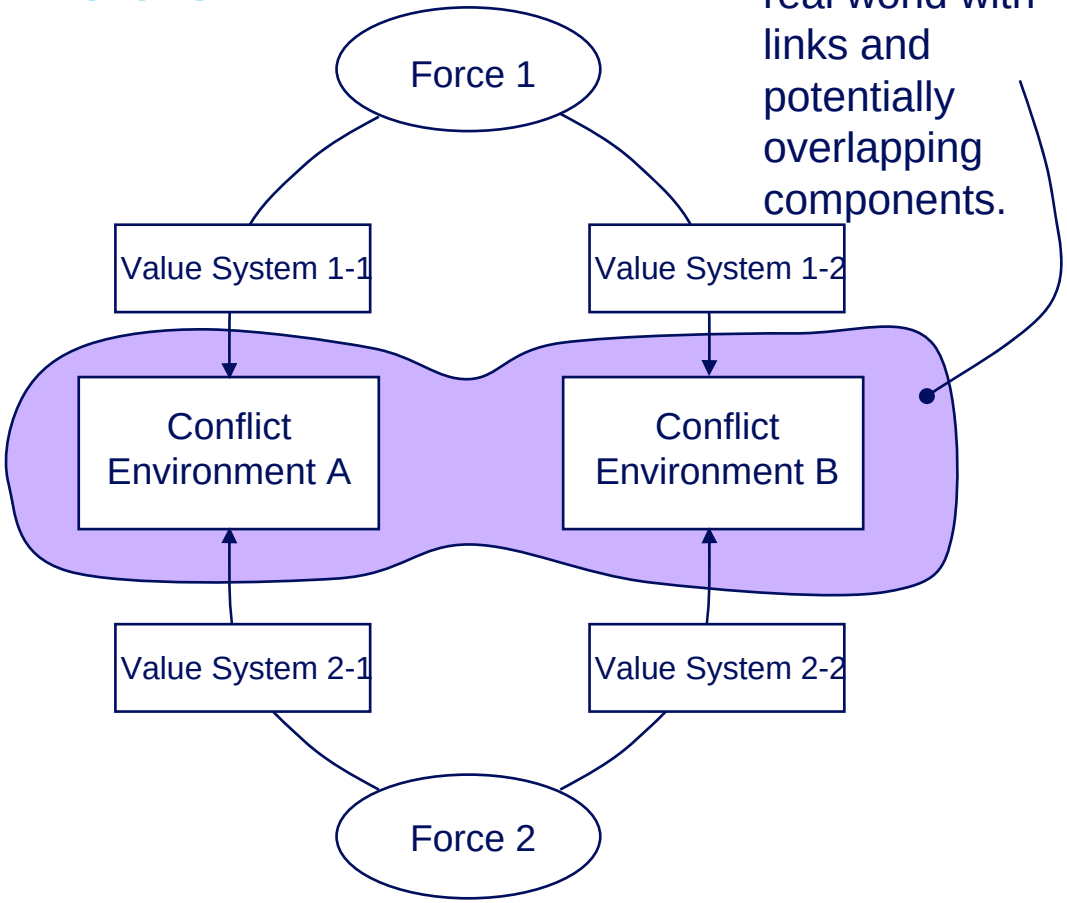
Traditional Model

Environment model



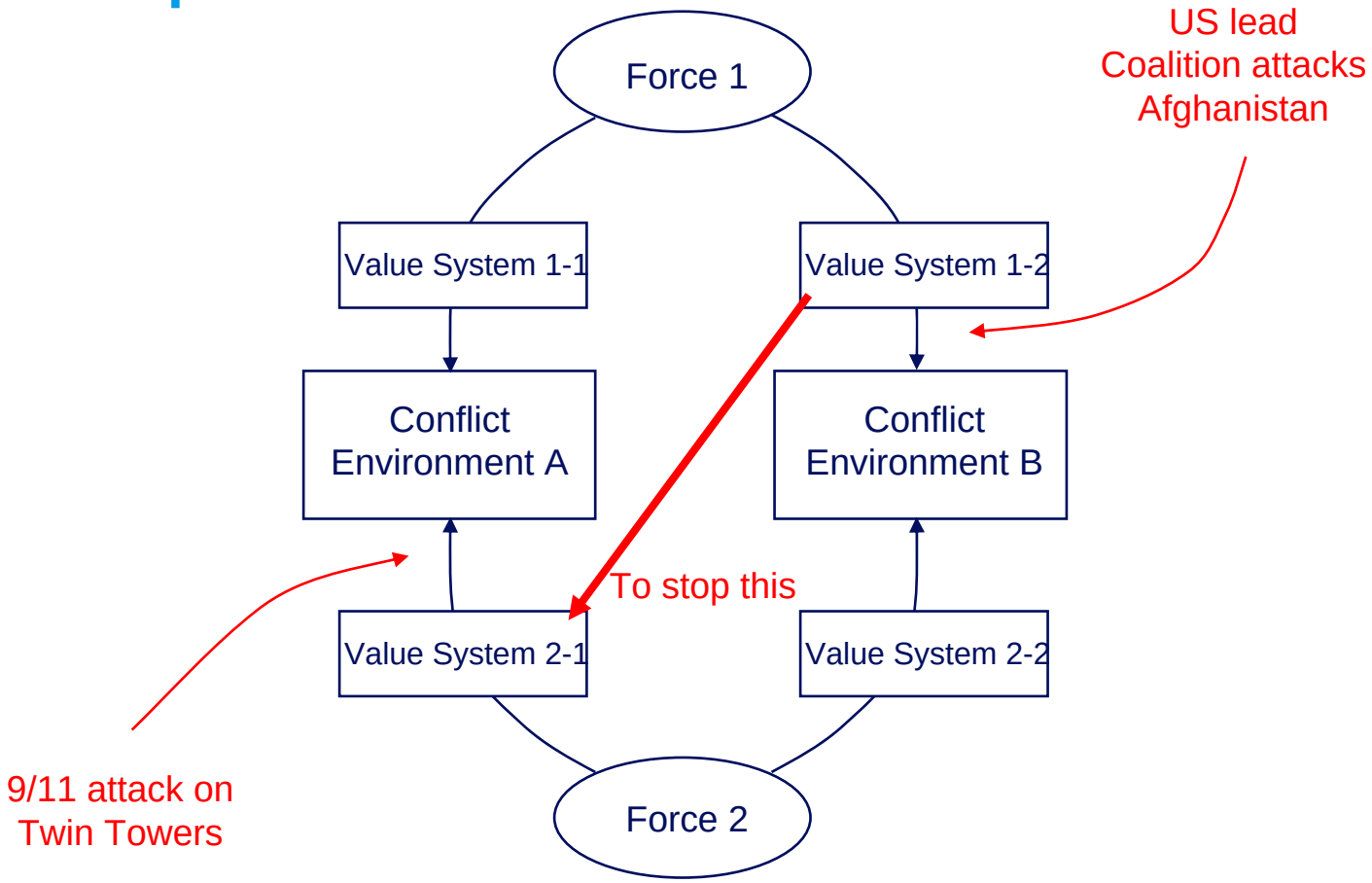
Traditional Model

Both within the real world with links and potentially overlapping components.

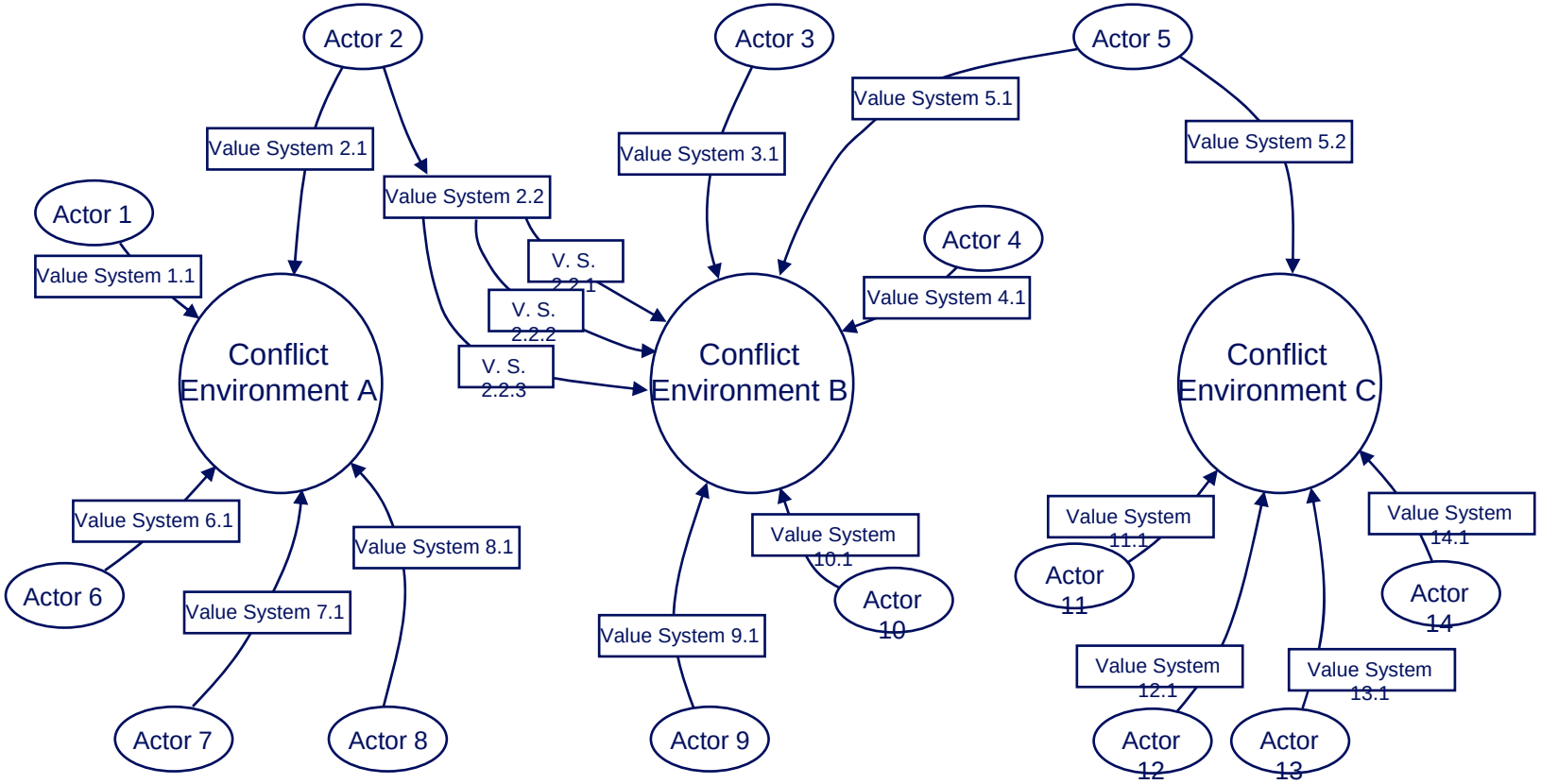


New Environment Model

Example


Force 1
US lead
Coalition attacks
Afghanistan
Value System 1-1
Value System 1-2
Conflict
Environment A
Conflict
Environment B
To stop this
Value System 2-1
Value System 2-2
9/11 attack on
Twin Towers
Force 2

Complex Environment Model



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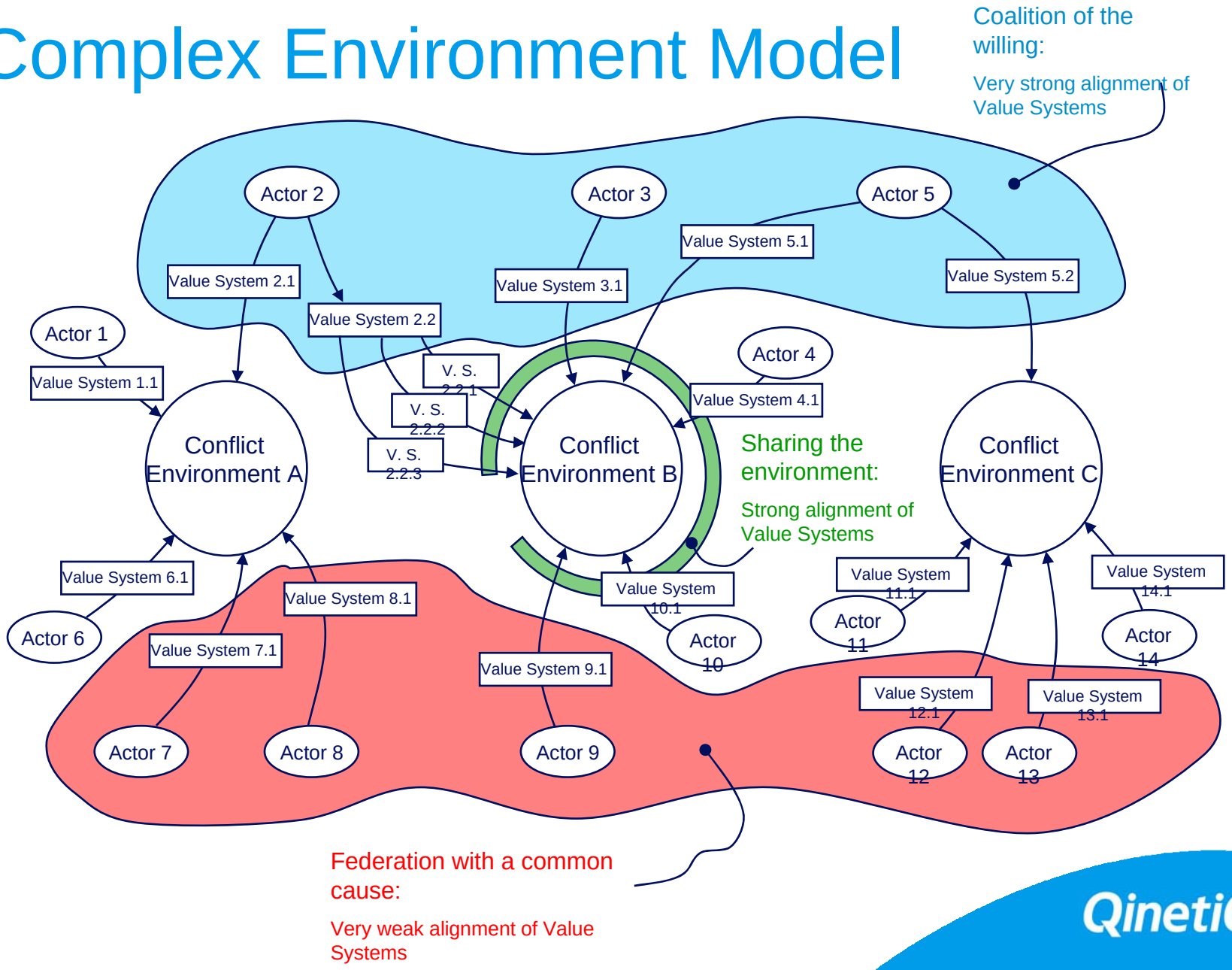

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