How Can You Support Your Software Development Method with Essence?

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Agenda

- Part 1: Introduction
  - SEMAT and Essence
  - Essence Kernel
- Part 2: Using the Kernel
  - Scenario on Solving Pain Points
- Part 3: Exercising the Kernel
- Part 4: The value of the Kernel?
- Part 5: Kernel cont. & Kernel Extensions

Acknowledgements

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- Bob Palank, St. Louis Community College

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SEMAT: Software Engineering Method and Theory

Founded by Ivar Jacobson, Bertrand Meyer, Richard Soley in 2009

Re-found software engineering as a rigorous discipline based on a general theory of software engineering and a unifying process framework

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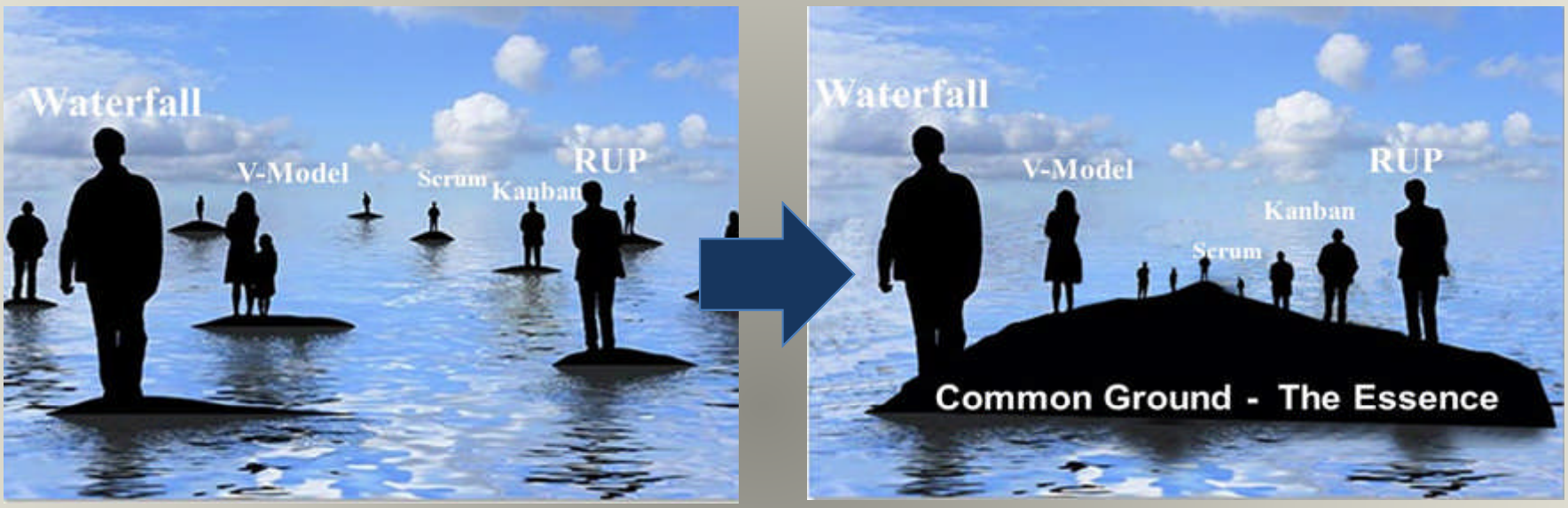
Common Ground



Everyone of us knows how to develop **our own** software, but as a community we have **no** widely accepted common ground


Measures
Find a kernel of widely agreed elements
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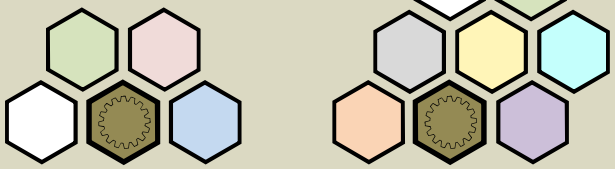
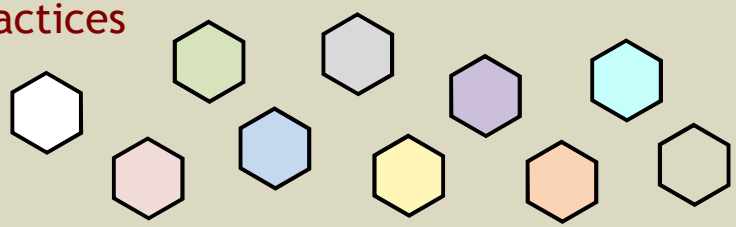
What is Essence?

Methods



Custom Method M Custom Method N

Practices



Kernel

Essence Kernel

Language

Essence Language

OBJECT MANAGEMENT GROUP

Essence - Kernel and Language for Software Engineering Methods

http://www.omg.org/spec/Essence/Current

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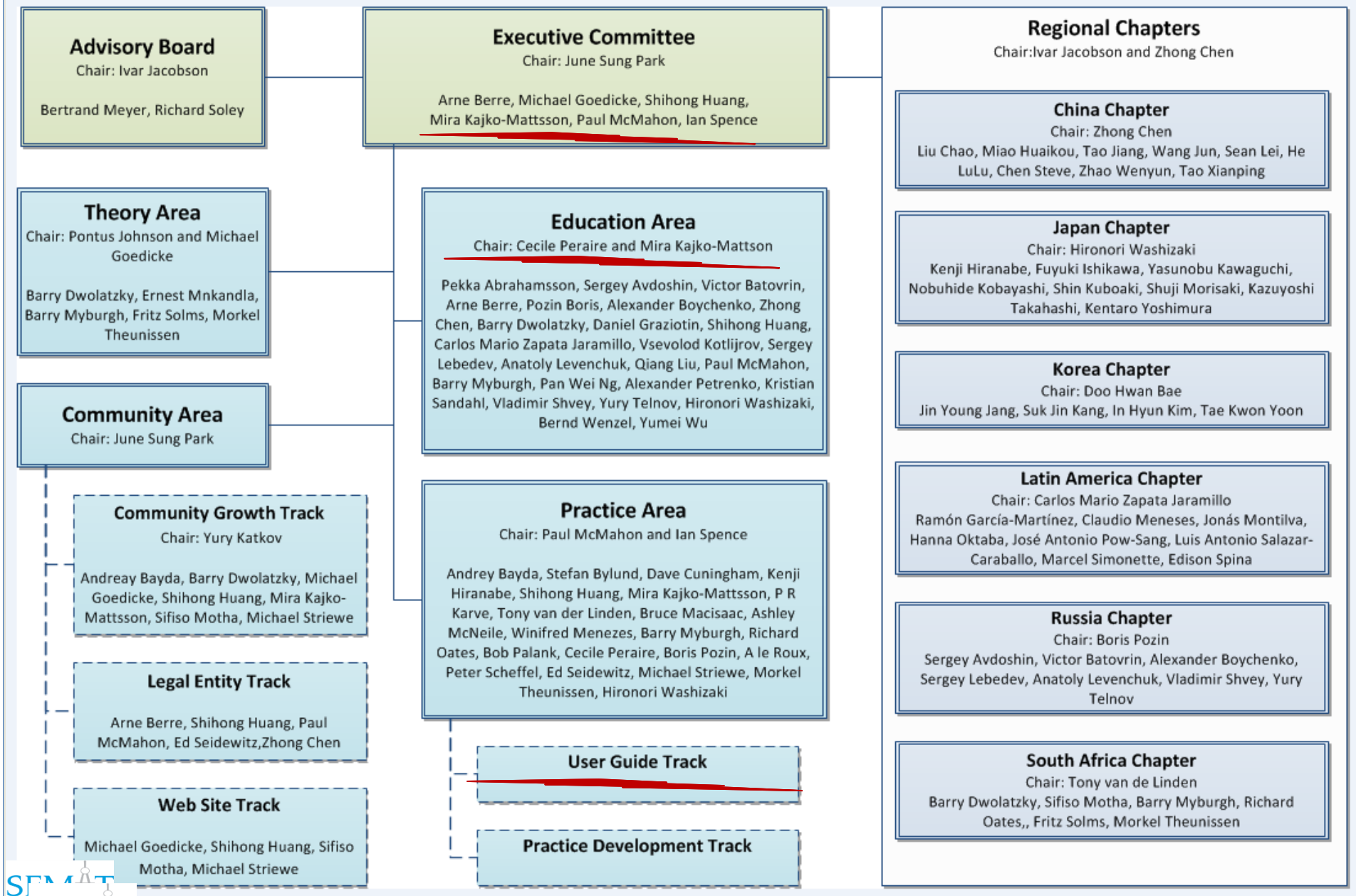
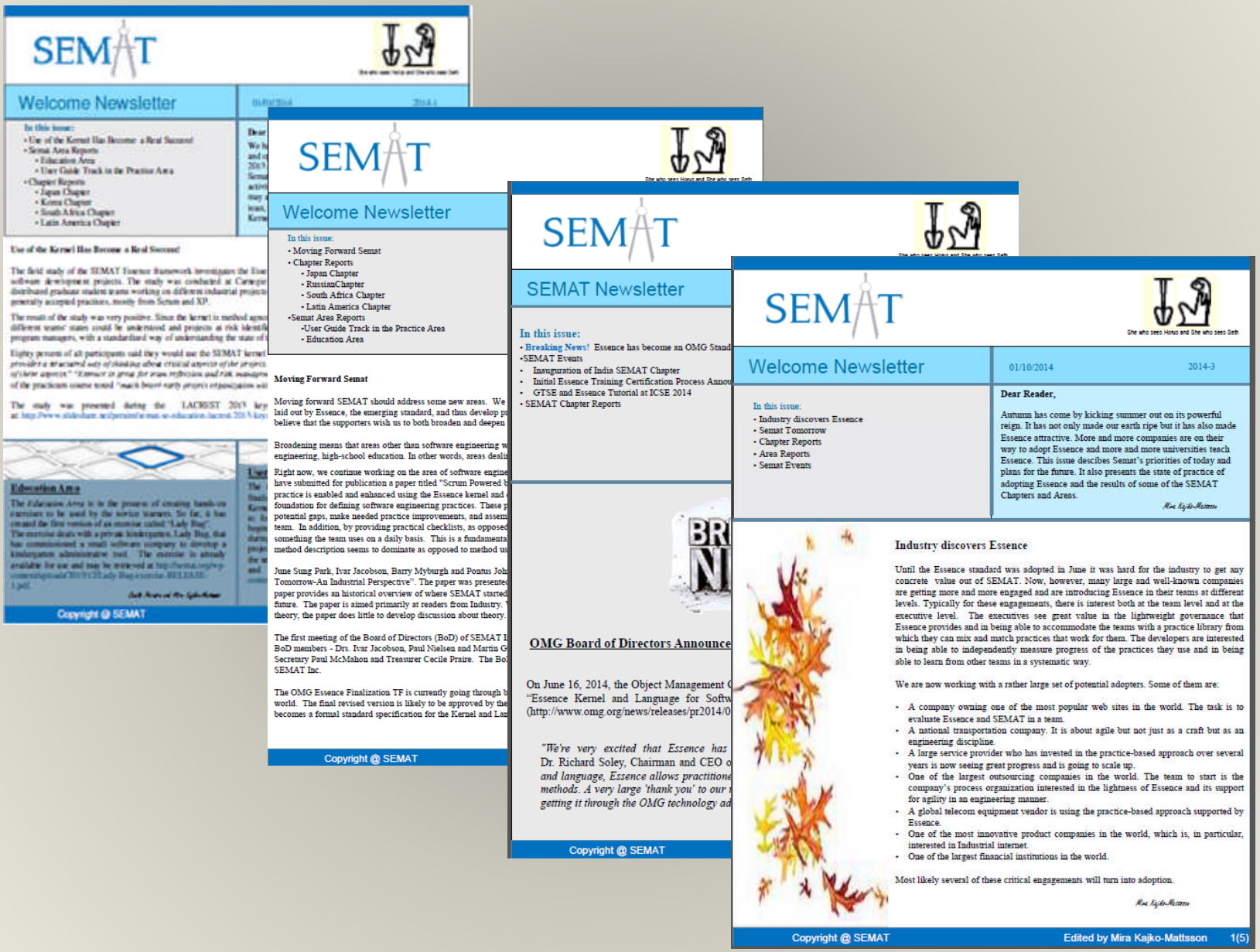
Method Architecture

Mira and SEMAT



SEMAT Newsletter



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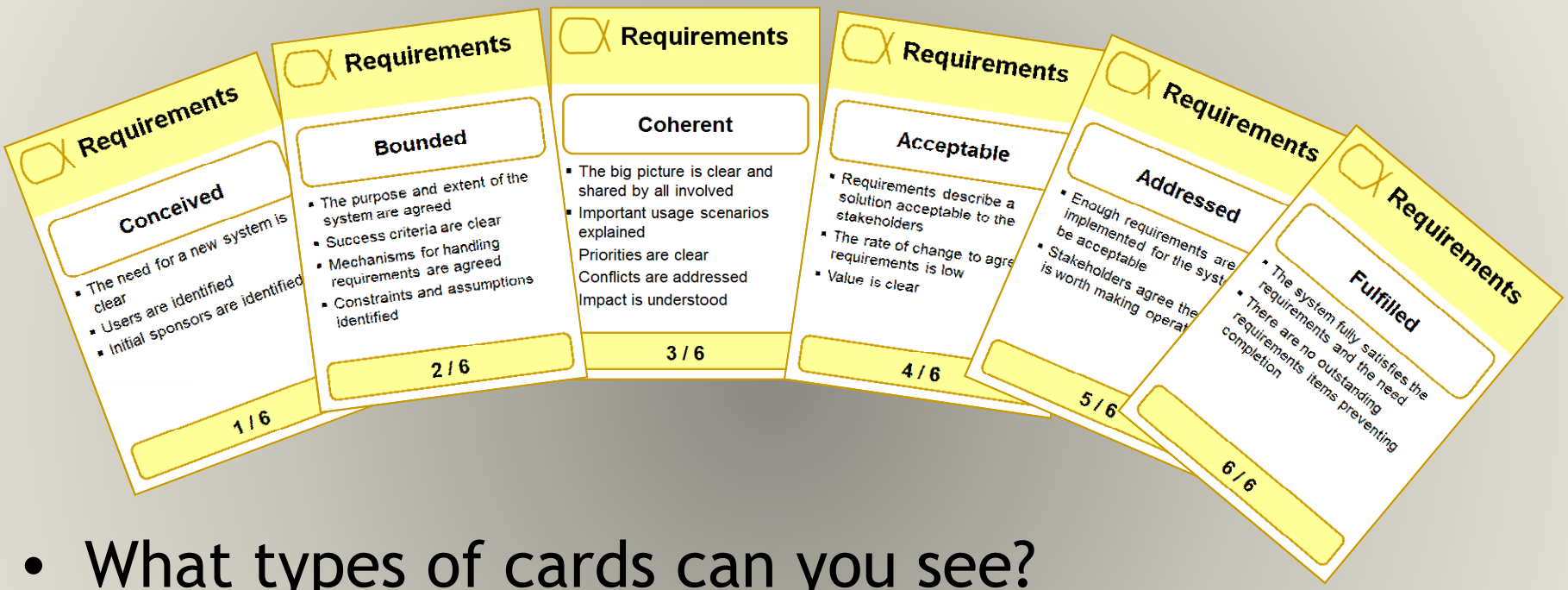
Essence Cards



- What types of cards can you see?
- What do you think they are for?
- Is there any type missing?
- Does the colour of the cards indicate anything?

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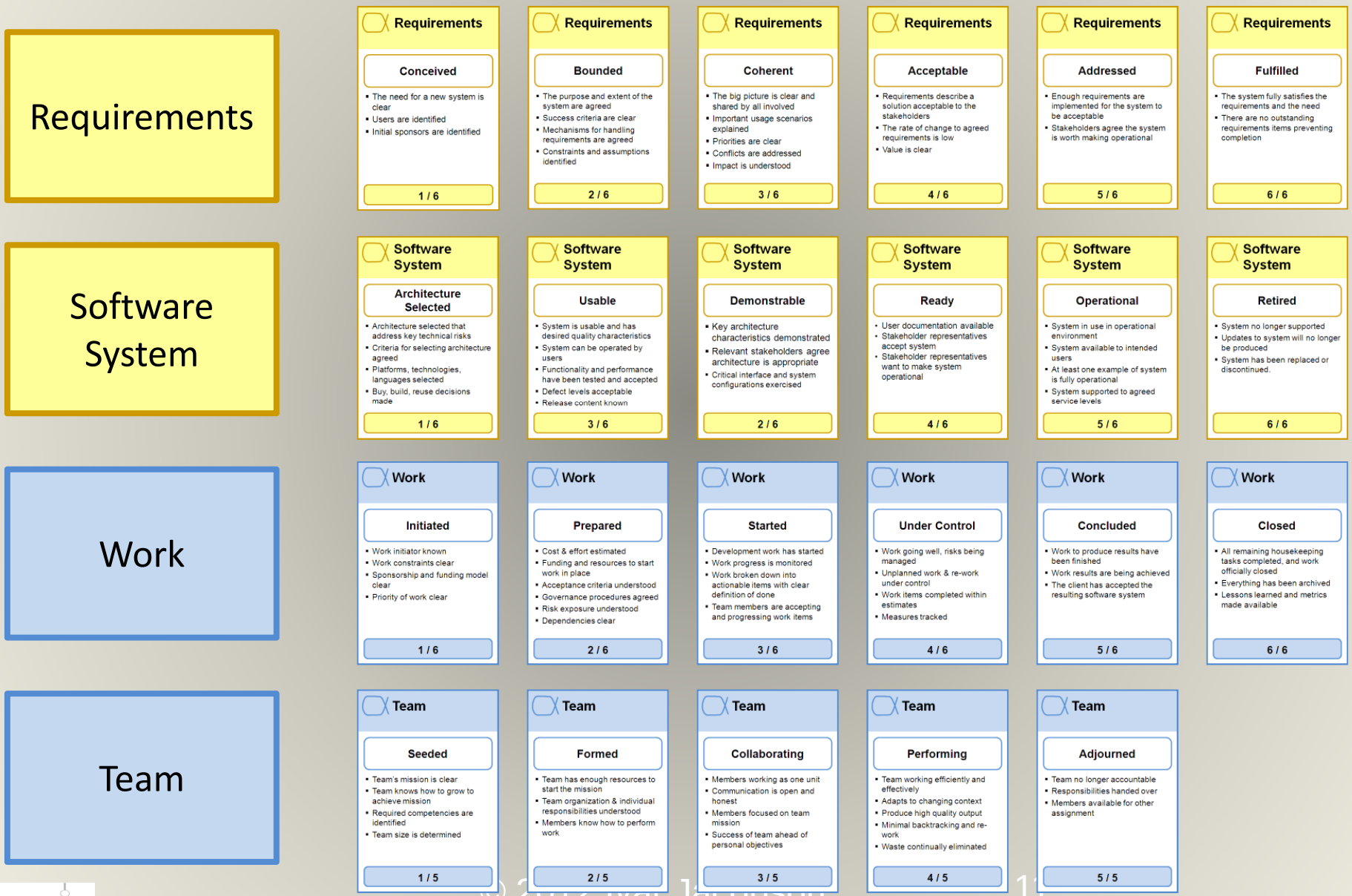
Essential things to work with - Alphas



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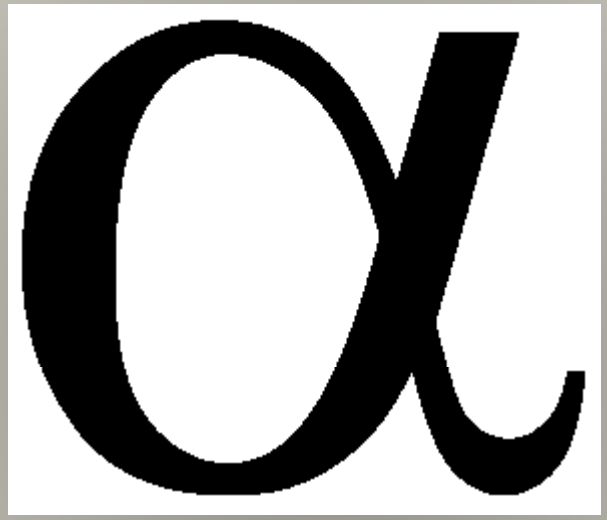
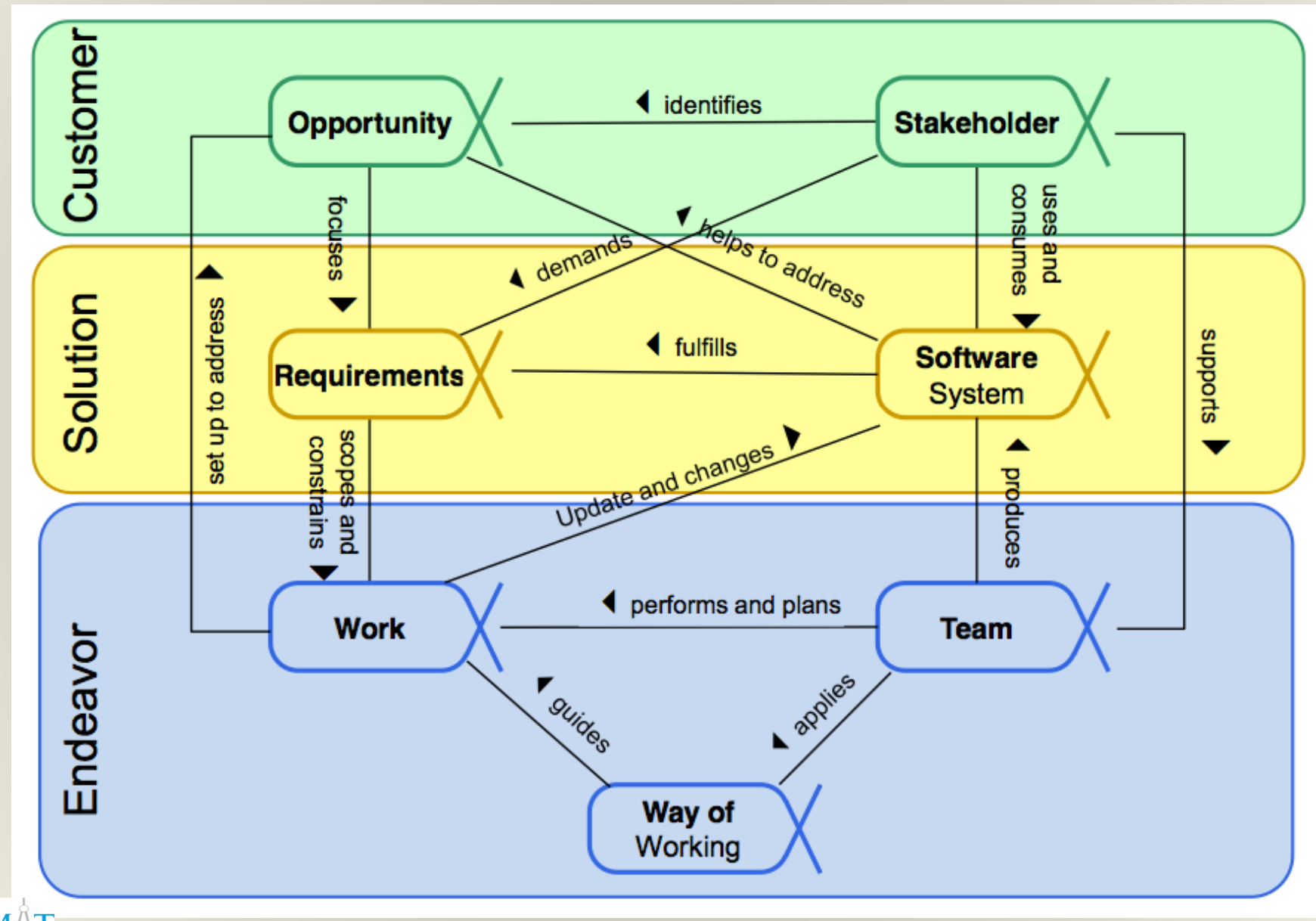
What is an Alpha?

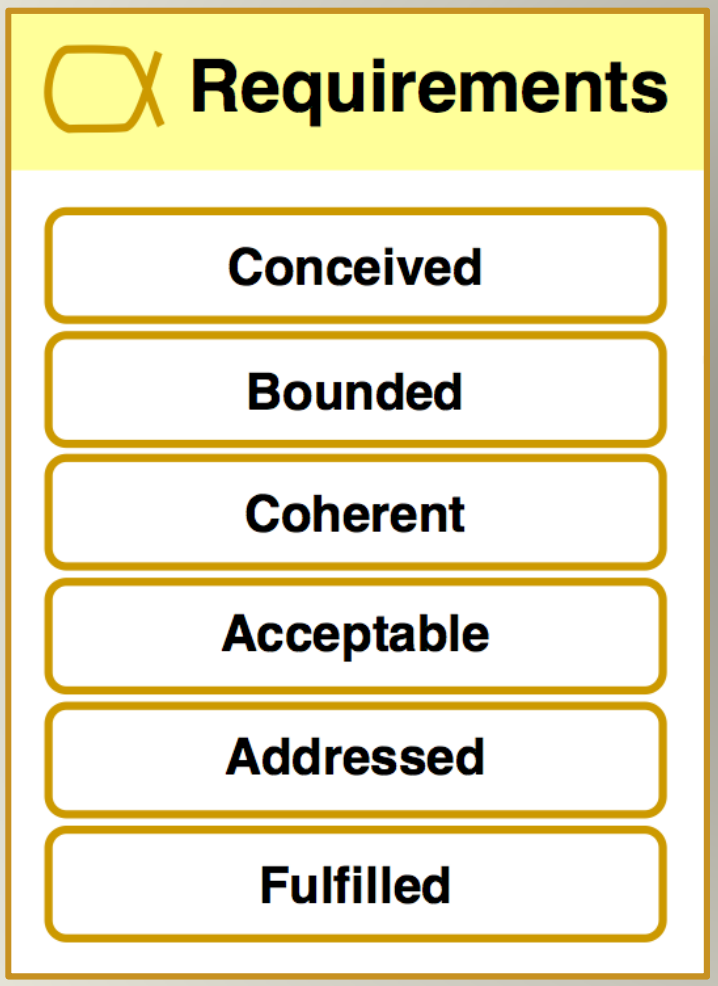


- Alpha is an acronym for an **A**bstract-**L**evel **P**rogress **H**ealth **A**ttribute.
- An essential element of the software engineering endeavor that is relevant to an assessment of the progress and health of the endeavor.

Essence Kernel Alphas

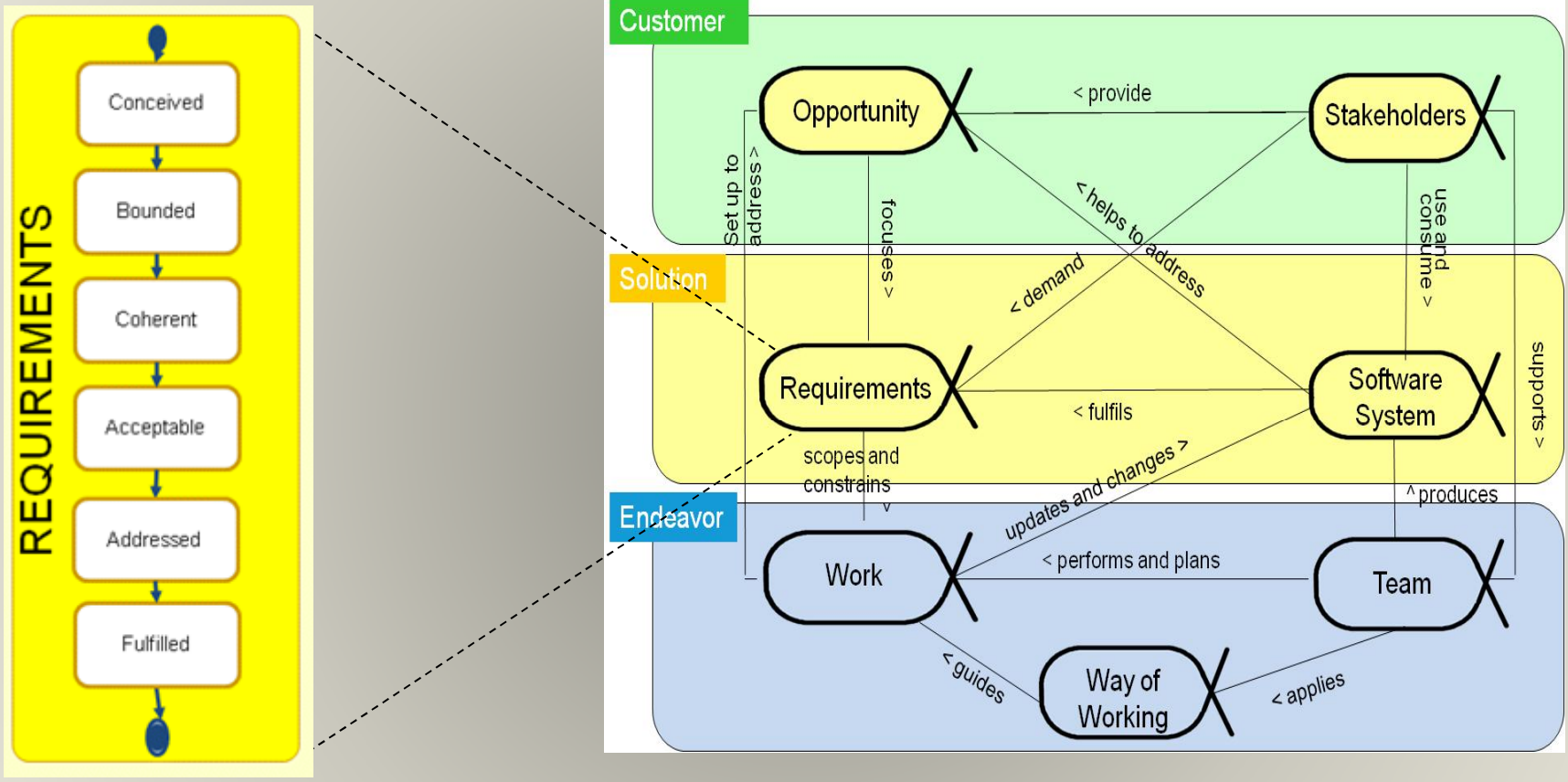


Peeking into the Alphas



- There are several cards for each Alpha. What does each cards stand for?
- What is included in each card?

Requirements- one of the Alphas



Requirements Definition: What the software system must do to address the opportunity and satisfy the stakeholders.

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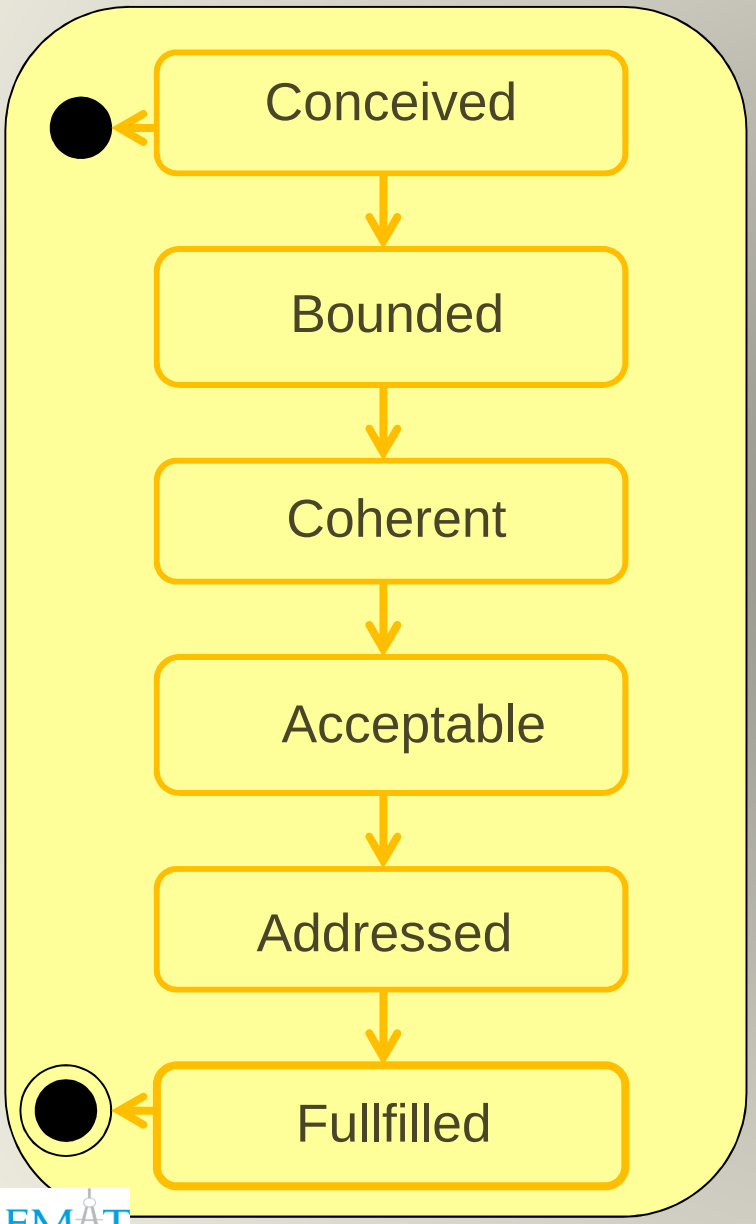
Requirements states



The need for a new system has been agreed.

The purpose and theme of the new system are clear.

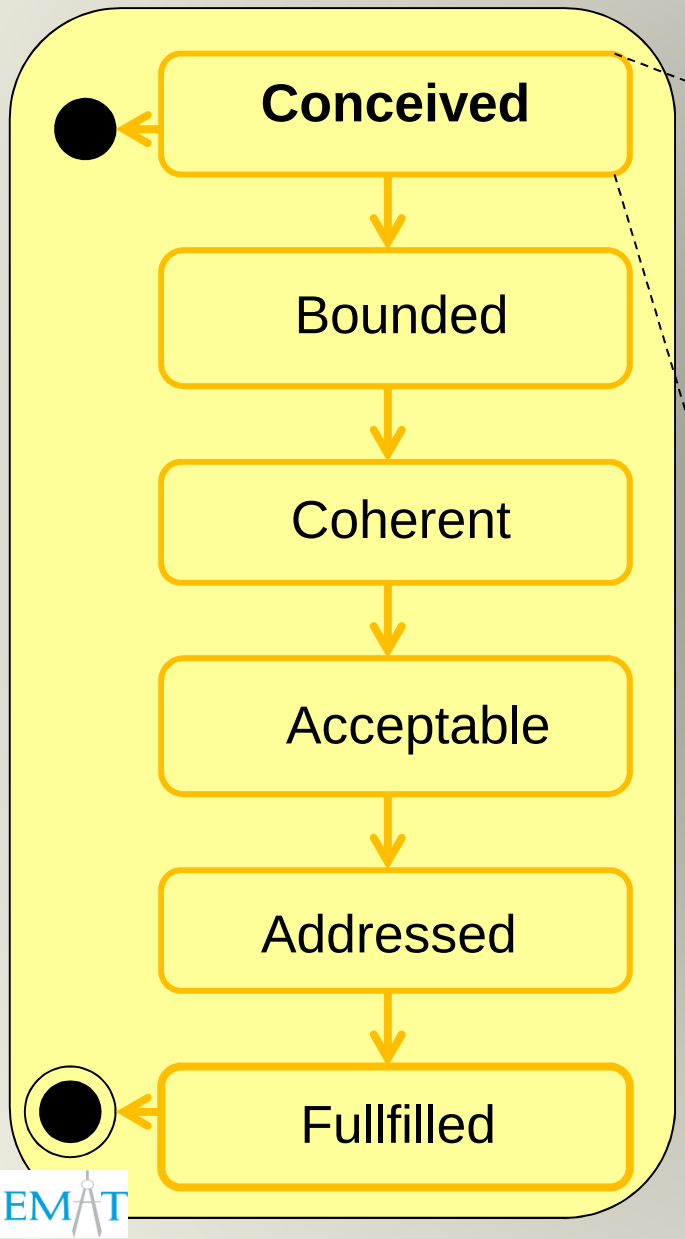
The requirements provide a coherent description of the essential characteristics of the new system.

The requirements describe a system that is acceptable to the stakeholders.

Enough of the requirements have been addressed to satisfy the need for a new system in a way that is acceptable to the stakeholders.

The requirements have been addressed to fully satisfy the need for a new system.

Checklist for requirements states



- ❑ The initial set of stakeholders agrees that a system is to be produced.
- ❑ The stakeholders that will use the new system are identified.
- ❑ The stakeholders that will fund the initial work on the new system are identified.
- ❑ There is a clear opportunity for the new system to address.

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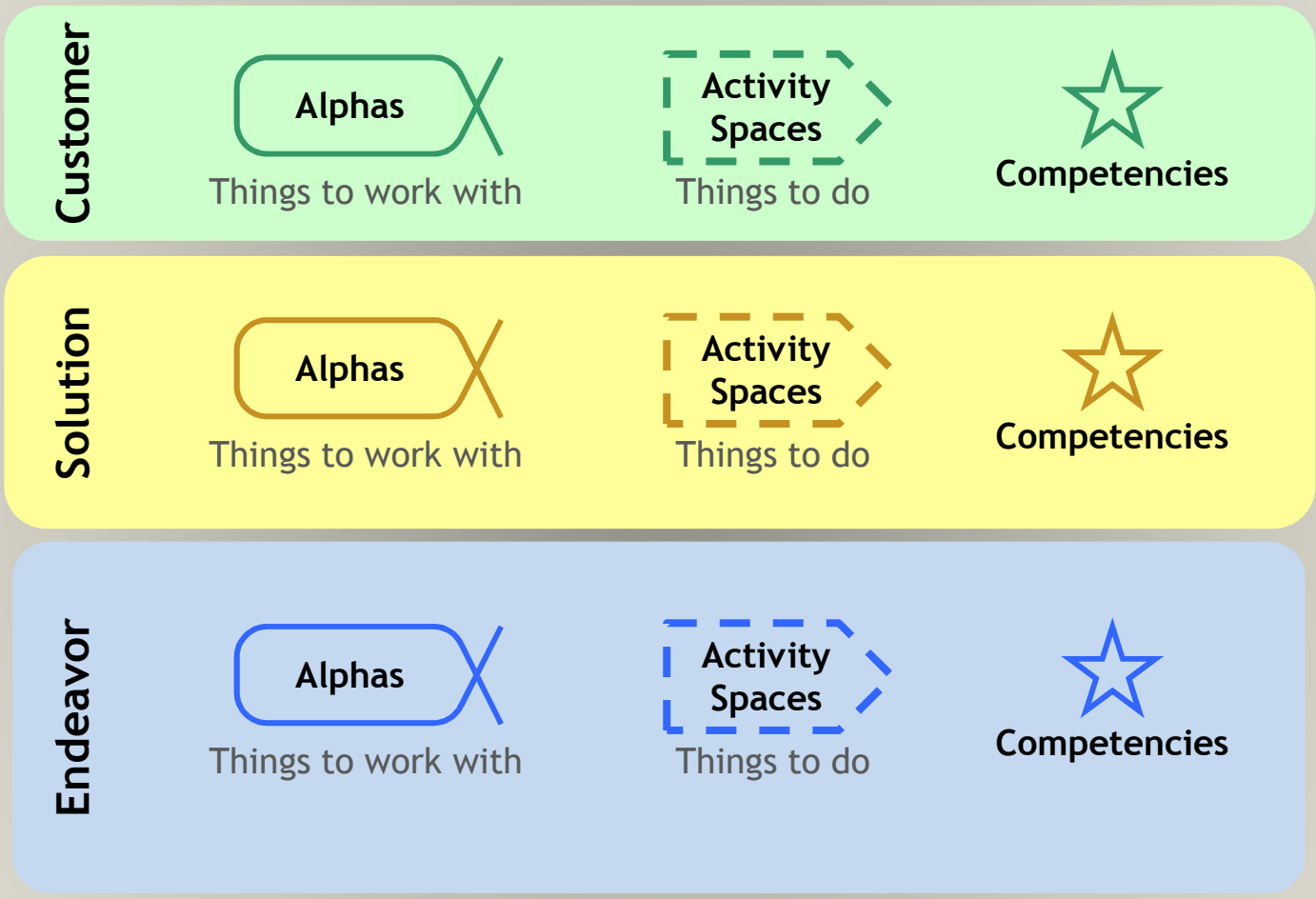
Essence Kernel



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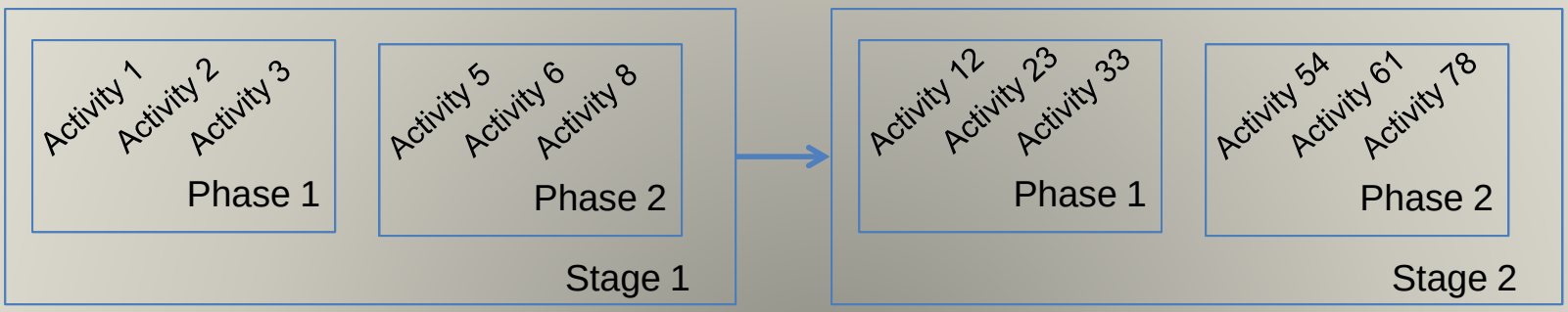
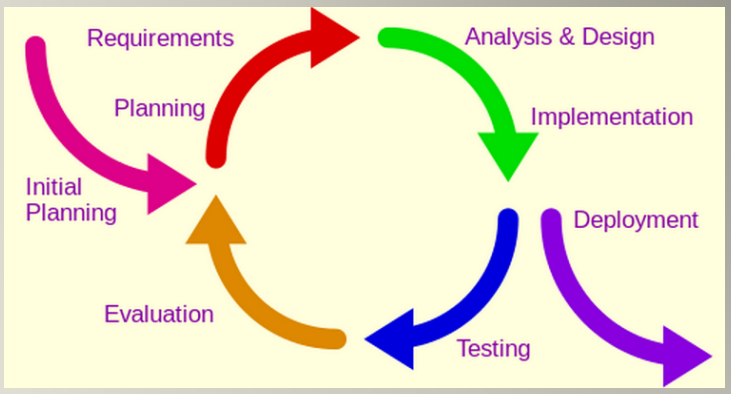
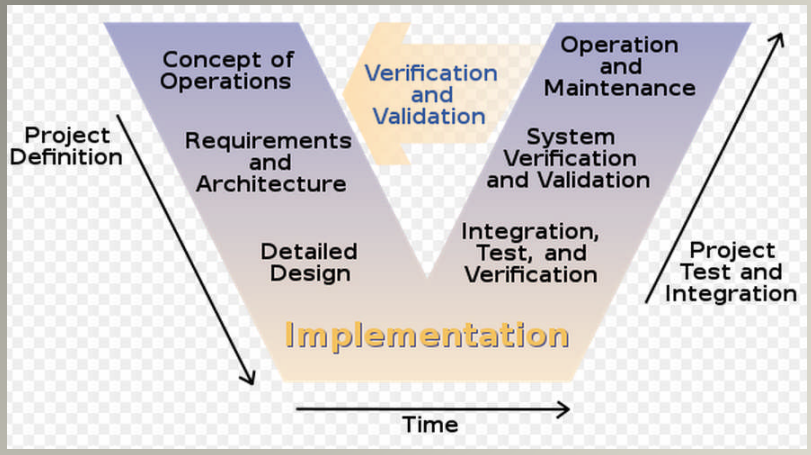
Software development methods today



Sequential



Iterative



V-Model

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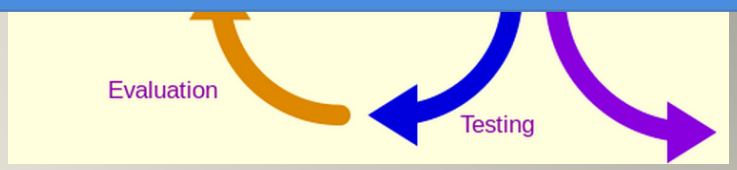
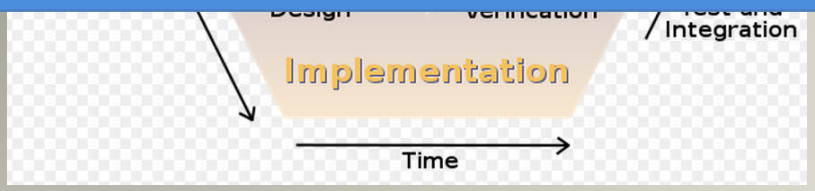
Software development methods today

Focus on activities in two essential things:

- Way of working
- Work



Iterative



V-Model

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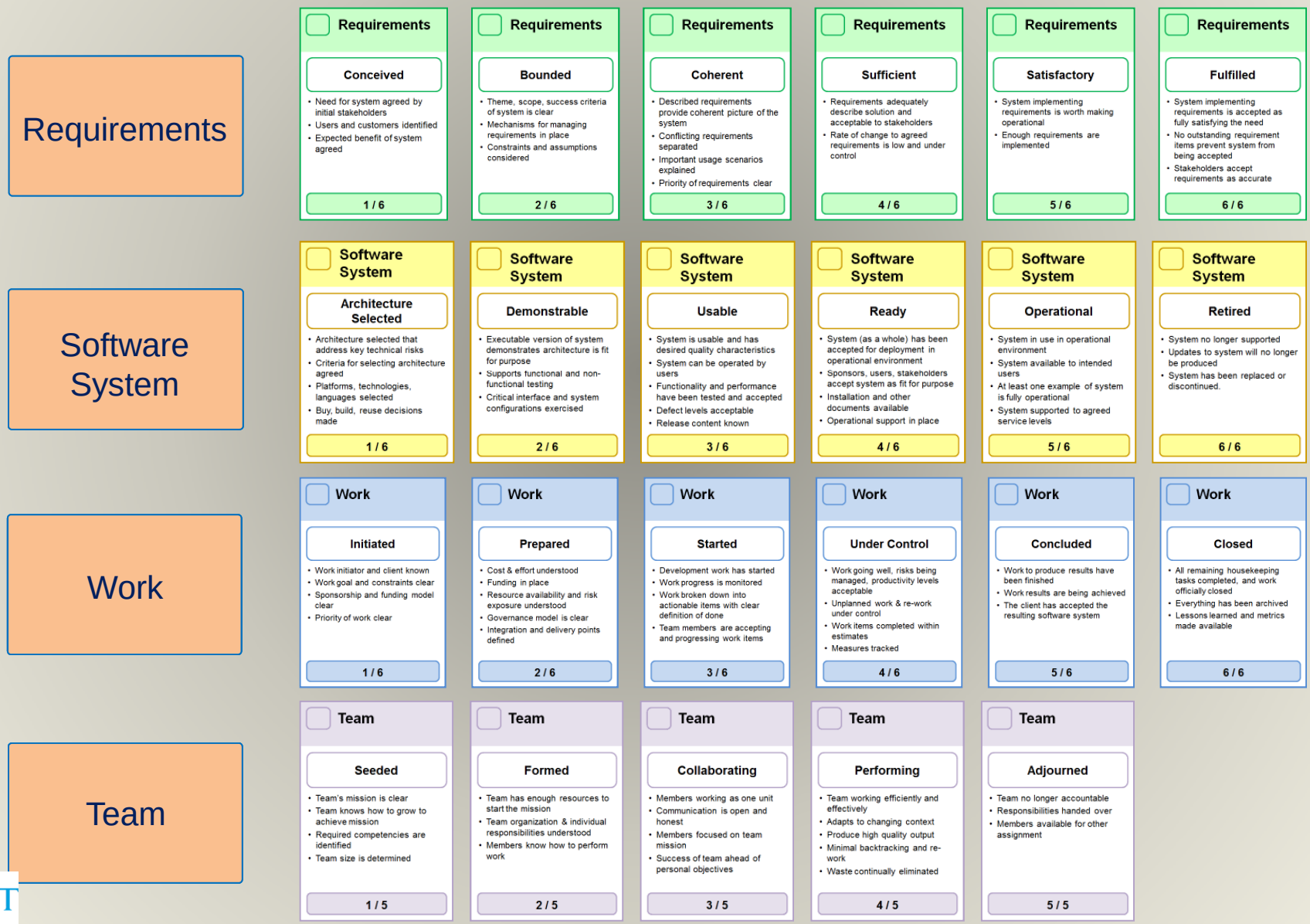
Four of the seven essential things



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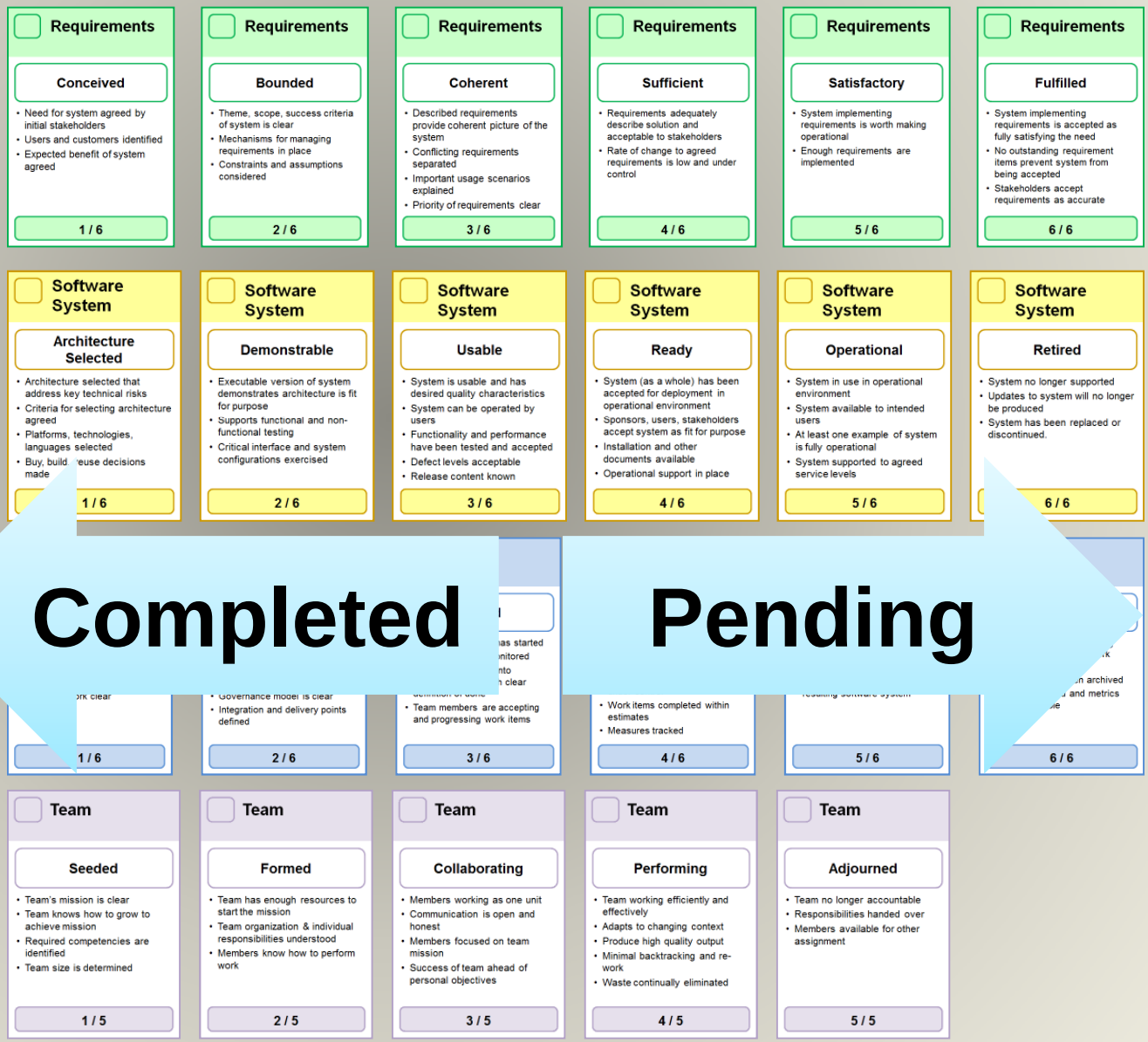
Plan: Determine Current State



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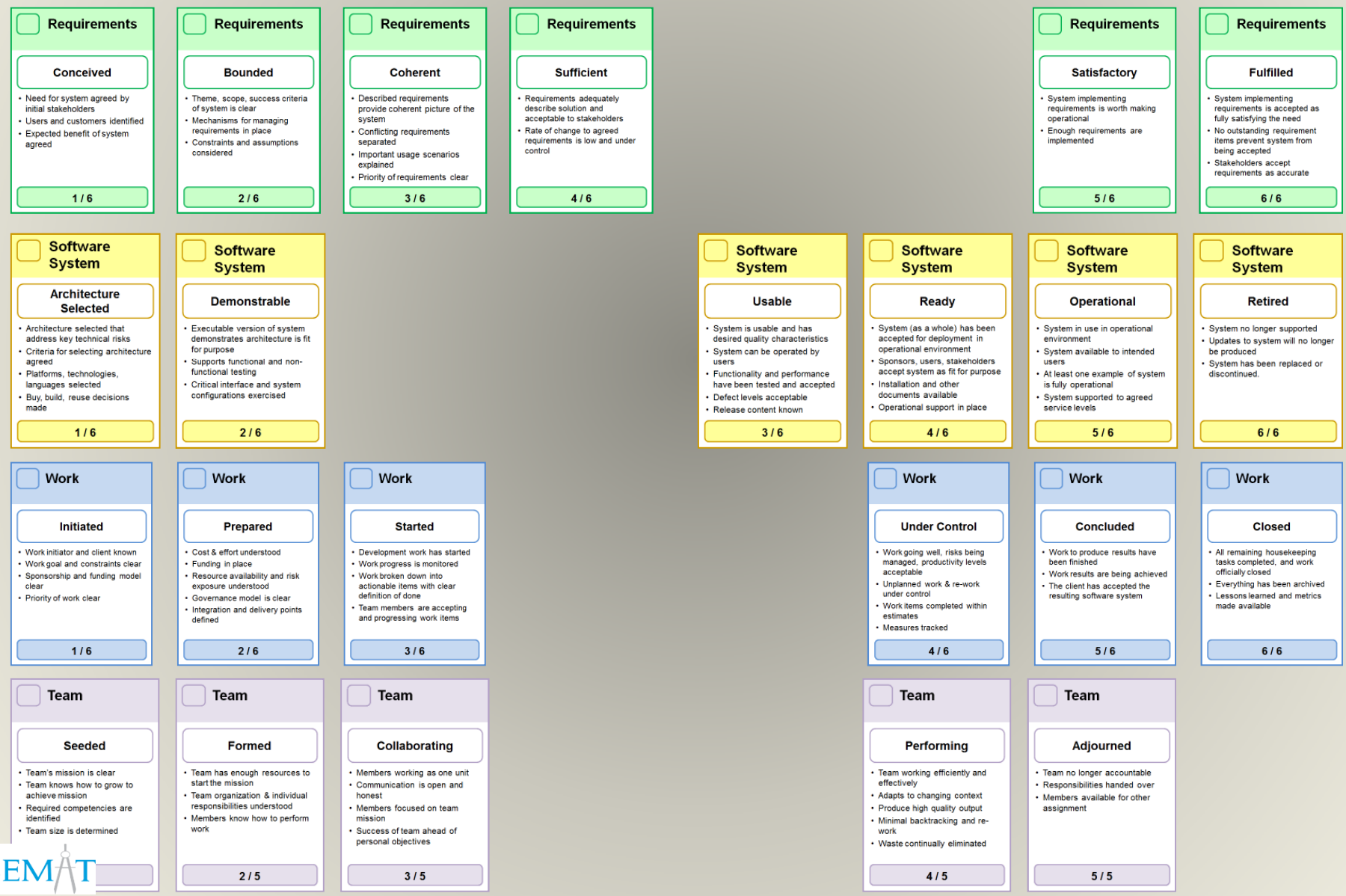
Plan: Determine Next State



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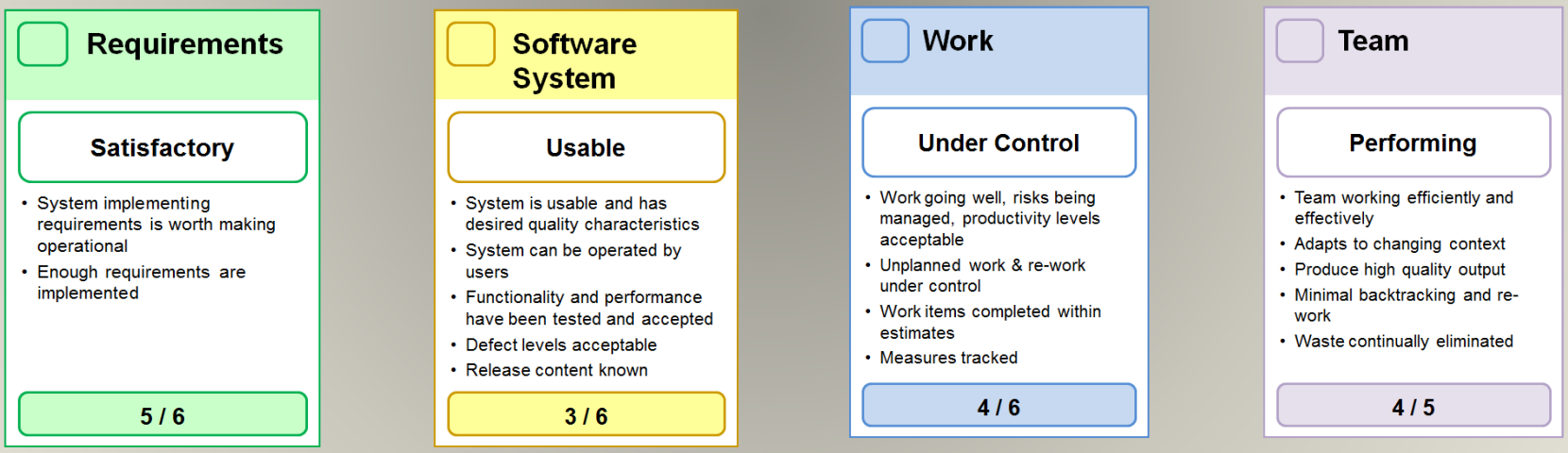
Plan: Determine How to Achieve Next State



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Essence Kernel

Requirements | Requirements | Requirements | Requirements | Requirements | Requirements

Focus on states in seven essential things:

- Way of working
- Work
- Stakeholder
- Opportunity
- Requirements
- Software System
- Team

team

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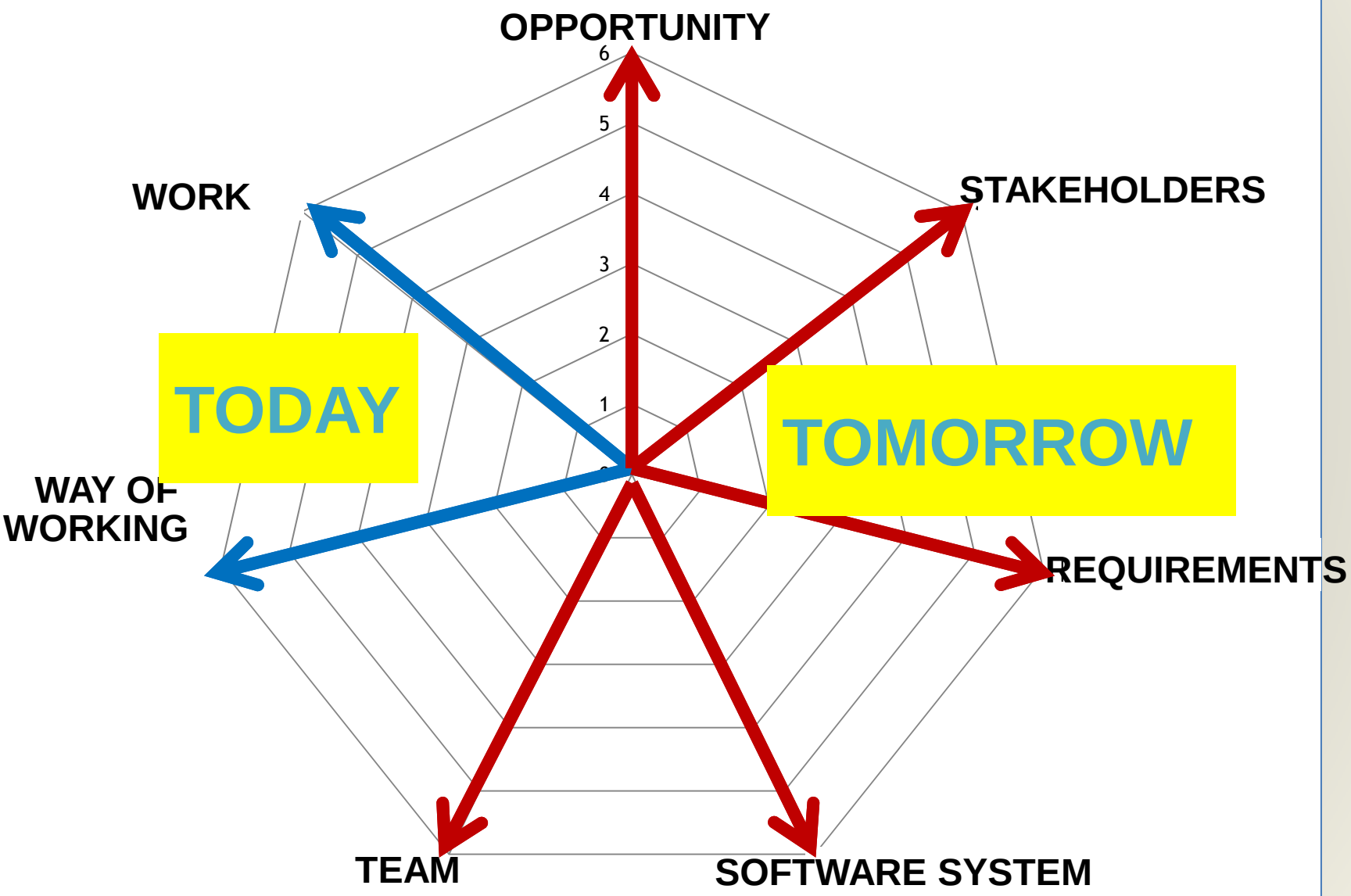
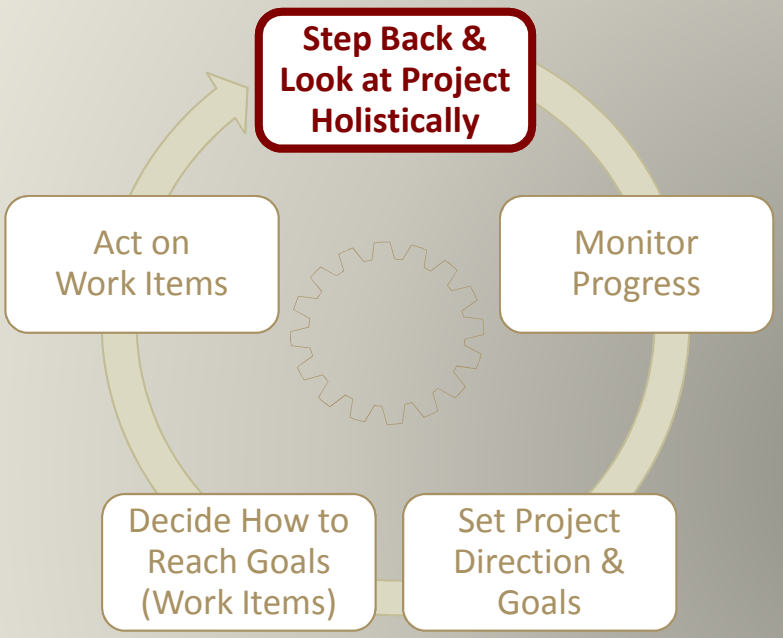
Following essential things

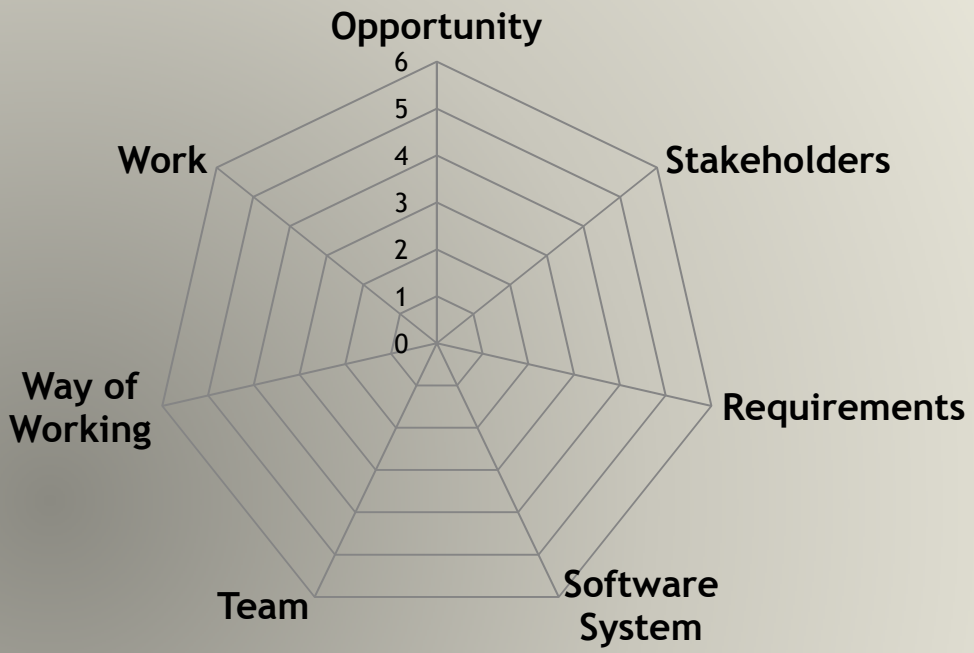


You do not need to use cards! You may use checklists!

State	Checklist
Recognized	All the different groups of stakeholders that are, or will be, affected by the development and operation of the software system are identified. There is agreement on the stakeholder groups to be represented. At a minimum, the stakeholders groups that fund, use, support, and maintain the system have been considered. The responsibilities of the stakeholder representatives have been defined.
Represented	The stakeholder representatives have agreed to take on their responsibilities. The stakeholder representatives are authorized to carry out their responsibilities. The collaboration approach among the stakeholder representatives has been agreed. The stakeholder representatives support and respect the team's way of working.
Involved	The stakeholder representatives assist the team in accordance with their responsibilities. The stakeholder representatives provide feedback and take part in decision making in a timely manner. The stakeholder representatives promptly communicate changes that are relevant for

How does the Essence Kernel Work?





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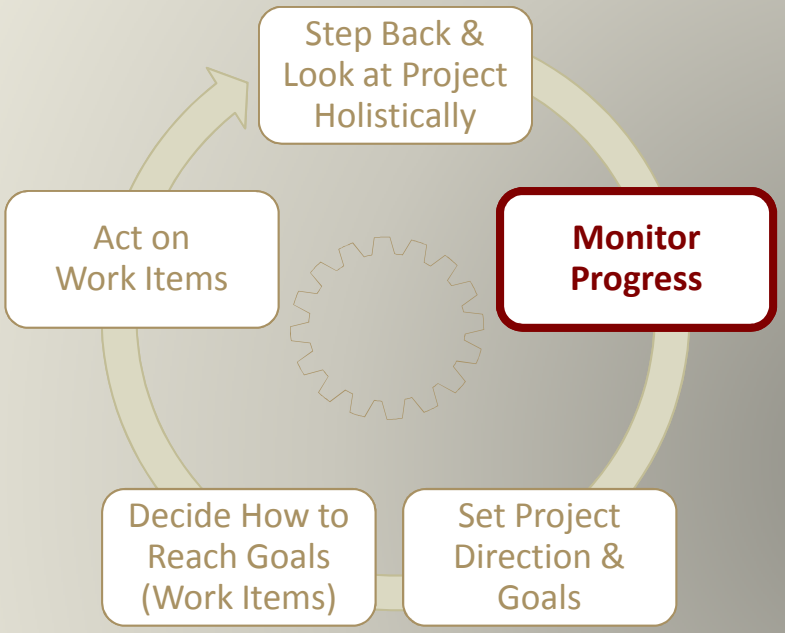

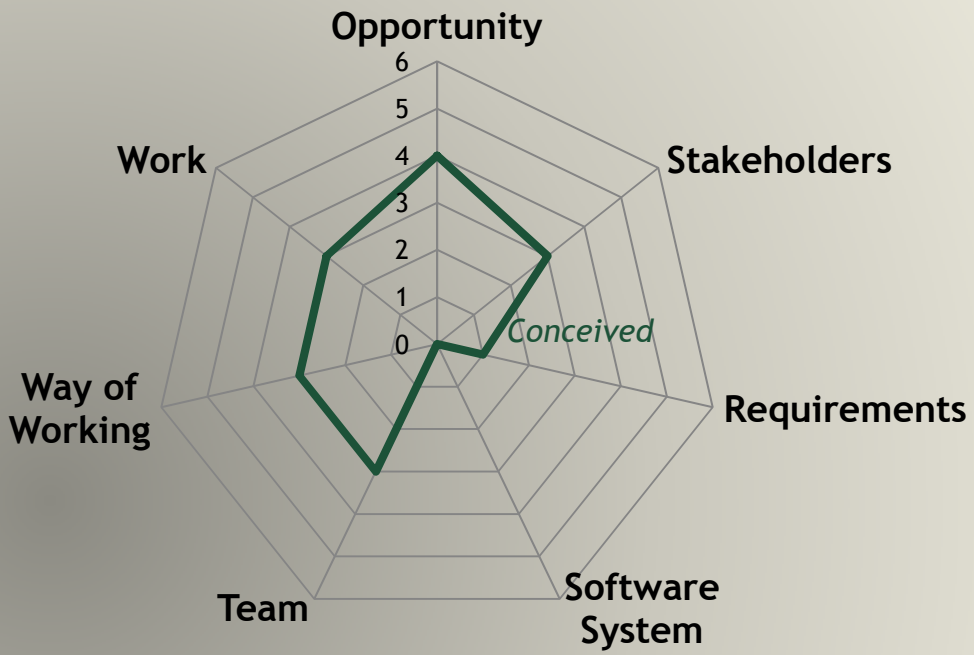

Current State

Requirements	Requirements	Requirements	Requirements	Requirements	Requirements
Conceived	**Bounded**	**Coherent**	**Acceptable**	**Addressed**	**Fulfilled**
▪ The need for a new system is clear ▪ Users are identified ▪ Initial sponsors are identified	▪ The purpose and extent of the system are agreed ▪ Success criteria are clear ▪ Mechanisms for handling requirements are agreed ▪ Constraints and assumptions identified	▪ The big picture is clear and shared by all involved ▪ Important usage scenarios explained ▪ Priorities are clear ▪ Conflicts are addressed ▪ Impact is understood	▪ Requirements describe a solution acceptable to the stakeholders ▪ The rate of change to agreed requirements is low ▪ Value is clear	▪ Enough requirements are implemented for the system to be acceptable ▪ Stakeholders agree the system is worth making operational	▪ The system fully satisfies the requirements and the need ▪ There are no outstanding requirements items preventing completion
1 / 6	2 / 6	3 / 6	4 / 6	5 / 6	6 / 6

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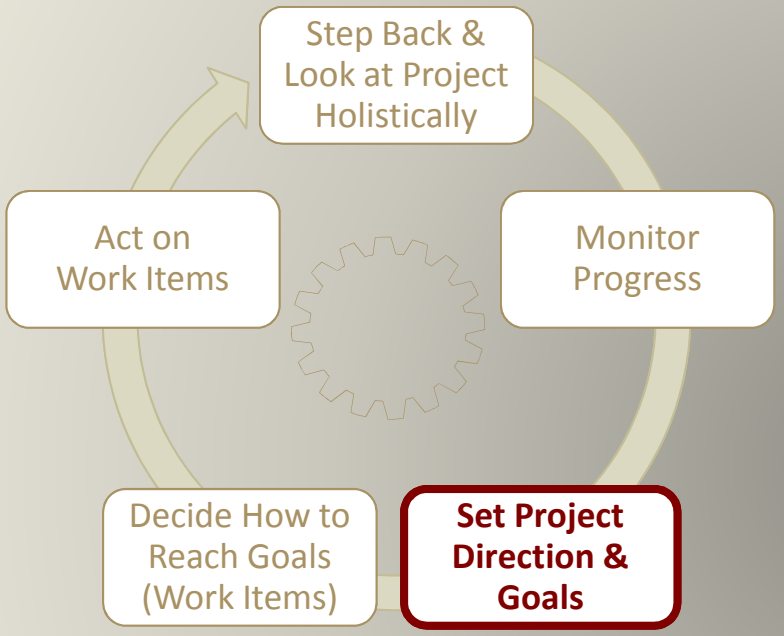
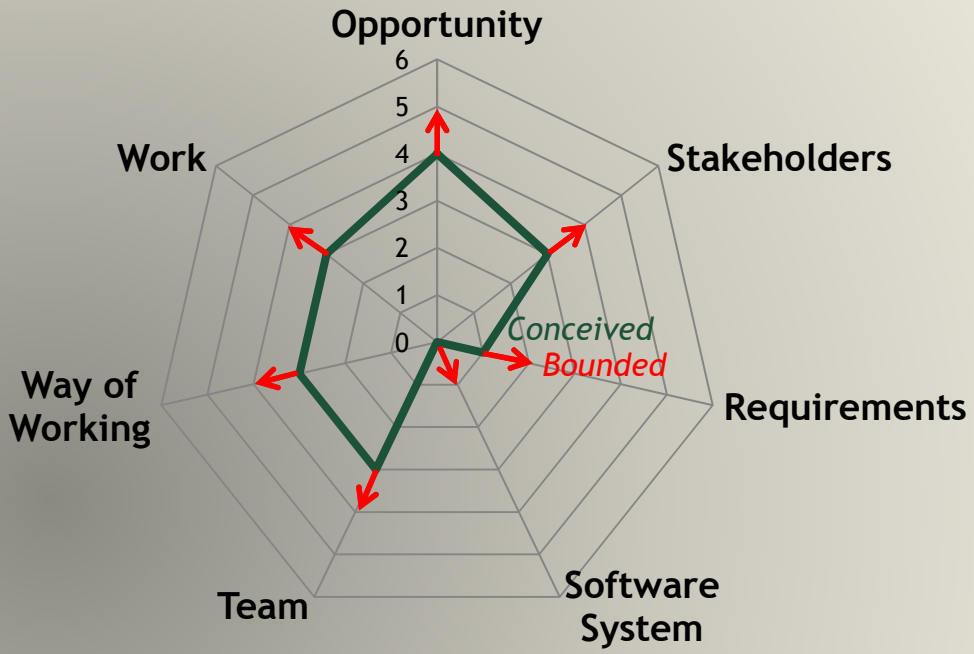
How does the Essence Kernel Work?

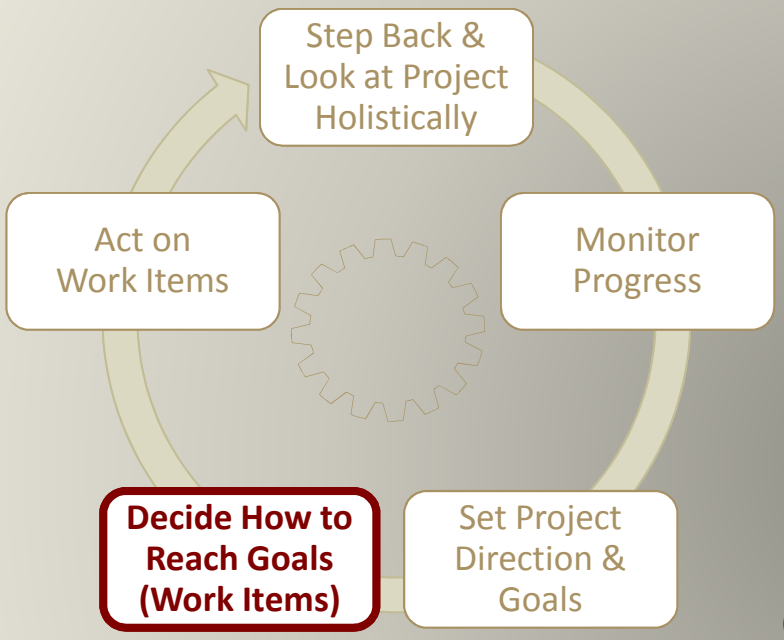


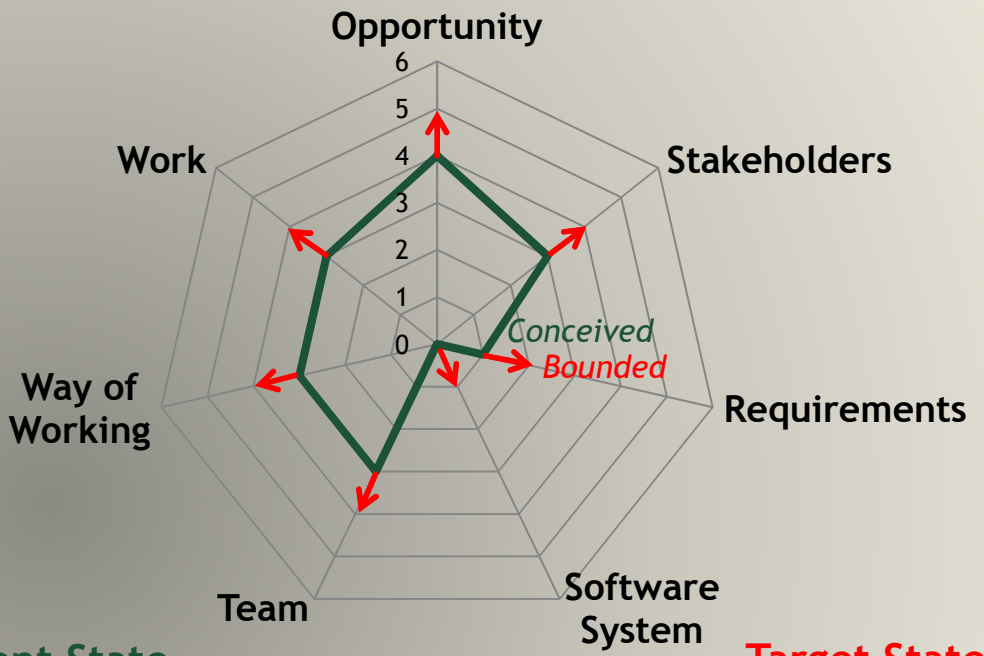


Current State | **Target State**

Requirements	Requirements	Requirements	Requirements	Requirements	Requirements
Conceived	**Bounded**	**Coherent**	**Acceptable**	**Addressed**	**Fulfilled**
▪ The need for a new system is clear ▪ Users are identified ▪ Initial sponsors are identified	The purpose and extent of the system are agreed Success criteria are clear ▪ Mechanisms for handling requirements are agreed ▪ Constraints and assumptions identified Goals	▪ The big picture is clear and shared by all involved ▪ Important usage scenarios explained ▪ Priorities are clear ▪ Conflicts are addressed ▪ Impact is understood	▪ Requirements describe a solution acceptable to the stakeholders ▪ The rate of change to agreed requirements is low ▪ Value is clear	▪ Enough requirements are implemented for the system to be acceptable ▪ Stakeholders agree the system is worth making operational	▪ The system fully satisfies the requirements and the need ▪ There are no outstanding requirements items preventing completion
1 / 6	2 / 6	3 / 6	4 / 6	5 / 6	6 / 6

How does the Essence Kernel Work?





Current State

Requirements

Conceived

- The need for a new system is clear
- Users are identified
- Initial sponsors are identified

1 / 6

Work Items:

- ❑ Define Project Scope
- ❑ Clarify Success Criteria

Target State

Requirements

Bounded

- The purpose and extent of the system are agreed — Goals
- Success criteria are clear
- Mechanisms for handling requirements are agreed
- Constraints and assumptions identified

2 / 6

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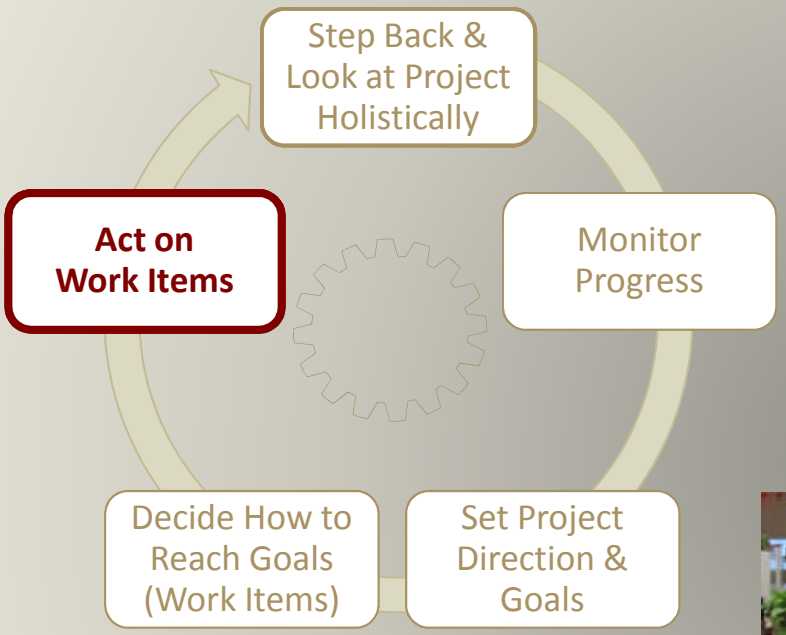
How does the Essence Kernel Work?



Work Items

- ❑ Define Project Scope
- ❑ Clarify Success Criteria
- ❑ …
- ❑ …
- ❑ …
- ❑ …

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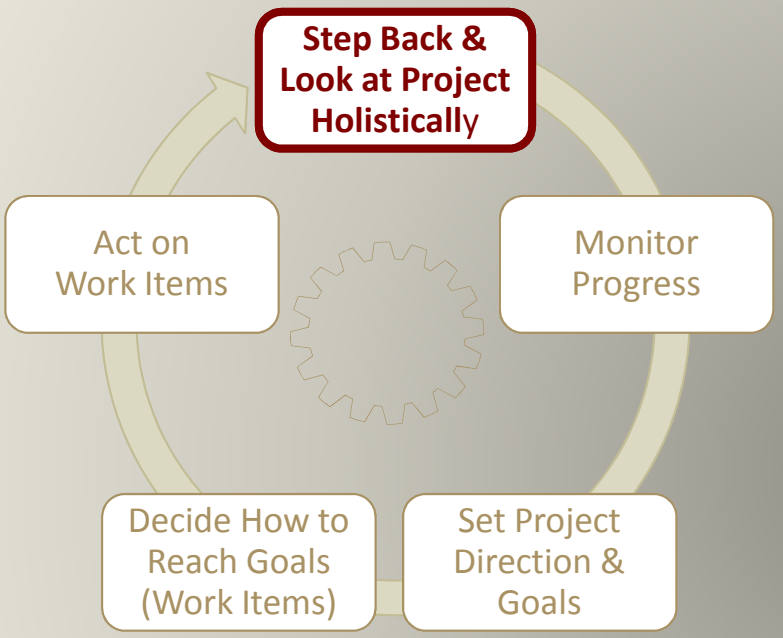
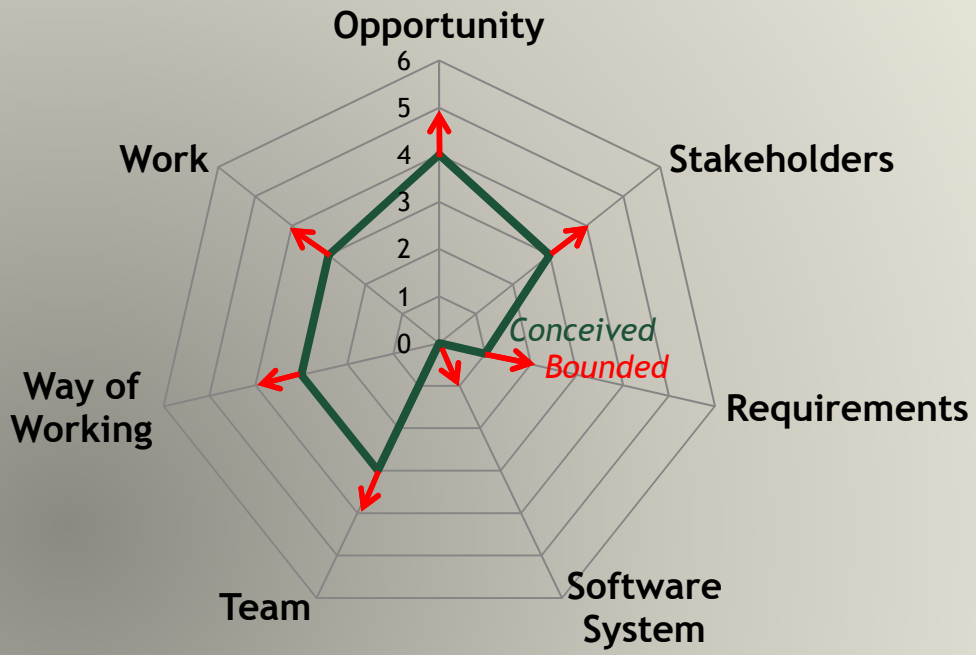
Time has passed





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Agenda

- Part 1: Introduction
  - SEMAT and Essence
  - Essence Kernel
- Part 2: Using the Kernel
  - Scenario on Solving Pain Points
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- Part 4: The value of the Kernel?
- Part 5: Kernel cont. & Kernel Extensions

Scenario on Solving Pain Points

Education Stream

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Terminology used

- Endeavor
- Pain Points (PPs)
- Pain Point Intervention (PPI) Meetings

Introduction

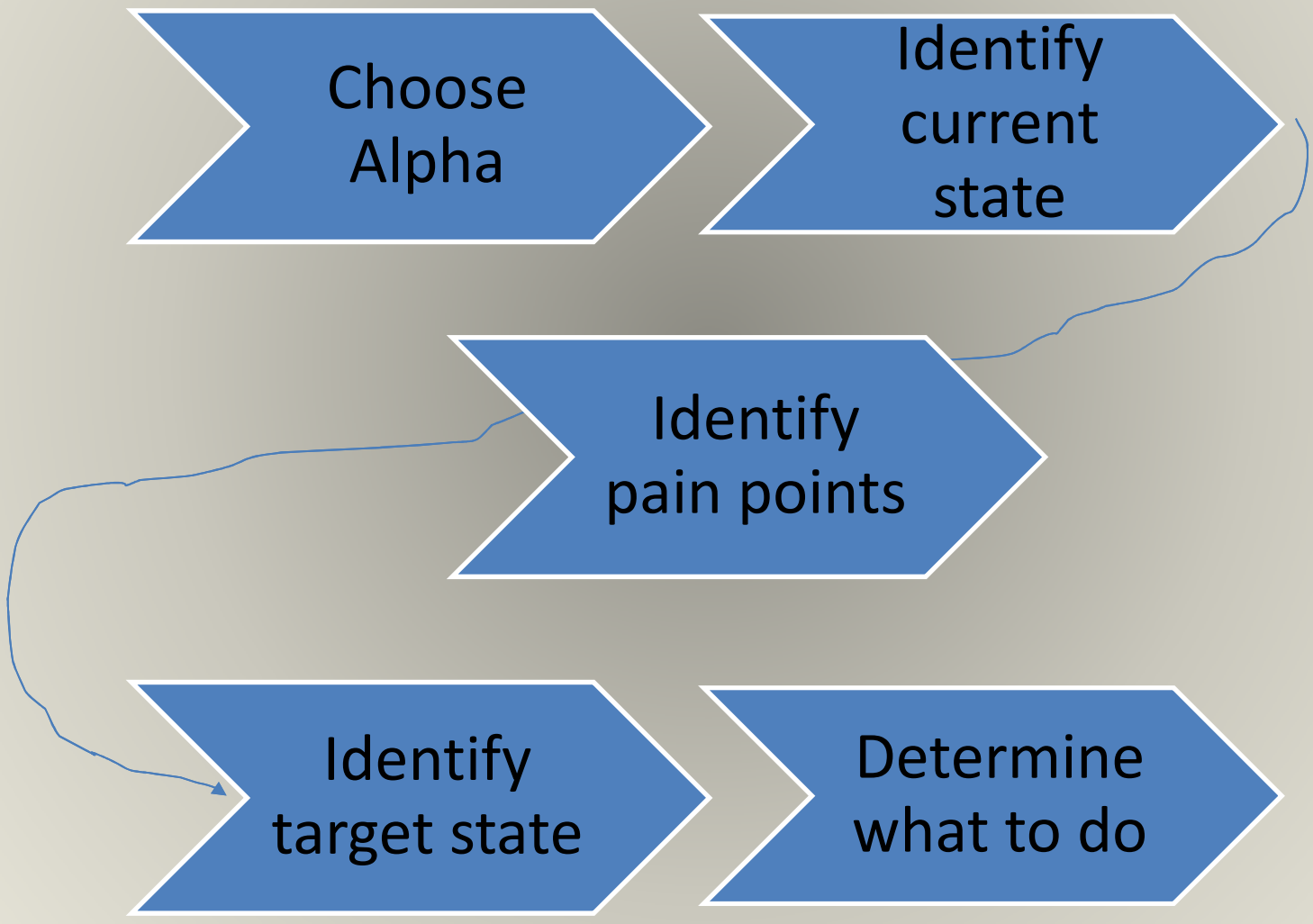
- **Purpose of the scenario**
  - How to accelarate the progress of a software development endeavor by identifying and solving pain points
- **Pre-conditions**
  - Background knowledge of Essence and its structure
- **When to Apply**
  - While experiencing problems in a software endeavor
- **Essence Scope**
  - Leveraging use of Alphas only
  - Activity Spaces and Competencies don’t feature in this scenario

Context

Five-member team is in charge of developing an online university course management system

- The team
  - works on the system's second release
  - identifies pain points during Pain Point Intervention Meetings (PPIM)
  - determines the current and target states of the endeavor by using Essence cards
  - Identifies appropriate tasks for remedying the pain points

Steps in PPI Meetings



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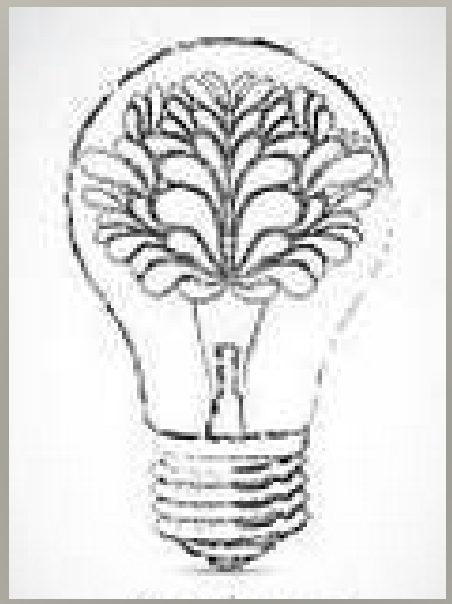
1st Pain Point Identification

- The team brainstorms overall progress & health of the endeavor
- Some faculty members resist migration to new system.
- Lack of constructive user feedback.
- What should they do?
- Which Alpha should they choose first?

1st PPI: Selection of Cards



Stakeholders: The people, groups, or organizations who affect or are affected by a software system.

- One team member suggests that the *Stakeholder* Alpha be investigated first.

1st PPI: Selection of Cards

- The team members arrange all the *Stakeholders* Alpha cards in sequences.

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Stakeholders

Stakeholders have been identified.

Recognized

- All the different groups of stakeholders that are, or will be, affected by the development and operation of the software system are identified.
- There is agreement on the stakeholder groups to be represented. At a minimum, the stakeholders groups that fund, use, support, and maintain the system have been considered.
- The responsibilities of the stakeholder representatives have been defined.

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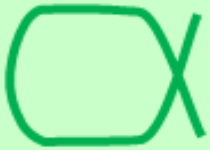
The Recognized state has been achieved



Stakeholders

Represented

- The stakeholder representatives have agreed to take on their responsibilities.
- The stakeholder representatives are authorized to carry out their responsibilities.
- The collaboration approach among the stakeholder representatives has been agreed.
- The stakeholder representatives support and respect the team's way of working.

Komplettera med bilder för scenorio status

2/ 6

The mechanisms for involving the stakeholders are agreed and the stakeholder representatives have been appointed.

The Represented state is the next Target state

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Result

Stakeholders

Recognized

- ❑ All the different groups of stakeholders that are, or will be, affected by the development and operation of the software system are identified.
- ❑ There is agreement on the stakeholder groups to be represented. At a minimum, the stakeholders groups that fund, use, support, and maintain the system have been considered.
- ❑ The responsibilities of the stakeholder representatives have been defined.

1 / 6

We are here

Our target

Stakeholders

Represented

- ❑ The stakeholder representatives have agreed to take on their responsibilities.
- ❑ The stakeholder representatives are authorized to carry out their responsibilities.
- ❑ The collaboration approach among the stakeholder representatives has been agreed.
- ❑ The stakeholder representatives support and respect the team's way of working.

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Tasks- *Stakeholders* Alpha

- ***Task 1***: Appoint stakeholder representatives for the faculty group, including supportive and unsupportive faculty members.

- ***Task 2***: Agree on or modify existing definition of responsibilities and collaboration approaches of the faculty representatives. Because of the iterative nature of the endeavor, the stakeholder need to agree on providing feedback on a regular basis.

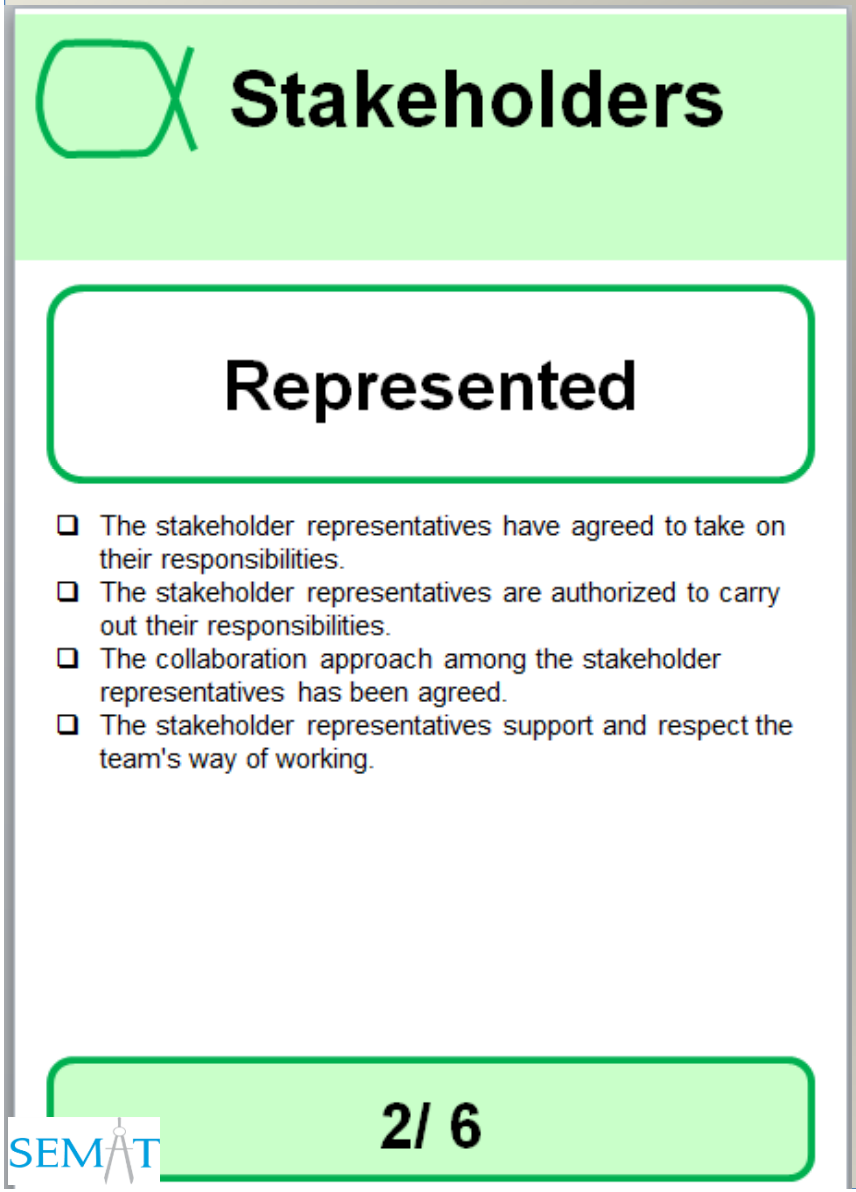
As a result. . .

- Tasks 1 and 2 receive attention

Bild?

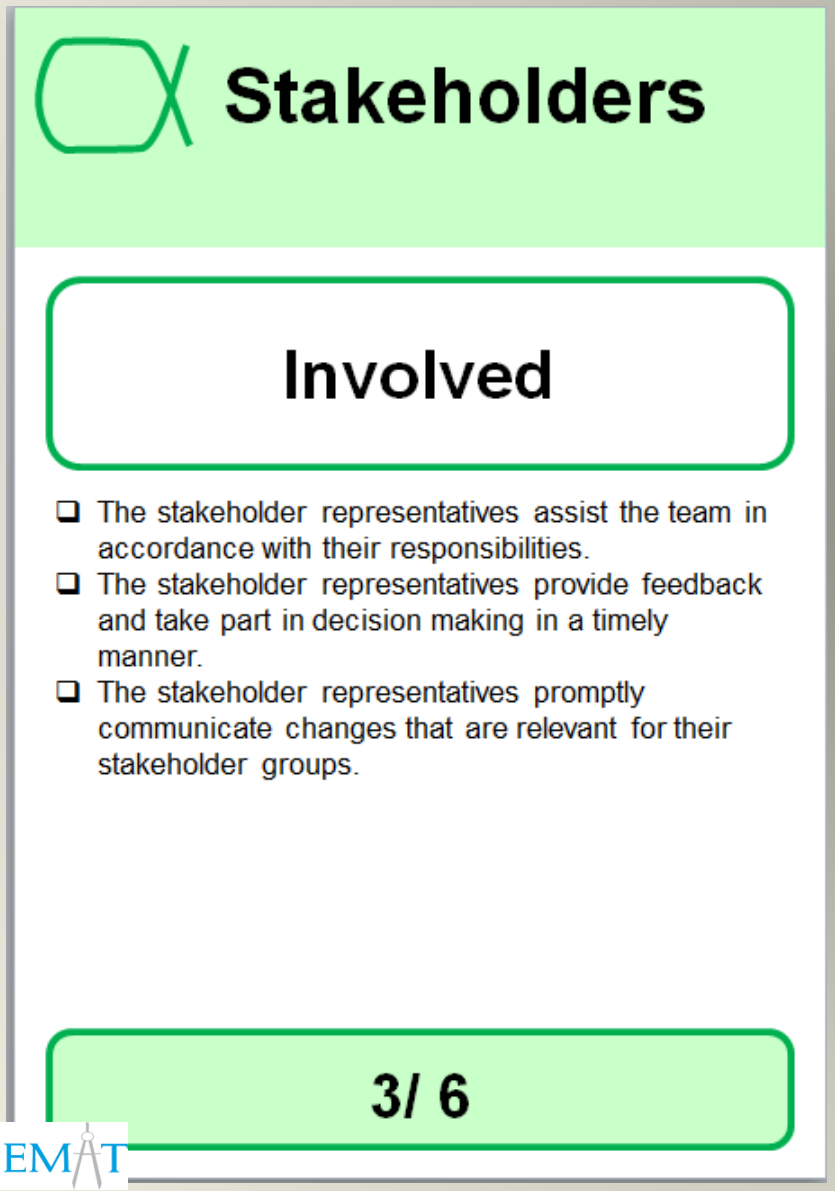
- In addition:
  - Engagement with other stakeholder groups continues
    - Administrators
    - Students
  - Work on the endeavor continues
  - To avoid over-burdening the team, additional alphas will be introduced incrementally during future pain point intervention meetings

2nd PPI Meeting: Identify Current State - *Stakeholders* Alpha



- *Represented* state has been achieved.
  - Four faculty representatives have been appointed: two supportive and two unsupportive
  - Agreement has been reached about their responsibilities and collaboration approach

2nd PPI Meeting: Identify Target State - *Stakeholders* Alpha



The stakeholder representatives are actively involved in the work and fulfilling their responsibilities.

- Despite receiving feedback from one faculty representative, this state has not yet been reached
- Team has not been able to fully engage all faculty representatives

2nd PPI Meeting: Identify Target State - *Stakeholders* Alpha

Stakeholders

Represented

- ❑ The stakeholder representatives have agreed to take on their responsibilities.
- ❑ The stakeholder representatives are authorized to carry out their responsibilities.
- ❑ The collaboration approach among the stakeholder representatives has been agreed.
- ❑ The stakeholder representatives support and respect the team's way of working.

2/ 6

We are here → Our target

Stakeholders

Involved

- ❑ The stakeholder representatives assist the team in accordance with their responsibilities.
- ❑ The stakeholder representatives provide feedback and take part in decision making in a timely manner.
- ❑ The stakeholder representatives promptly communicate changes that are relevant for their stakeholder groups.

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2nd PPI Meeting: Identify Tasks - *Stakeholders* Alpha

- ***Task 3***: Prepare for short interviews with Faculty representatives

- ***Task 4***: Carry out interviews with all Faculty representatives

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2nd PPI Meeting Continues

- Negative feedback received from the unsupportive faculty member reveals that he does not see the value of the new system
- What should they do?
- Which Alpha should they choose next?

2nd PPI Meeting Continues

Opportunity: The set of circumstances that makes it appropriate to develop or change a software system.

- Team decides to study the *Opportunity* alpha

2nd PPI Meeting Continues

- *Opportunity* alpha cards are arranged in sequence
- Examination of the cards helps the team uncover any issue related to the opportunity and its value to users

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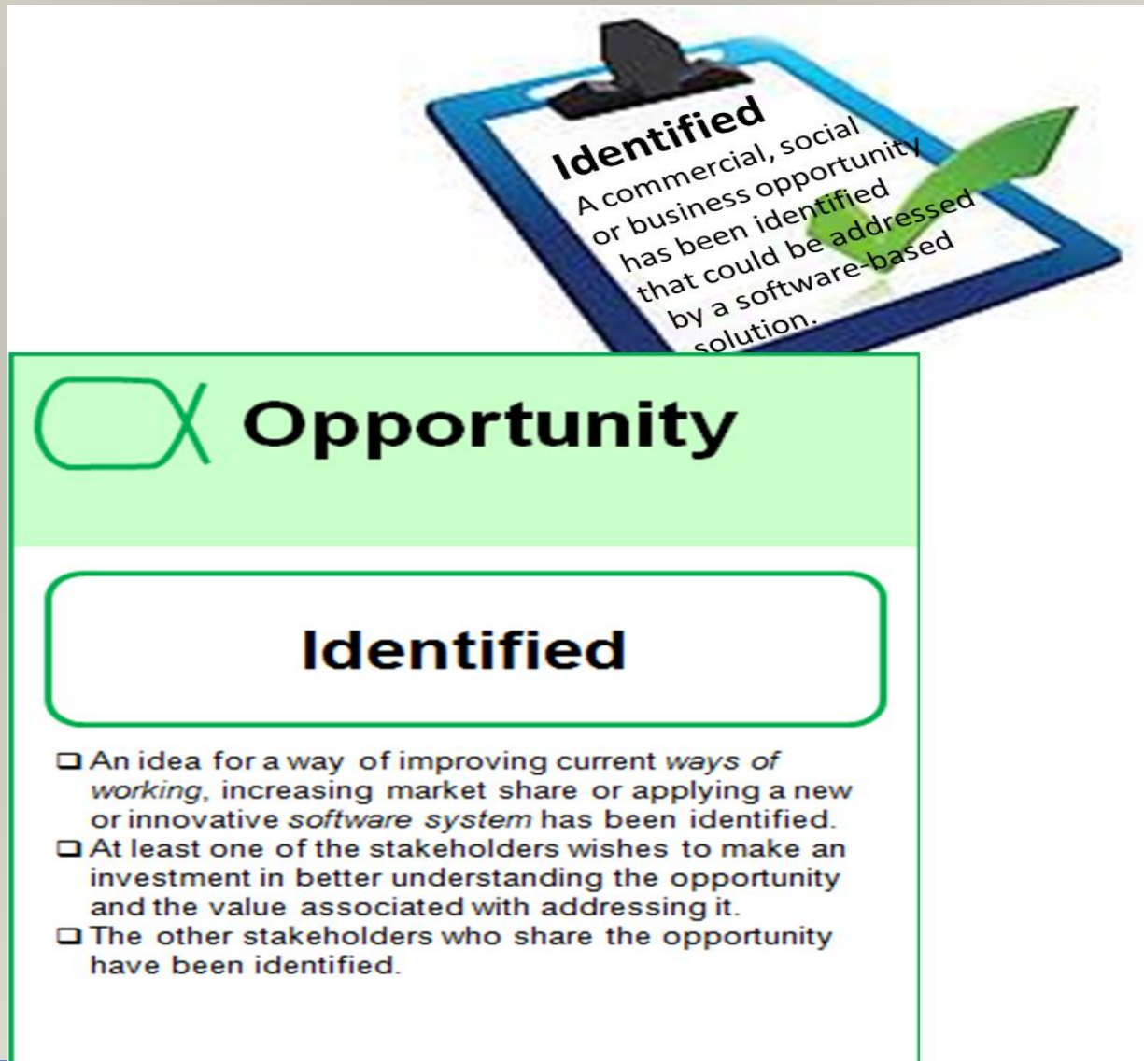
2nd PPI: Identify Current State – *Opportunity* Alpha



2nd PPI Meeting: Identify Target State - *Opportunity* Alpha

Opportunity

Solution Needed

- ❑ The stakeholders in the opportunity and the proposed solution have been identified.
- ❑ The stakeholders' needs that generate the opportunity have been established.
- ❑ Any underlying problems and their root causes have been identified.
- ❑ It has been confirmed that a software-based solution is needed.
- ❑ At least one software-based solution has been proposed.

2 / 6

We are here

Our target

Opportunity

Value Established

- ❑ The value of addressing the opportunity has been quantified either in absolute terms or in returns or savings per time period.
- ❑ The impact of the solution on the stakeholders is understood.
- ❑ The value that the software system offers to the stakeholders that fund and use the *software system* is understood.
- ❑ The success criteria by which the deployment of the *software system* is to be judged are clear.
- ❑ The desired outcomes required of the solution are clear and quantified.

3 / 6

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2nd PPI Meeting: Identify Tasks - *Opportunity* Alpha

- ***Task 5***: Prepare a short demonstration of the new solution key features while articulating their value (including value over the wiki-based solution)

- ***Task 6***: Present solution value to faculty during weekly faculty meeting

Moving forward . . .

- The team briefly reviews alphas that have been identified as candidates for pain point identification
- New alphas are introduced incrementally as needed, to address new pain points or simply check the state of the endeavor

Agenda

- Part 1: Introduction
  - SEMAT and Essence
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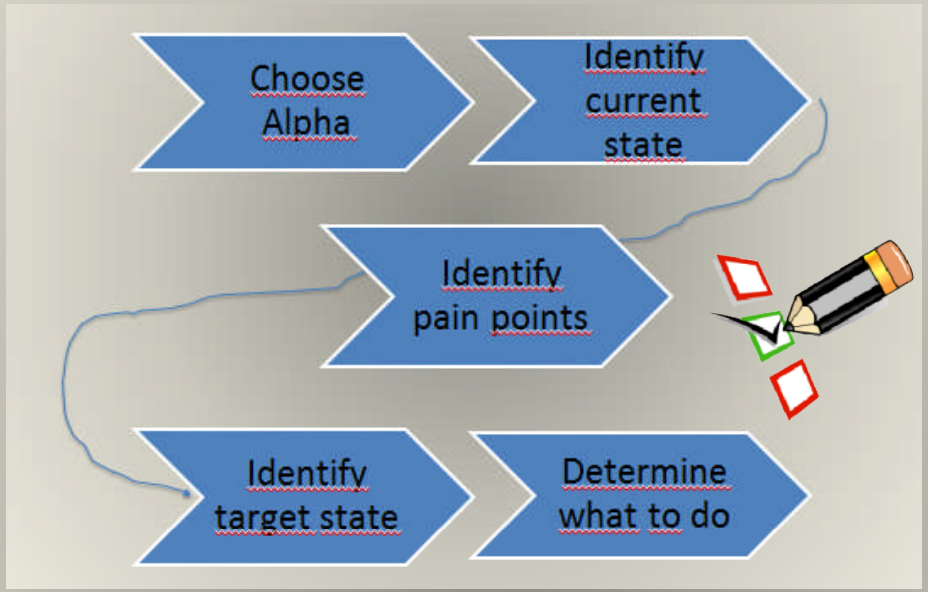
- Part 5: Kernel cont. & Kernel Extensions

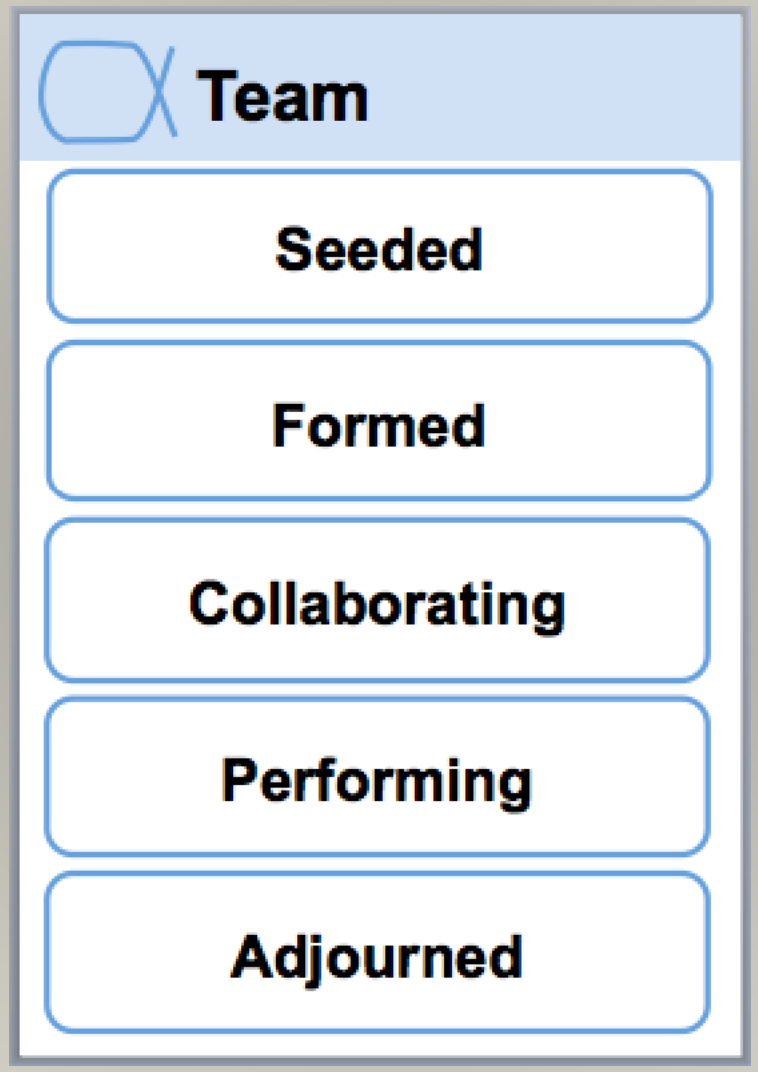
Your turn!



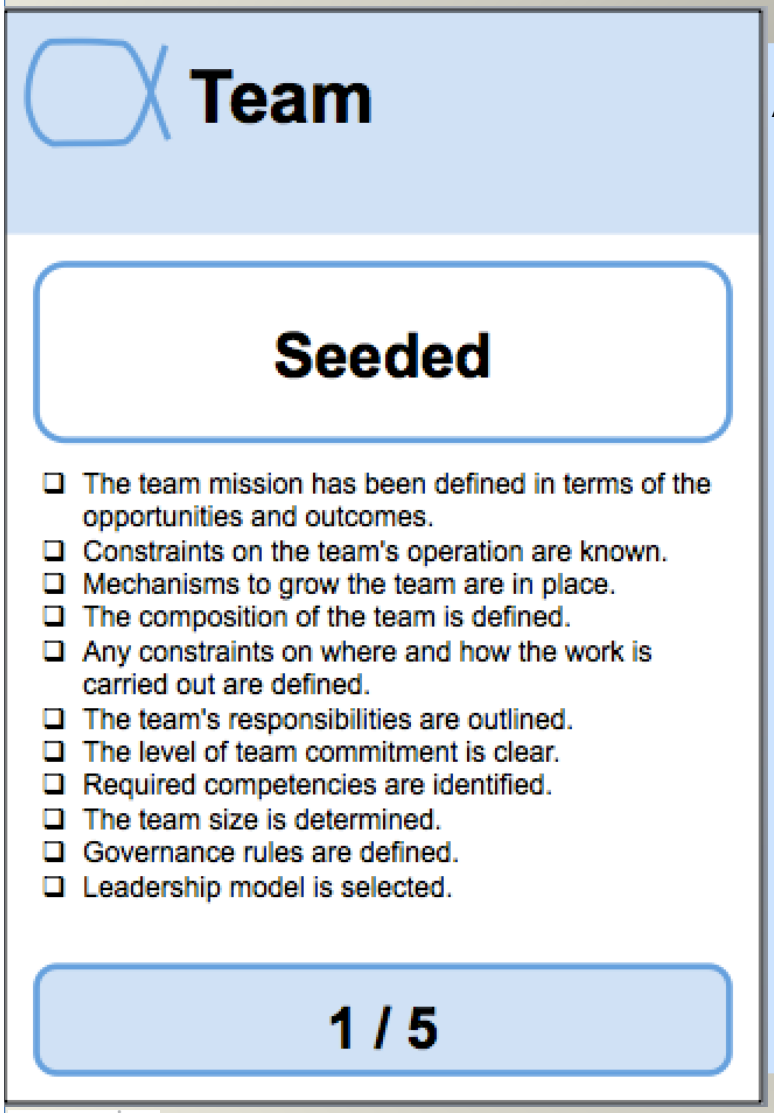
- Create a discussion group
- Read the handout for Scenario 2
- Assess the *Team* alpha
- Assess the *Requirements* alpha

Directions for the discussion

Let us share what we have found

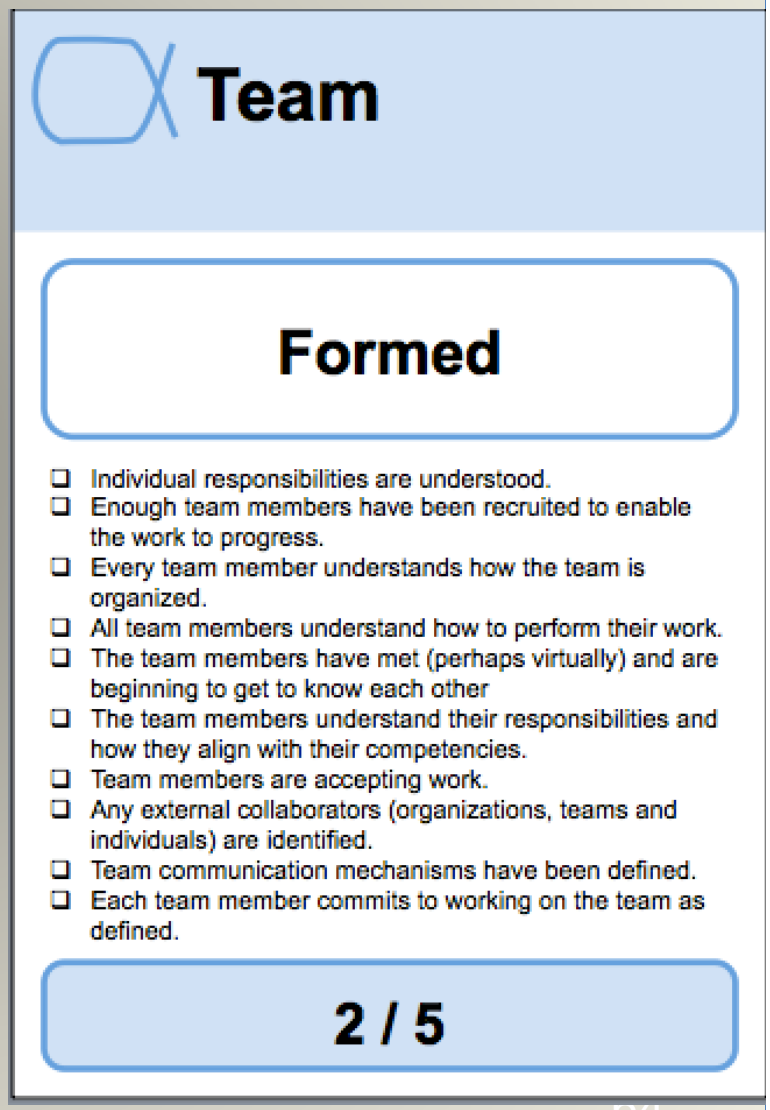


One possible finding to share

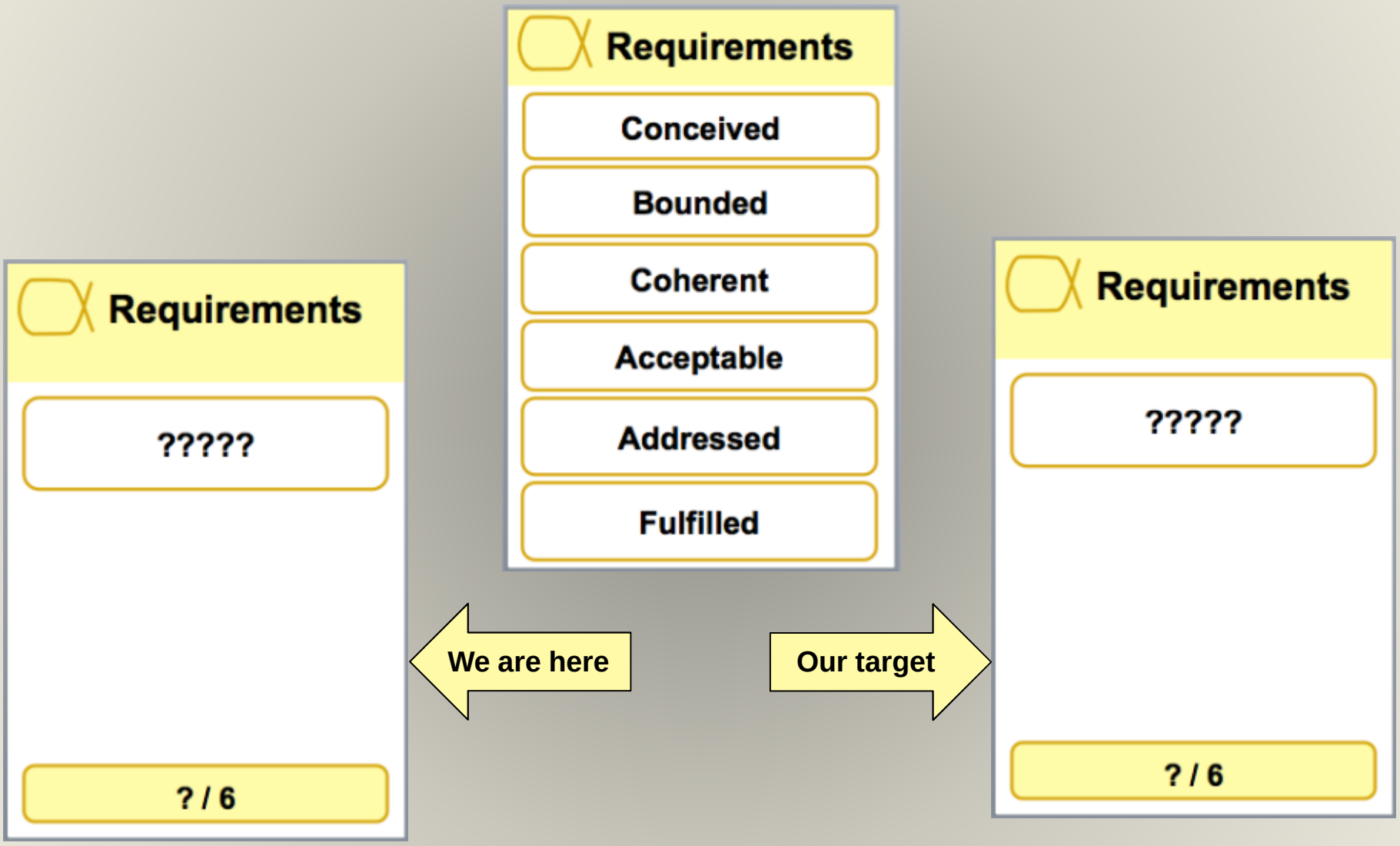


Action Items:

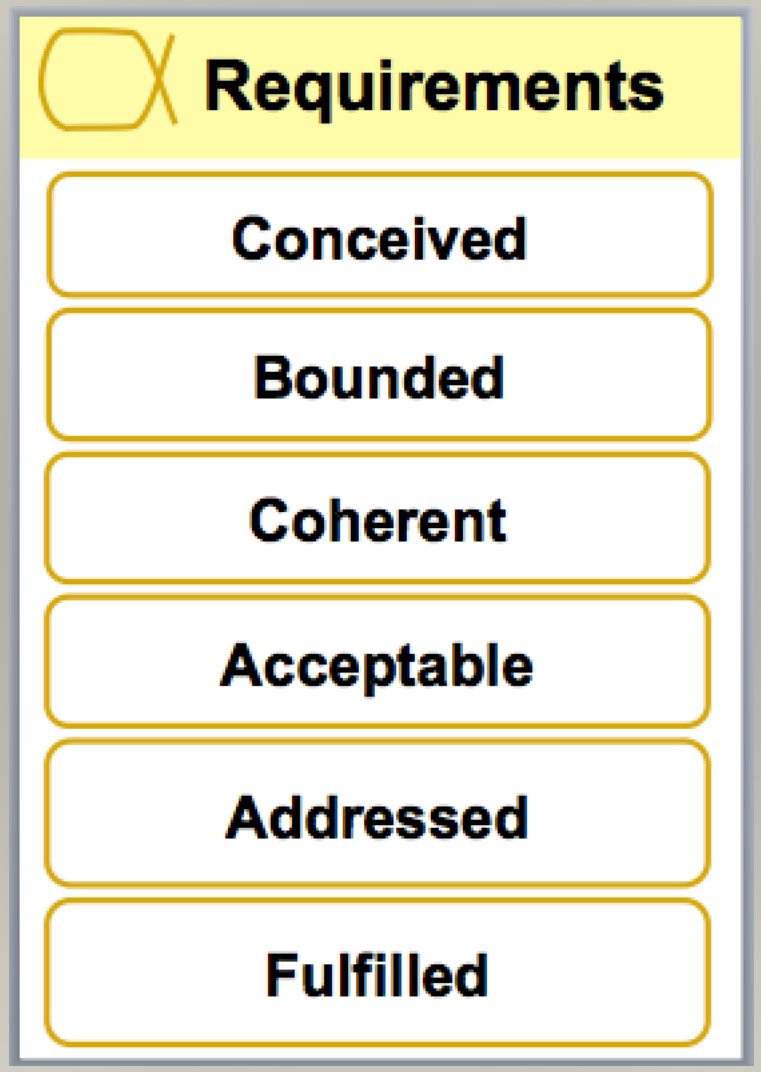
- ❑ Team needs to establish communication mechanisms
- ❑ Put a tool in place to track issues
- ❑ Team needs to work on how they deal with problems related to acceptance of stakeholders viewpoints
- ❑ Setup a session to talk about how to react to negative feedback



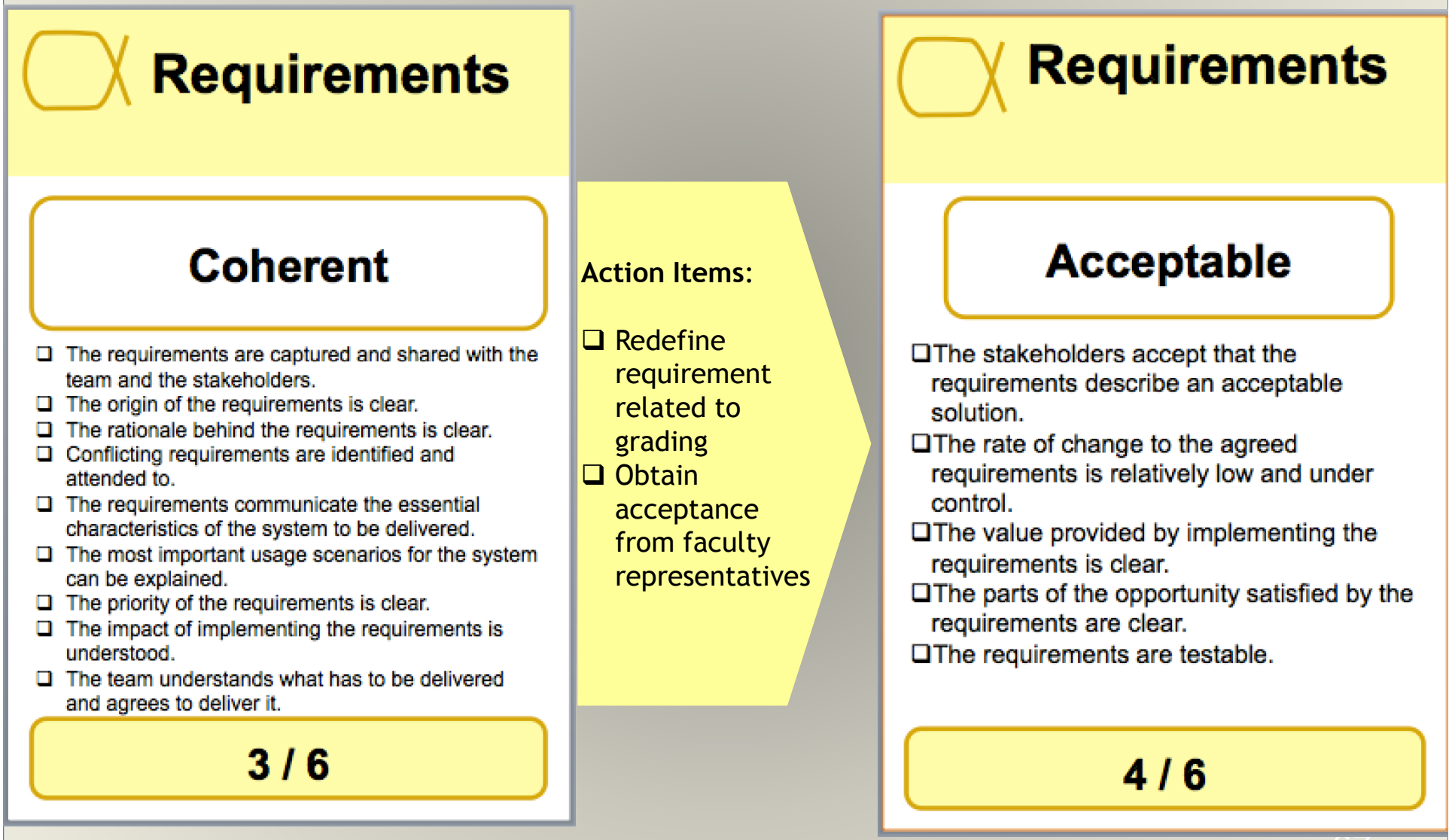
Directions for the discussion



Let us share what you have found



One possible finding to share



Summary: In this scenario …

- We acquainted ourselves with the Kernel Alphas
- We learned
  - how to use the Alpha states to identify pain points and current and target states
  - how to identify action items to achieve target states and alleviate pain points

Summary: In this scenario …

- we also learned that
  - problems that are usually common to many software projects can be avoided through the use of the Essence kernel

Summary: In this scenario …

- we also learned that
  - the Essence kernel provides a holistic approach to assess the health and the progress of a software project

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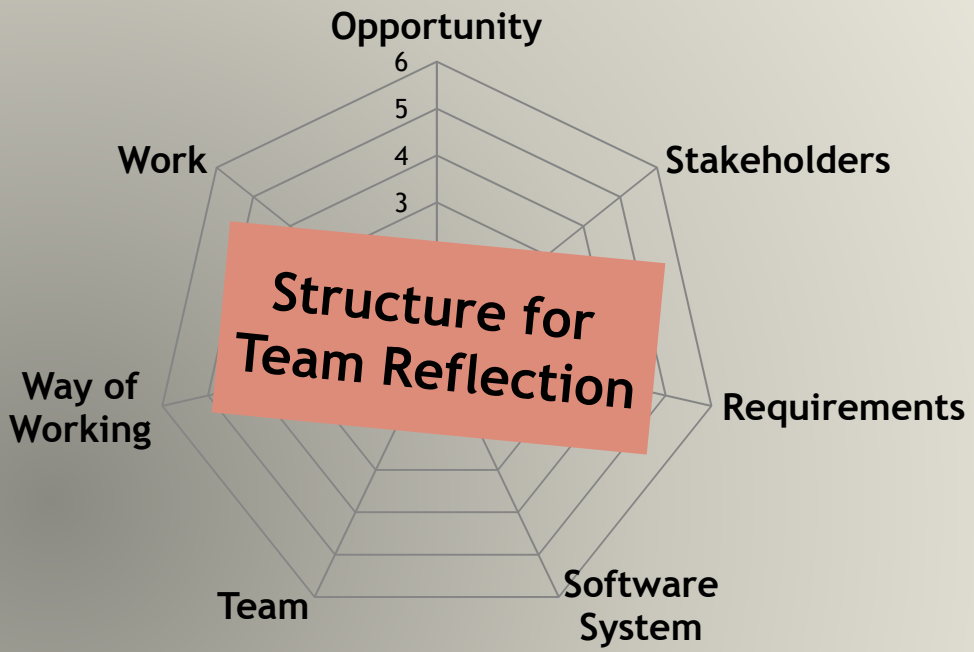
Essence Kernel Value

How does the approach provide value to the project team?

Value comes primarily from team discussions

Essence Kernel Value

Step Back & Look at Project Holistically



Quotes from CMU Students:

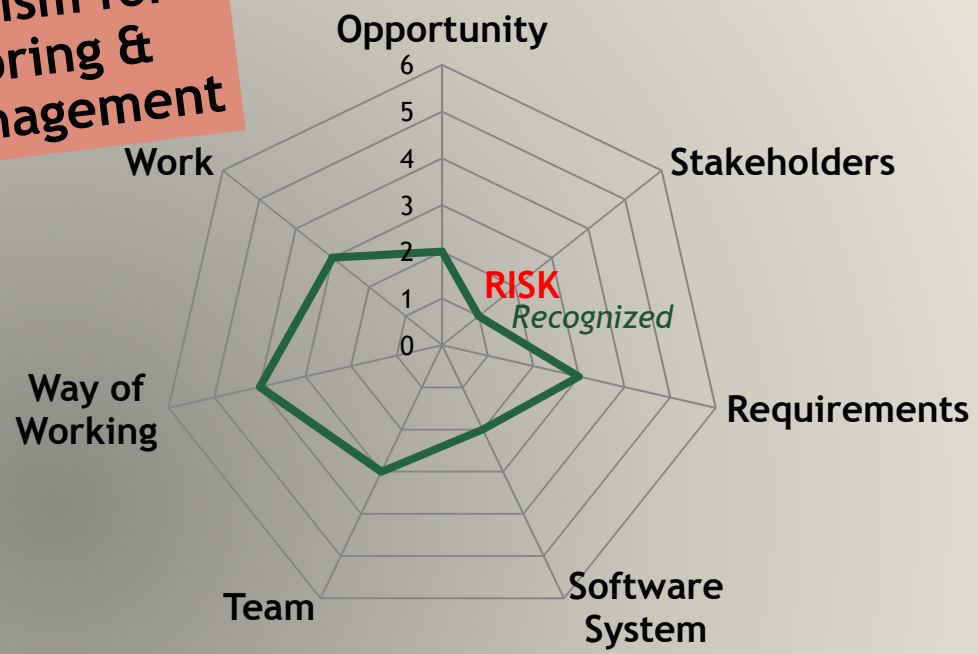
"Essence gives us a chance to back up and look at the project as a whole, from the birds point of view."

"Essence provides a structured way of thinking about critical aspects of the project. Without Essence, our team could have overlooked some of these aspects."

Essence Kernel Value

Monitor Progress

Mechanism for Monitoring & Risk Management



Quotes from CMU Students:

"The alphas seem to be exactly the right areas to monitor to promote project success."

"Essence is great for team reflection & risk management."

RISK: Opportunity & Requirements defined without proper stakeholders involvement

Current State

Stakeholders	Stakeholders	Stakeholders	Stakeholders	Stakeholders	Stakeholders
Recognized	**Represented**	**Involved**	**In Agreement**	**Satisfied for Deployment**	**Satisfied in Use**
▪ Stakeholders have been identified ▪ There is agreement on stakeholder groups to be represented ▪ Responsibilities of stakeholder representatives defined	▪ Stakeholder representatives appointed ▪ Stakeholder representatives agreed to take on responsibilities & authorized ▪ Collaboration approach agreed ▪ Representatives respect team way of working	▪ Stakeholder representatives carry out responsibilities ▪ Stakeholder representatives provide feedback & take part in decisions in timely way ▪ Stakeholder representatives promptly communicate to stakeholder group	▪ Stakeholder representatives agree their input is valued and respected by the team ▪ Stakeholder representatives agree with how different priorities balance ▪ Stakeholder representatives have agreed upon minimal expectations for deployment	▪ Stakeholder representatives provide feedback on system from their stakeholder group perspective ▪ Stakeholder representatives confirm system ready for deployment	▪ System has met or exceed minimal stakeholder expectations ▪ Stakeholder needs and expectations are being met
1 / 6	2/ 6	3/ 6	4/ 6	5/ 6	6/ 6

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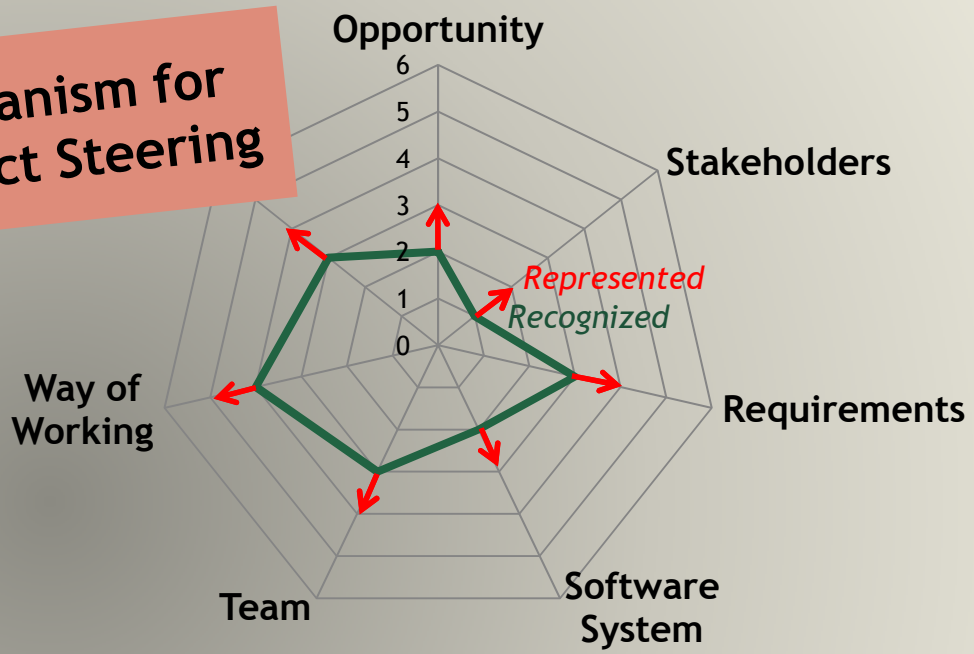
Essence Kernel Value

Set Project Direction & Goals

Mechanism for Project Steering



Quotes from CMU Students:

"Essence gives us structure and direction."

"Essence is useful, as it gives you an agenda or checklist based on various dimensions."

Current State / **Target State**

Stakeholders	Stakeholders	Stakeholders	Stakeholders	Stakeholders	Stakeholders
Recognized	**Represented**	**Involved**	**In Agreement**	**Satisfied for Deployment**	**Satisfied in Use**
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1 / 6	2/ 6 Goals	3/ 6	4/ 6	5/ 6	6/ 6

Cécile Péraire

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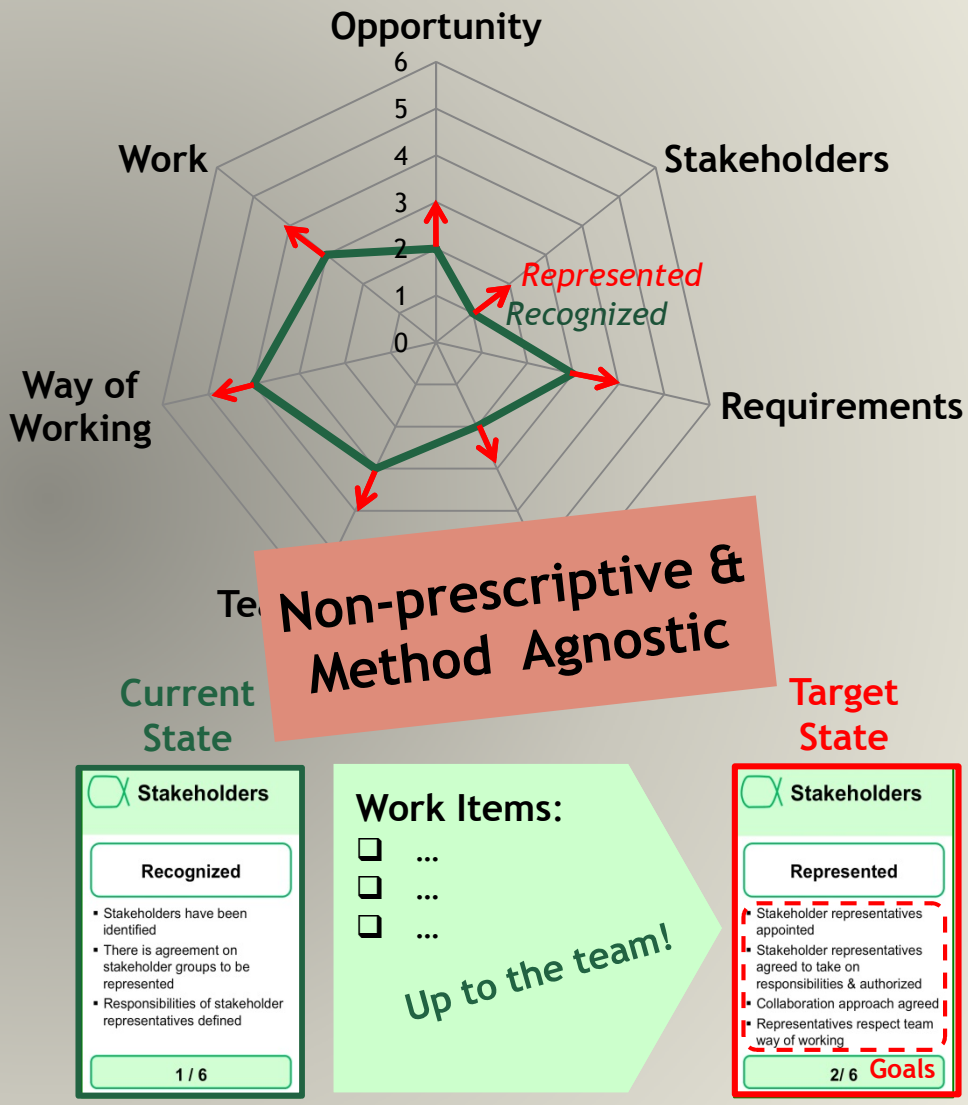
Essence Kernel Value

Decide How to Reach Goals
(Work Items)

Quote from CMU Student:

"I will use Essence on my next project, especially with a team that is not used to the same software engineering process.
In that case Essence is a backdrop at the basis of the communication about all the considerations for the success of the project."

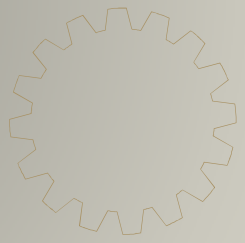


Essence Kernel Value

How does the approach provide value to the project team?

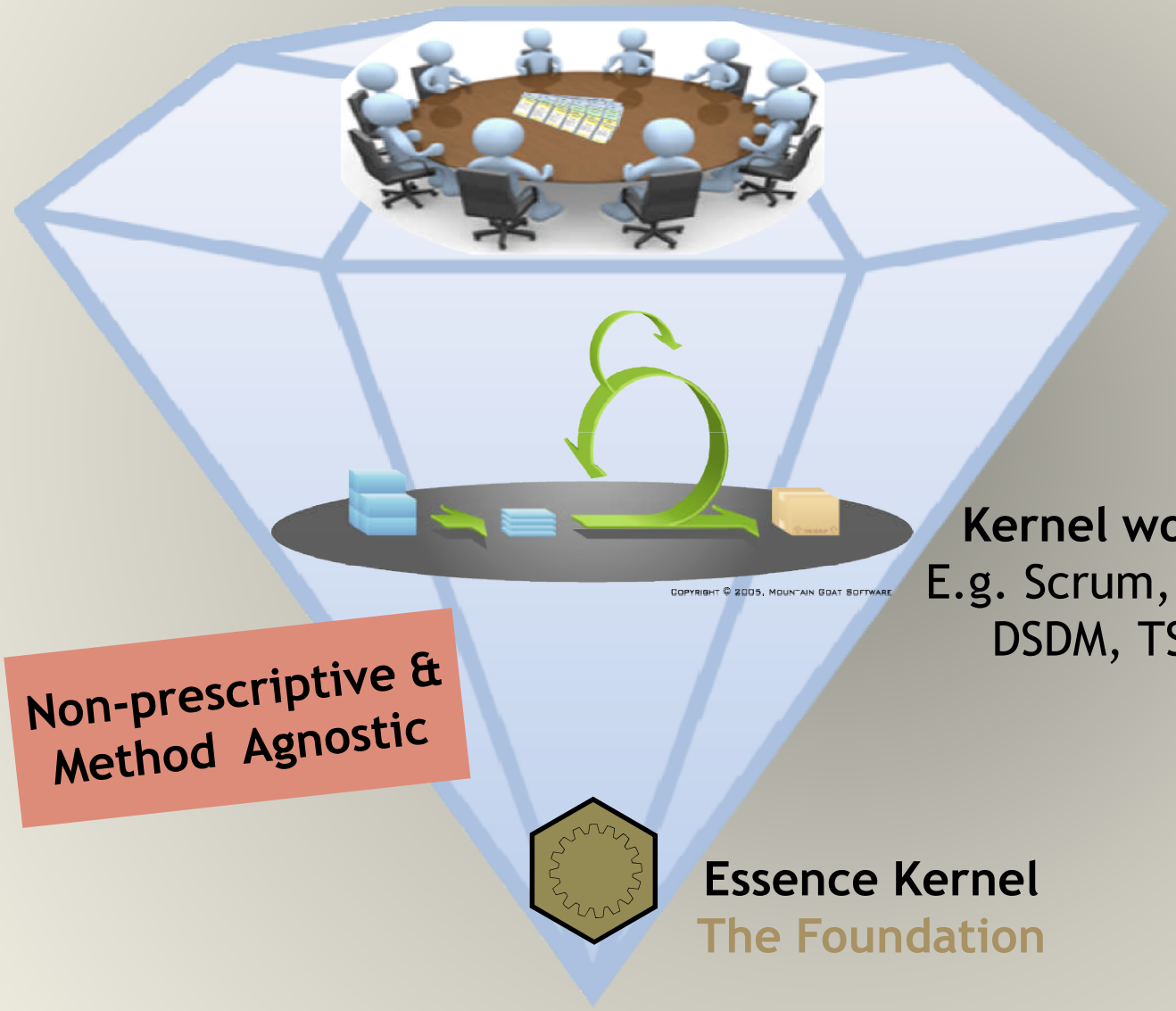
The Essence kernel provides a structure and mechanism for:

- **Progress monitoring**
- **Team reflection**
- **Risk management**
- **Project steering**



In a holistic, simple, lightweight, non-prescriptive and method-agnostic fashion

Essence Kernel and other Ways of Working



Kernel works with Any Method
E.g. Scrum, XP, Kanban, DAD, Safe, DSDM, TSP, RUP, Crystal, etc.

Non-prescriptive & Method Agnostic

Essence Kernel
The Foundation

Cécile Péraire

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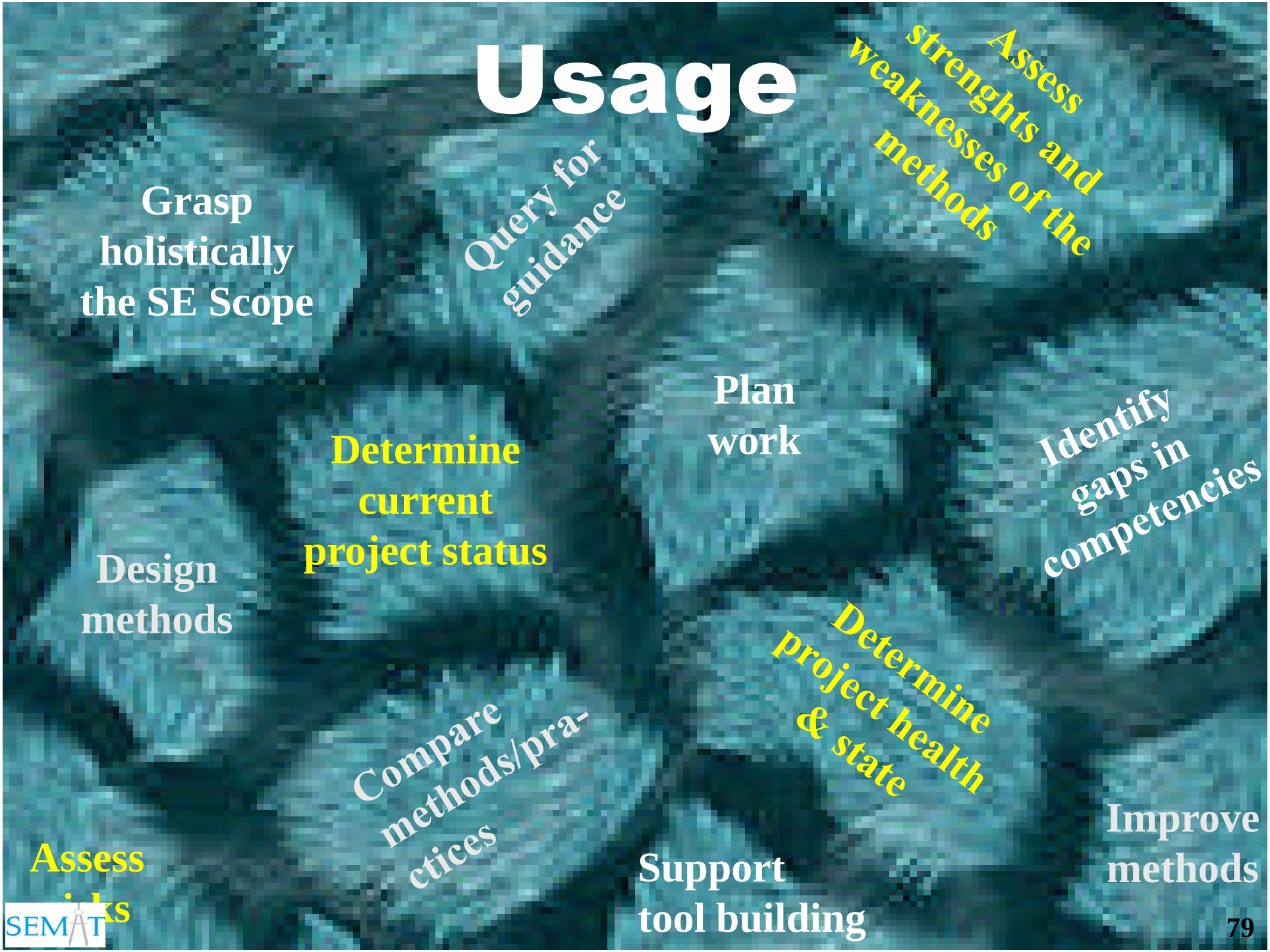
Usage
Grasp holistically the SE Scope
Query for guidance
Assess strenghts and weaknesses of the methods
Plan work
Identify gaps in competencies
Determine current project status
Design methods
Determine project health & state
Compare methods/practices
Improve methods
Support tool building
Assess
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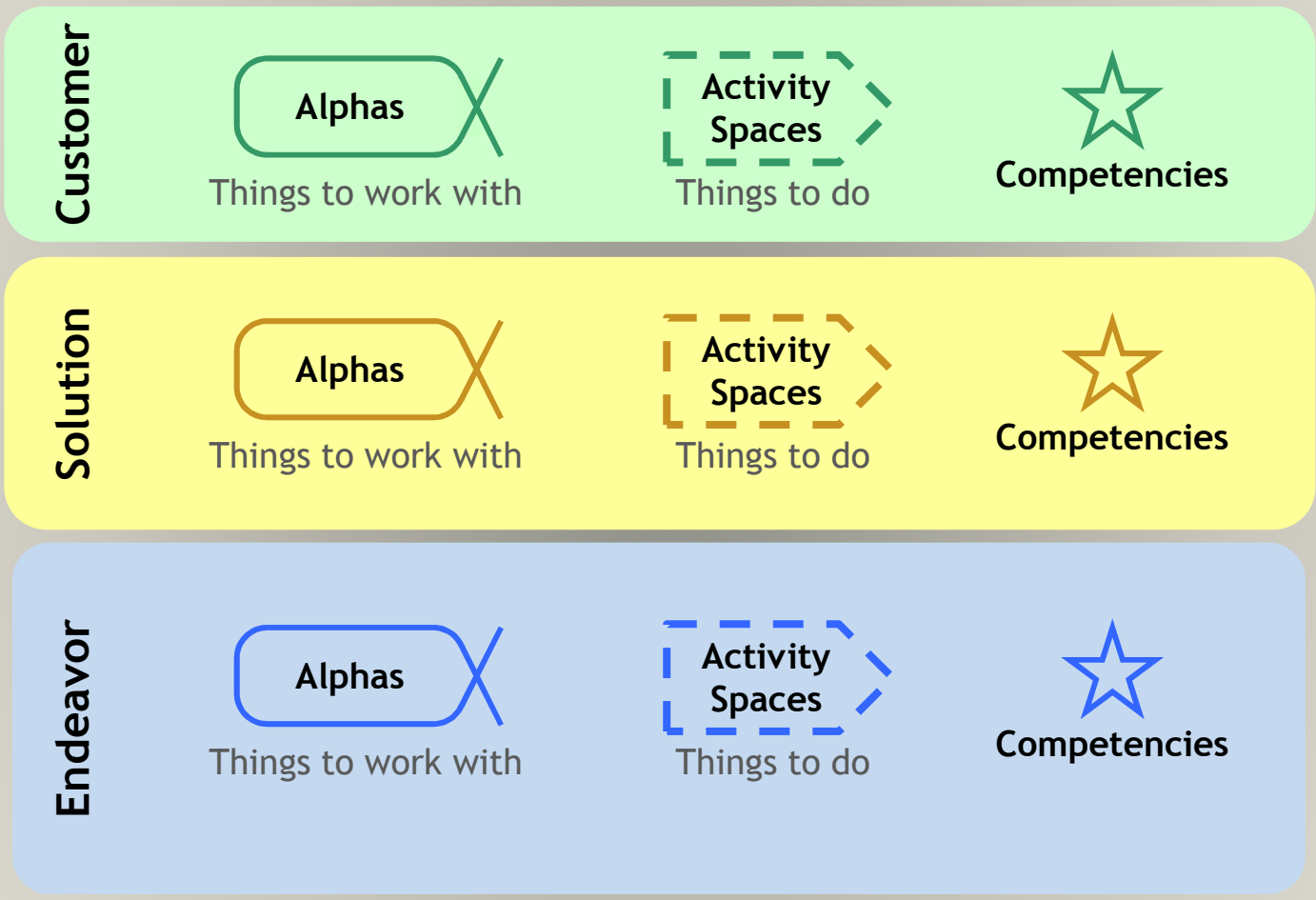
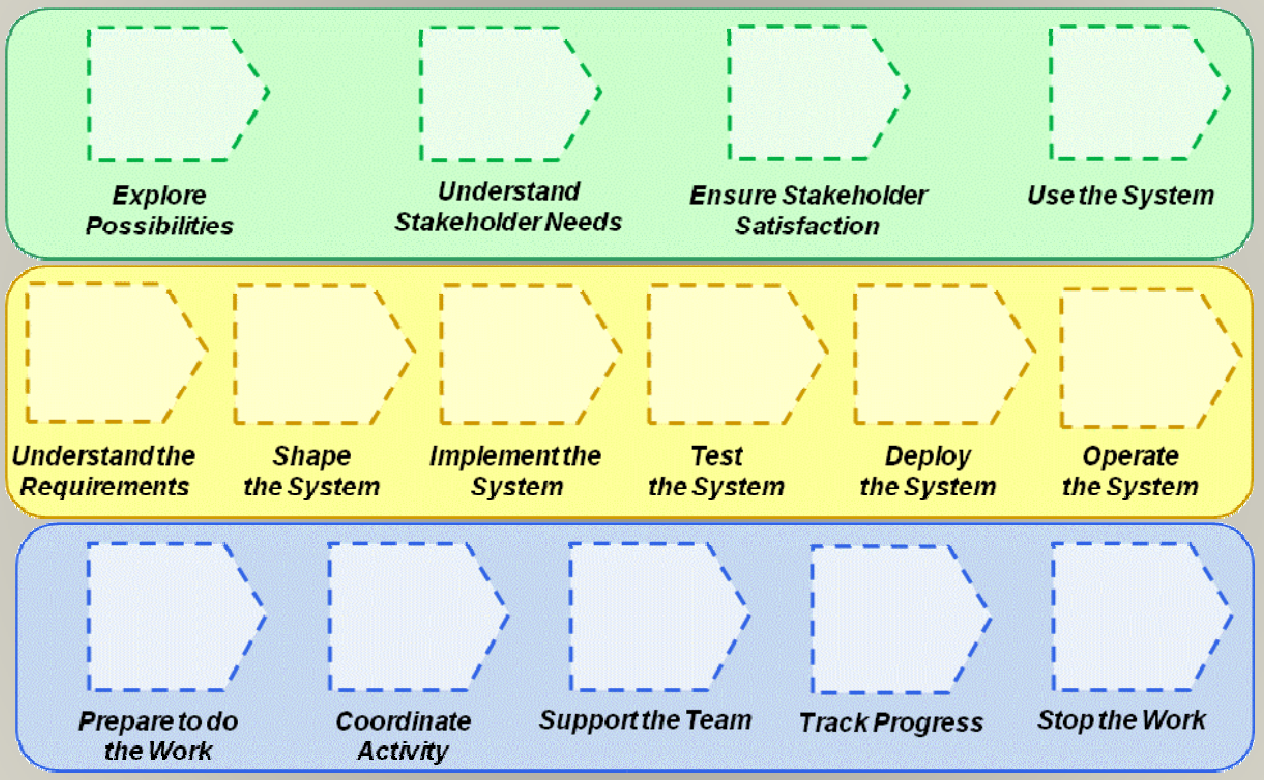
Essence Kernel



Advanced Topics

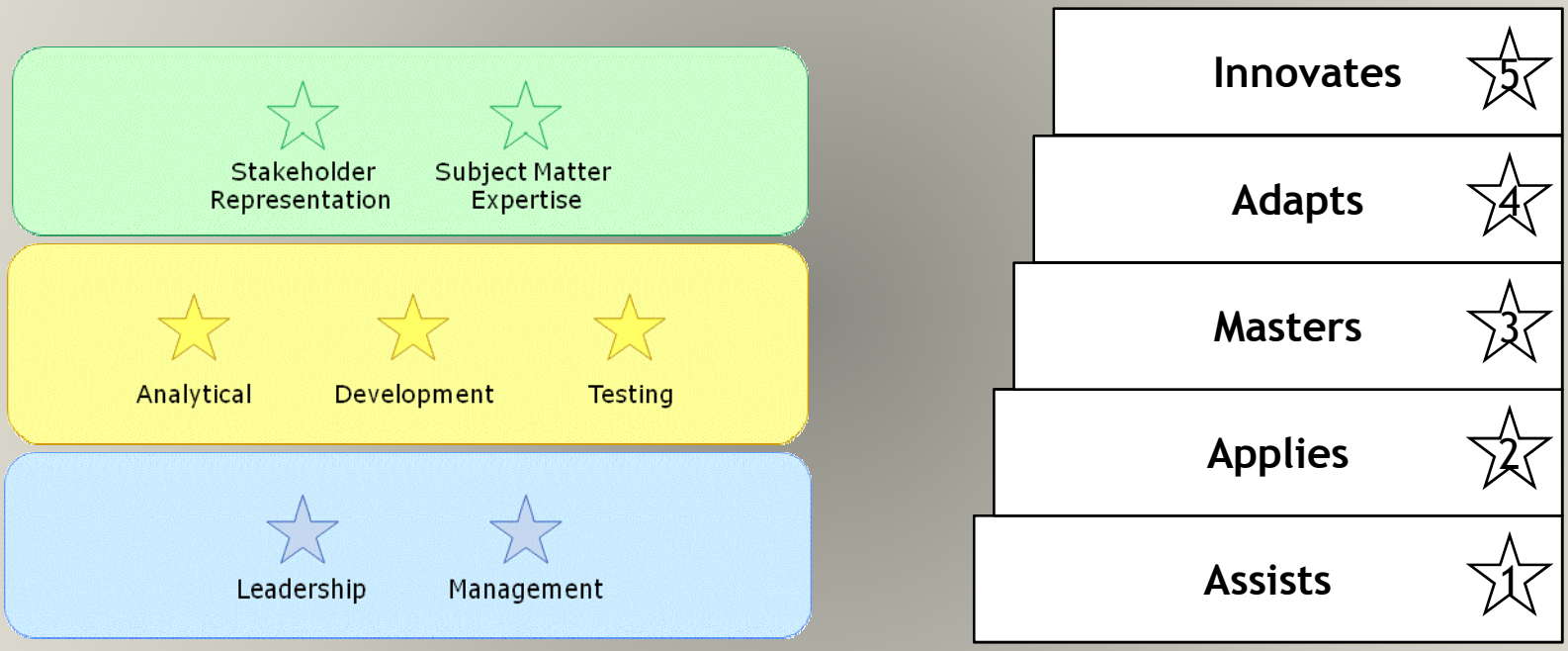
Activity Spaces - Things To Do



Activity based view of software engineering

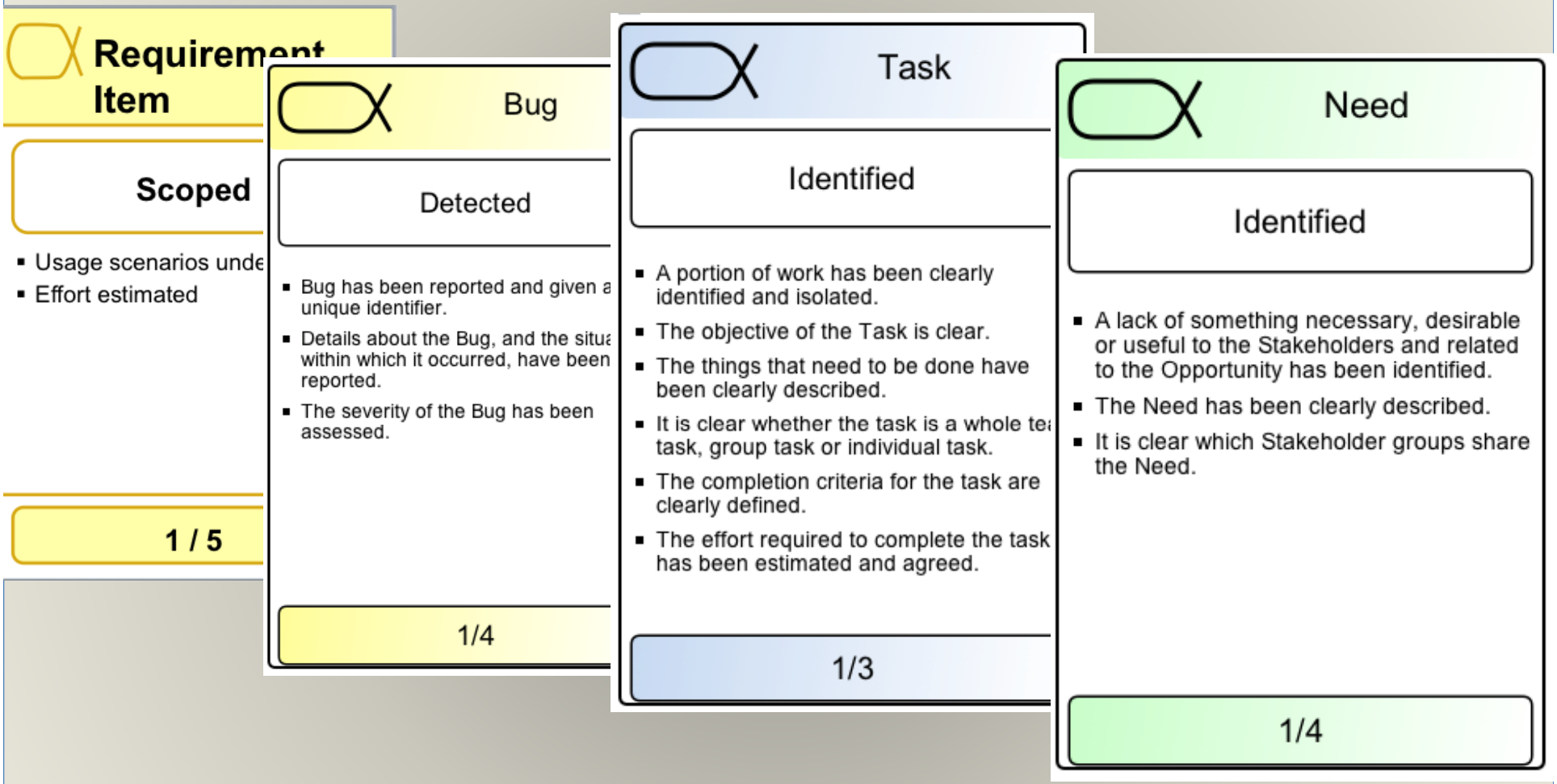
Advanced Topics

Competencies



View of key competencies needed in software engineering

Advanced Topics: Sub-Alphas



Sub-alphas could be added to the Kernel's alphas to monitor and steer other aspects of the project as needed (like user stories, bugs, tasks, etc.)

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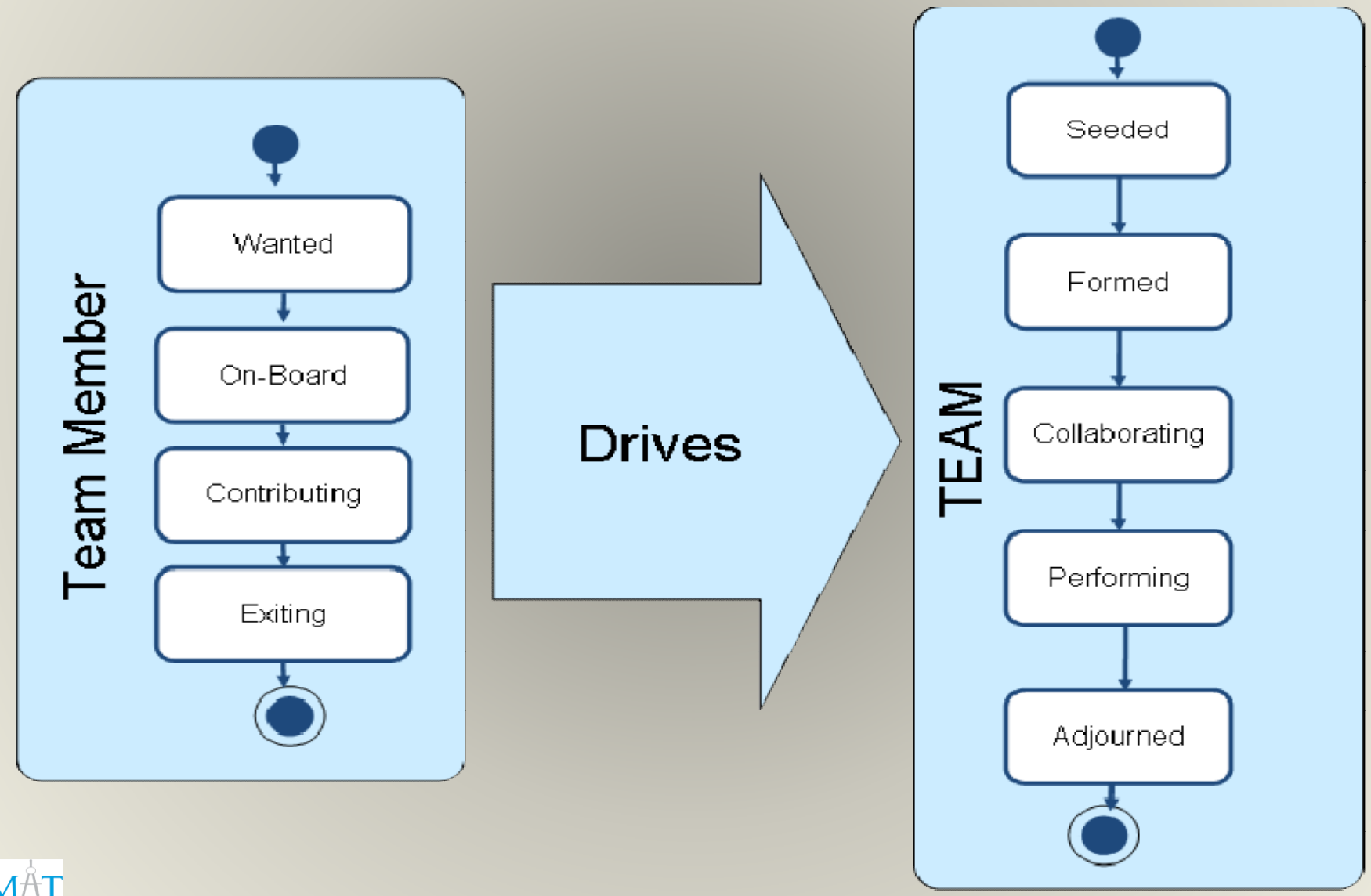
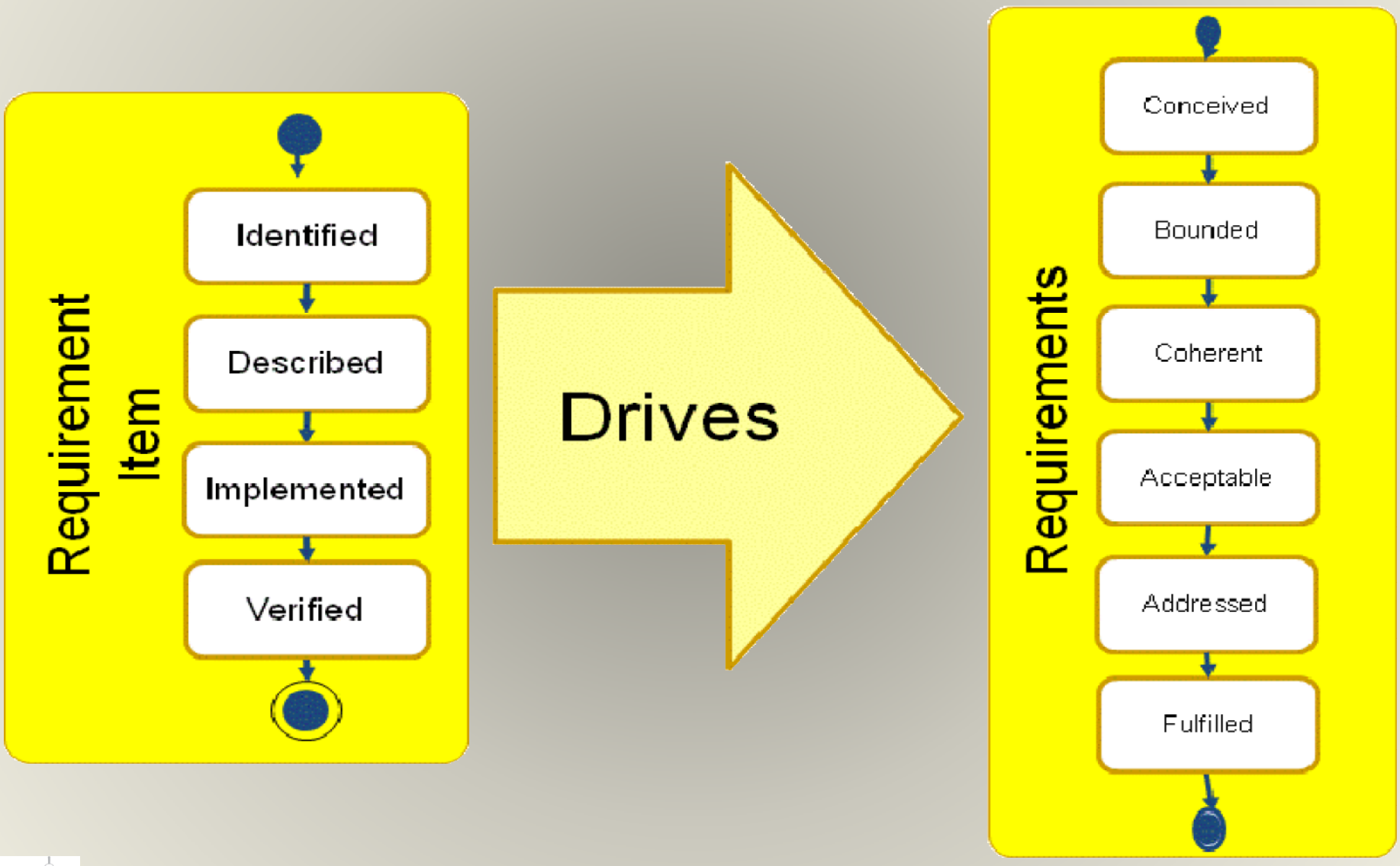
Sub-Alpha: Team Member



Sub-Alpha: Requirements Item



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