# 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

This material has been developed by the following SEMAT members:

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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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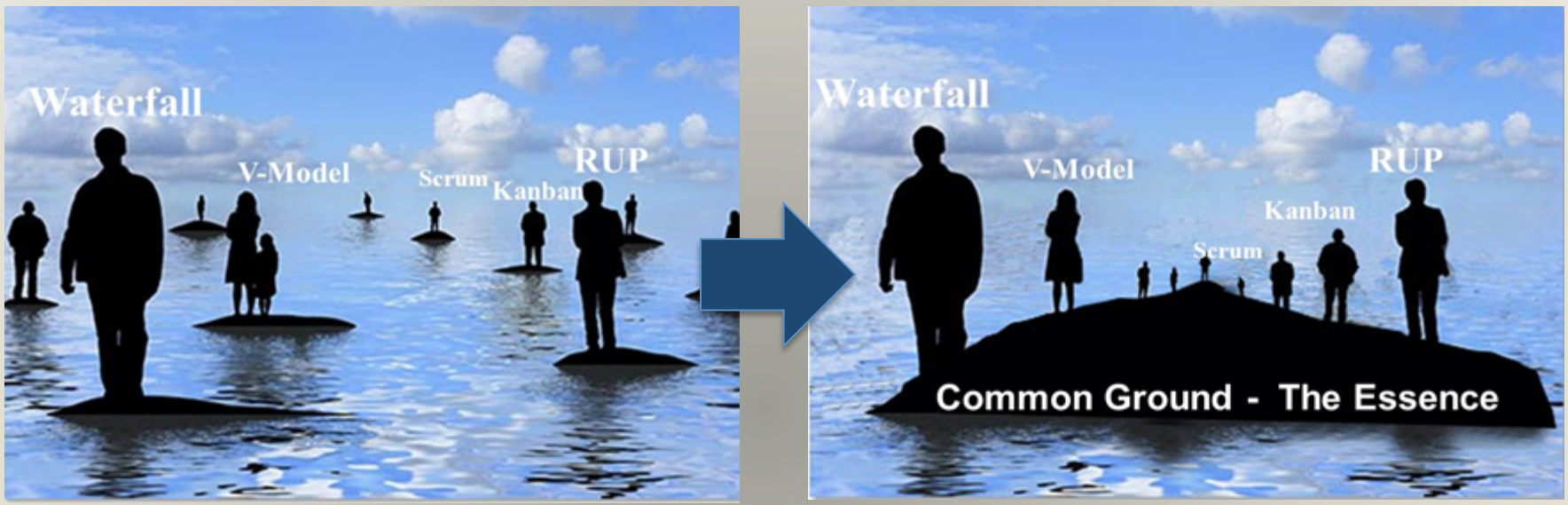
# Common Ground




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

# Measures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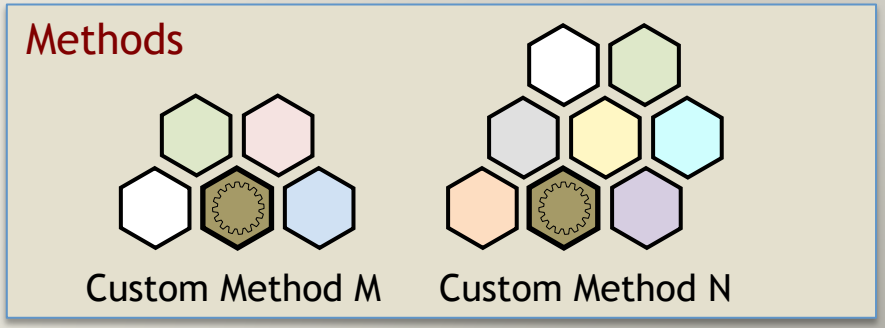
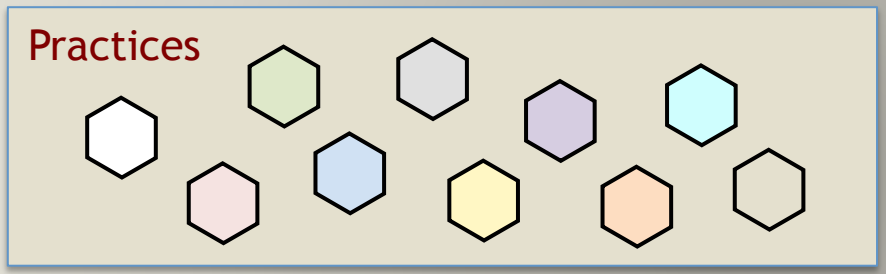
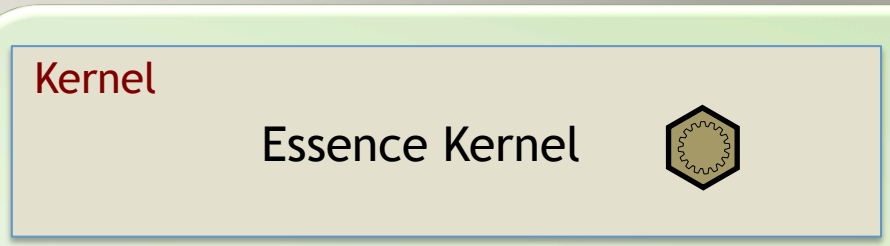
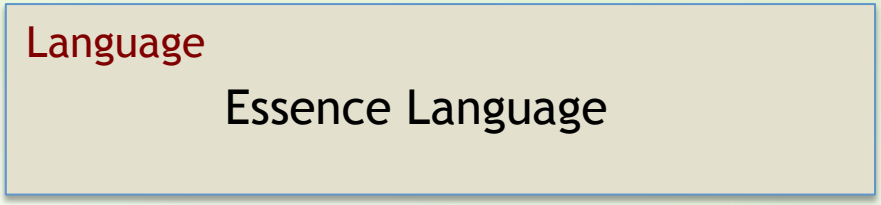
# What is Essence?



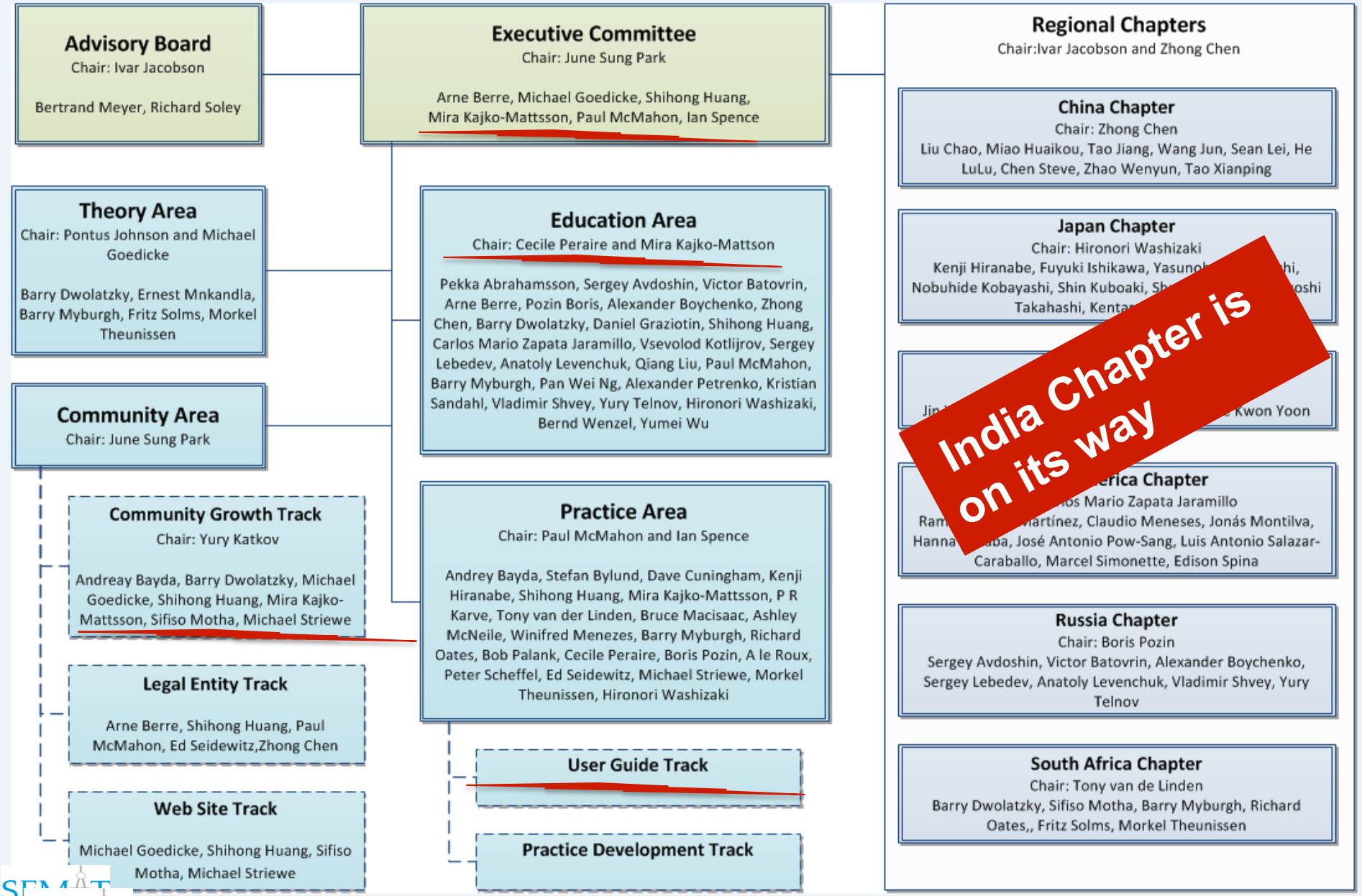


**Essence - Kernel and Language for Software Engineering Methods**

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

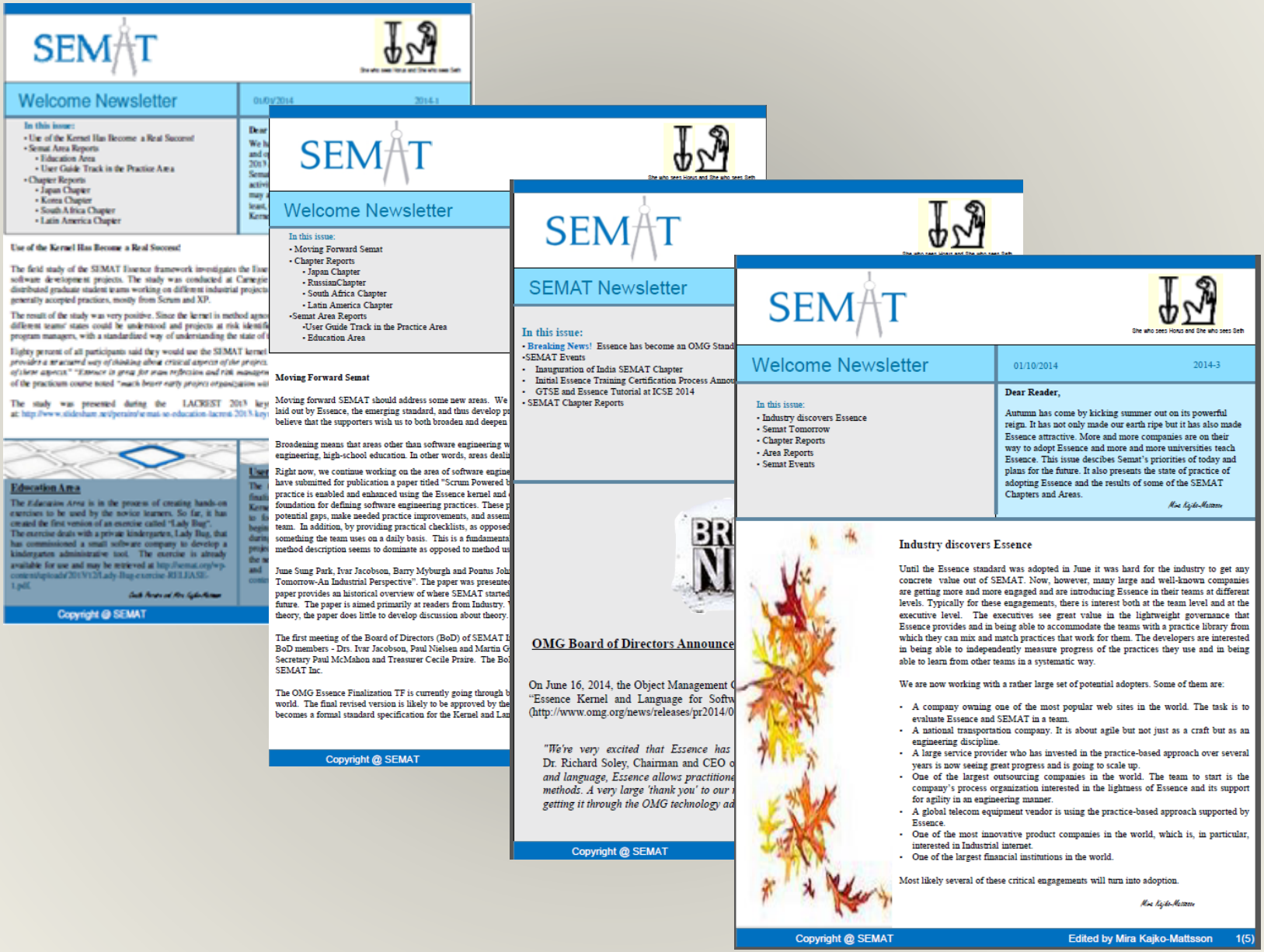
**Method Architecture**

# Mira and SEMAT



# SEMAT Newsletter

**semat.org**



# 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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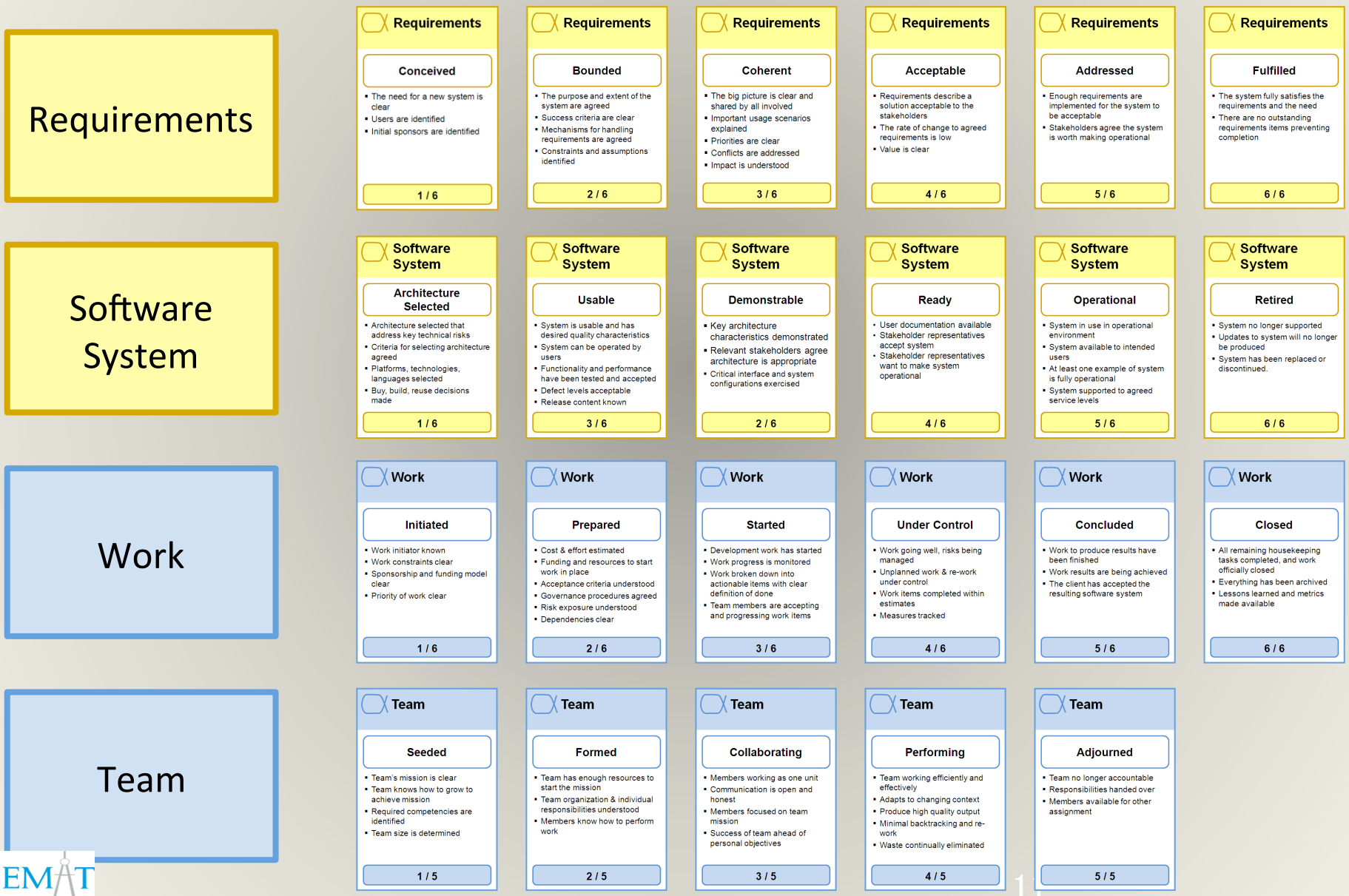
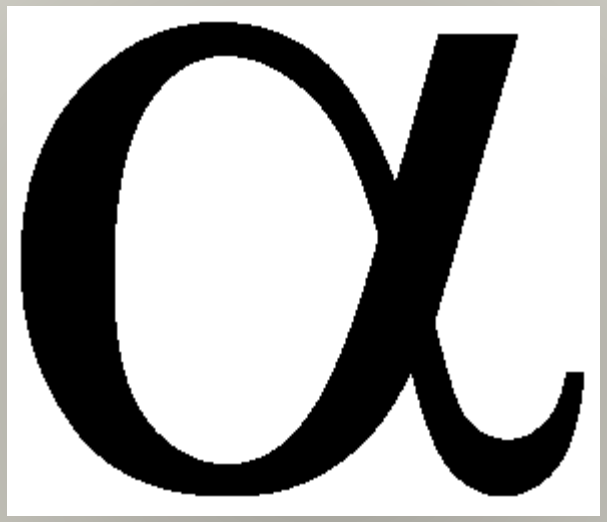
# Some essential things to work with - Alphas

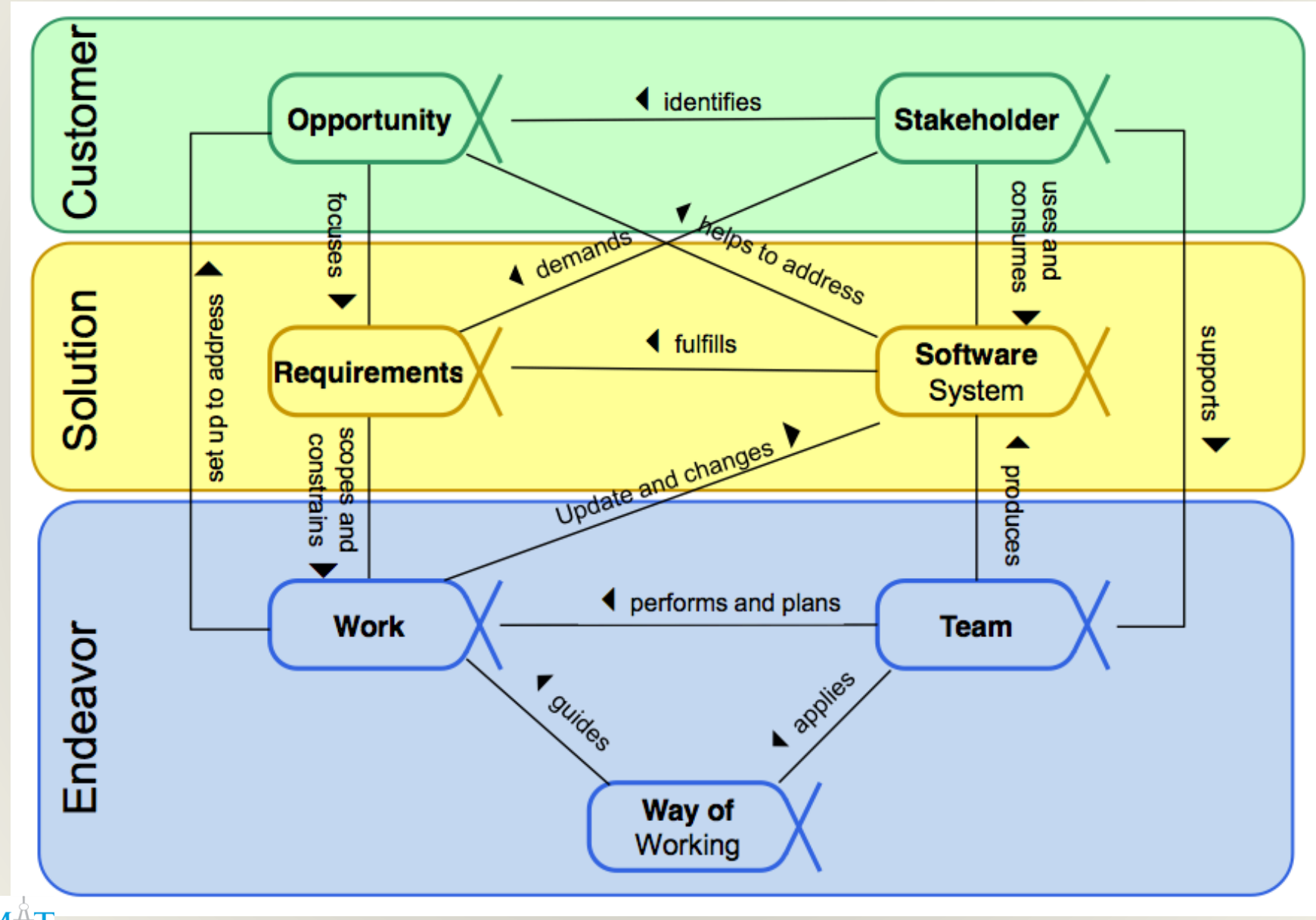


# What is an Alpha?

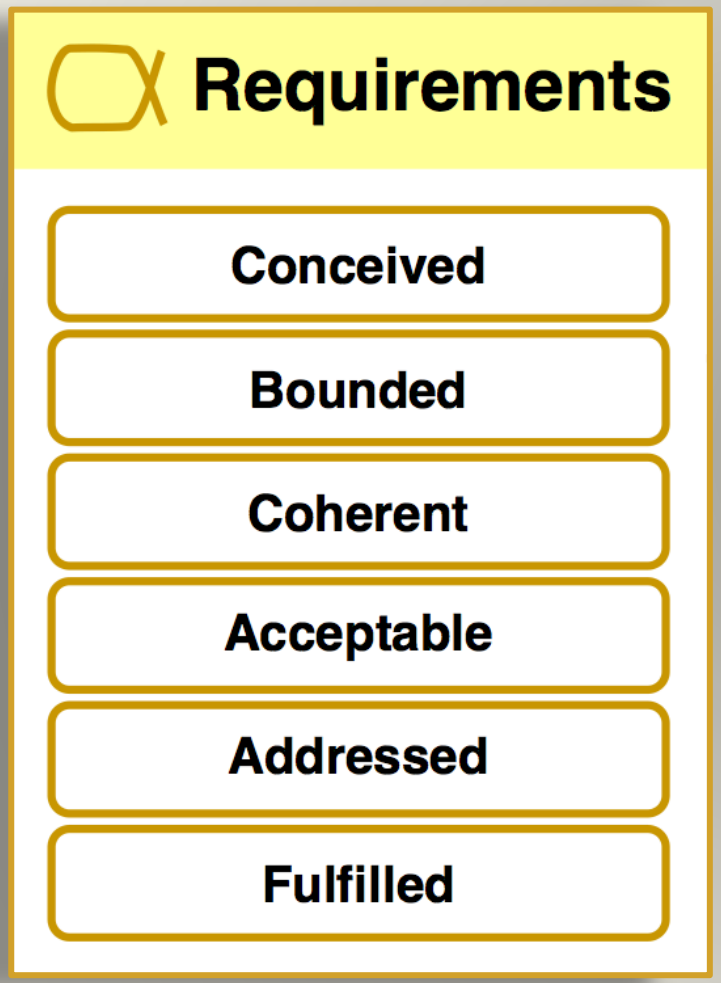


- Alpha is an acronym for an **A**bstract-**L**evel **P**rogress **H**ealth **A**ttribute.
- An essential element of the software engineering endeavor that is relevant to an assessment of the progress and health of the endeavor.

# Essence Kernel Alphas

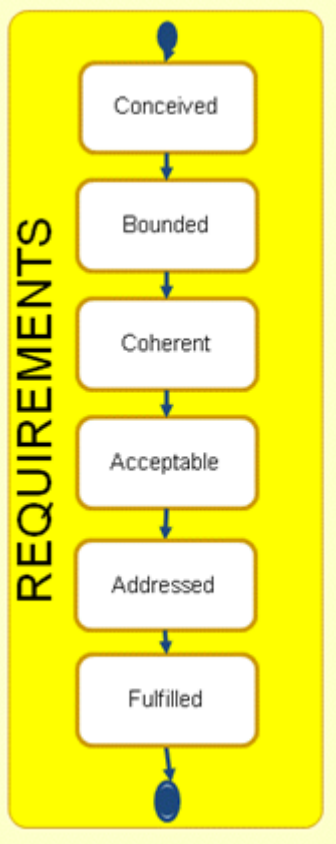


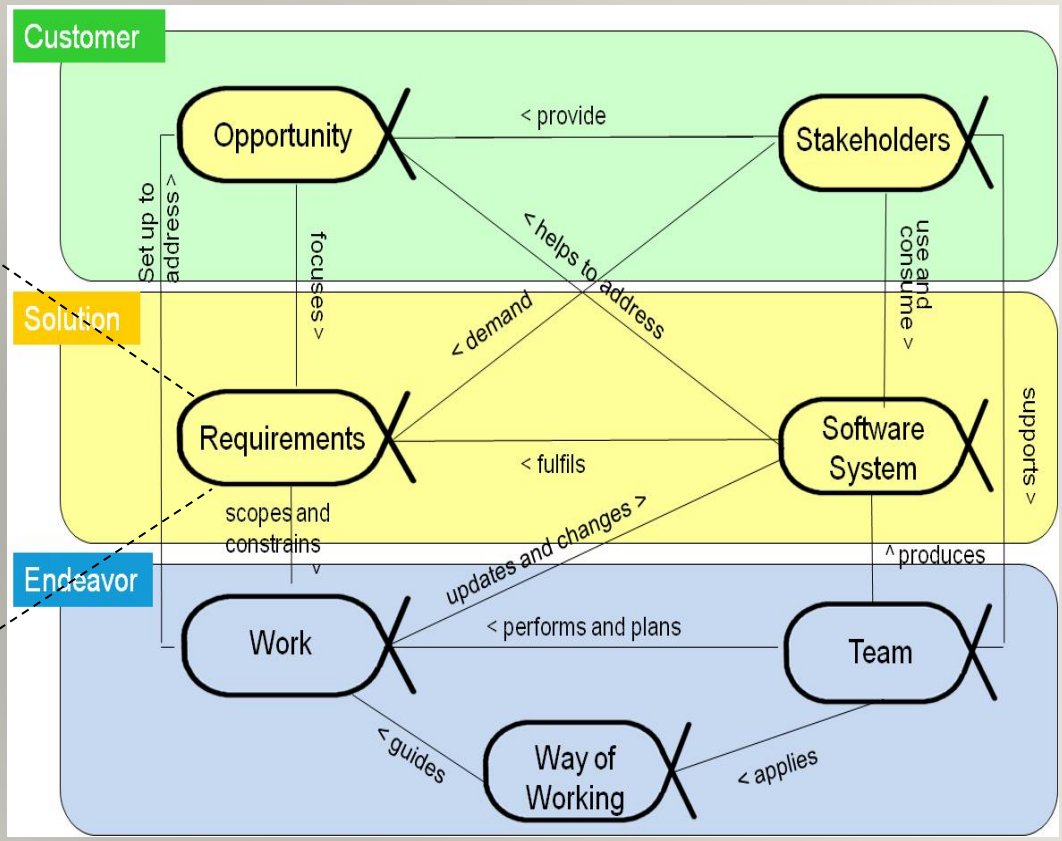
# Peeking into the Alphas




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

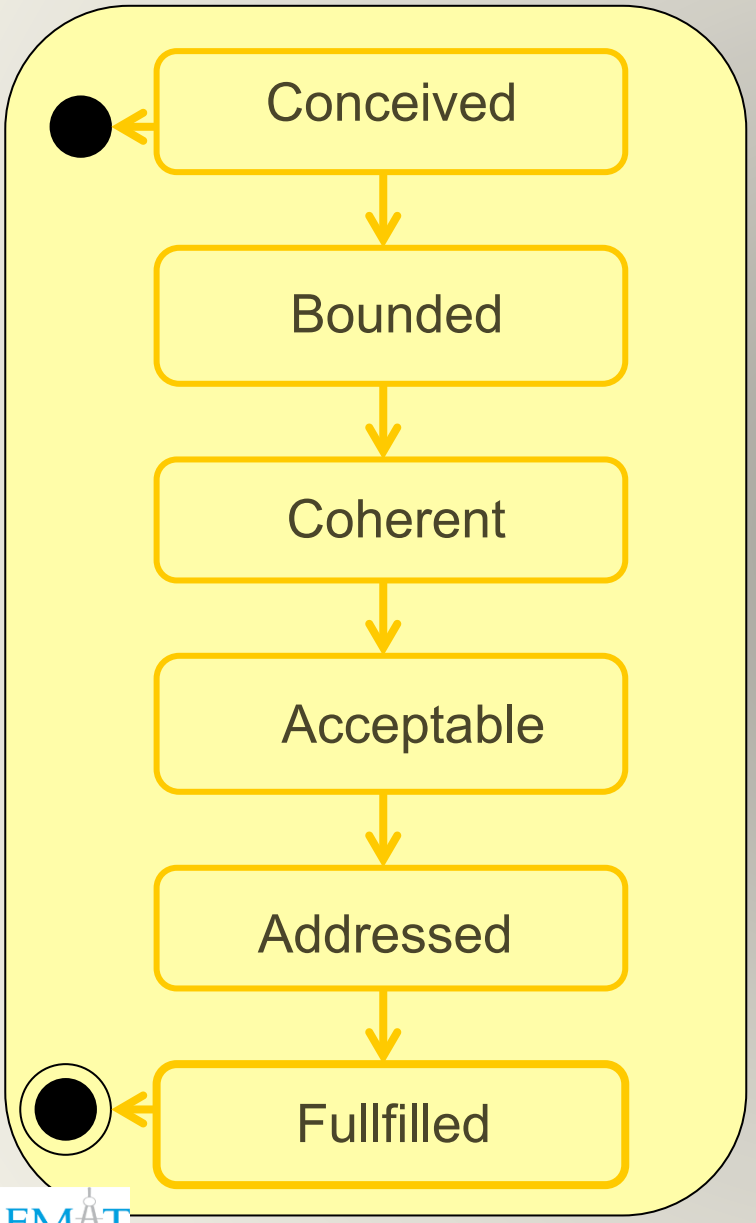
# Requirements- one of the Alphas




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

# 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.

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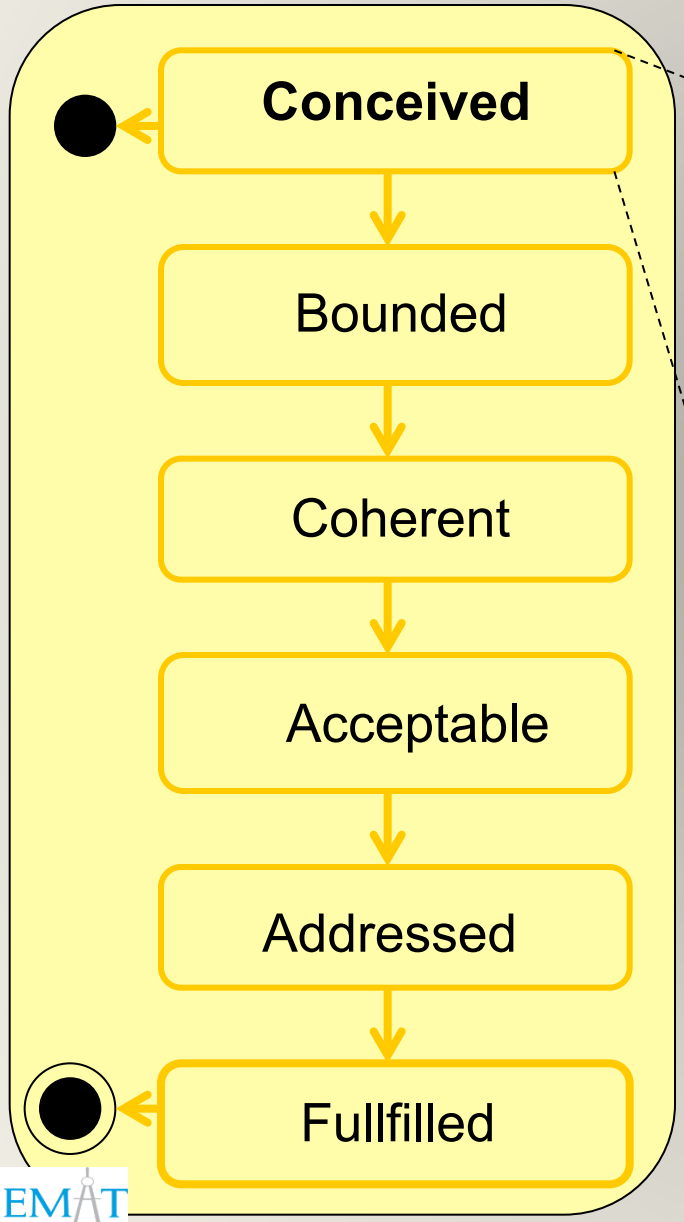
# Checklist for requirements states




- ❑ 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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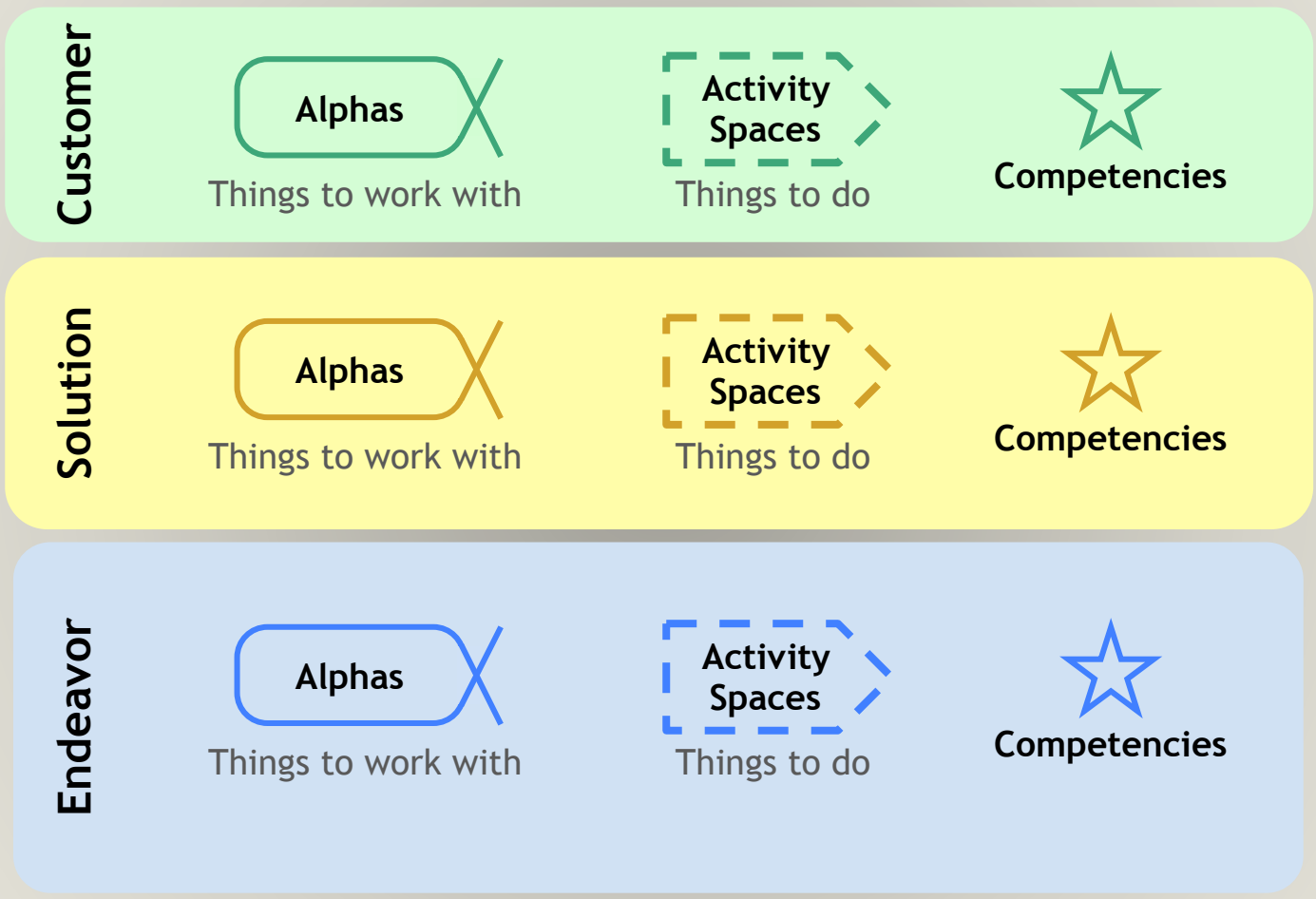
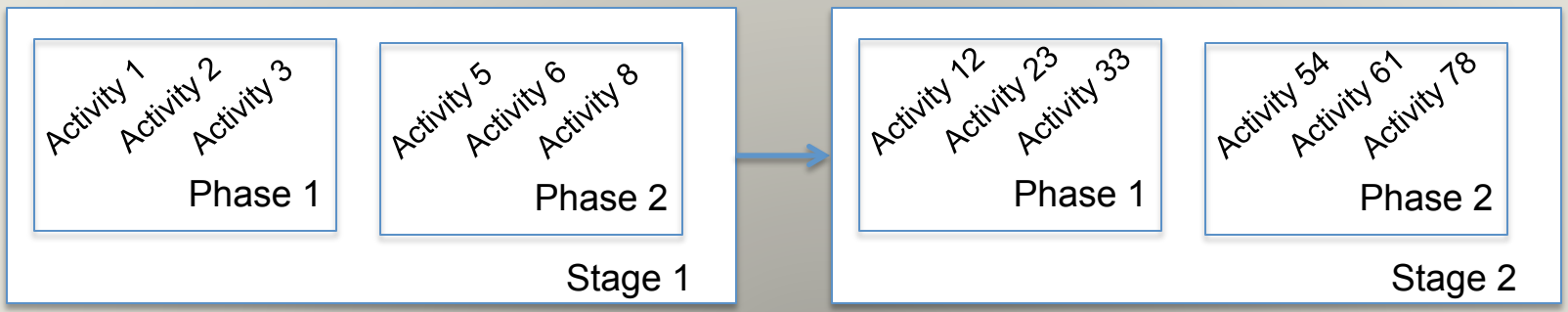
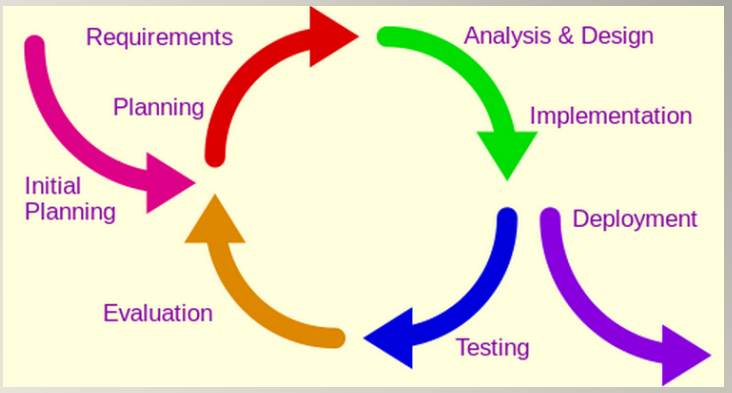
# Essence Kernel



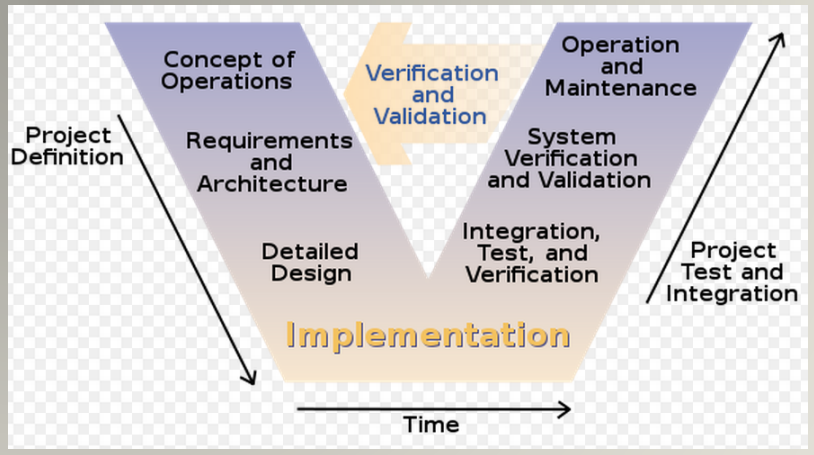
# Software development methods today




Sequential




Iterative




V-Model

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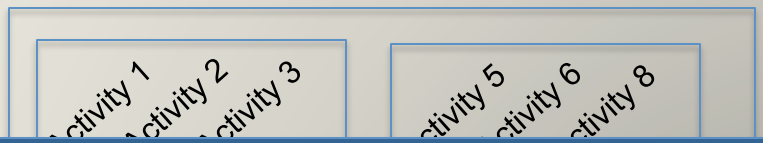
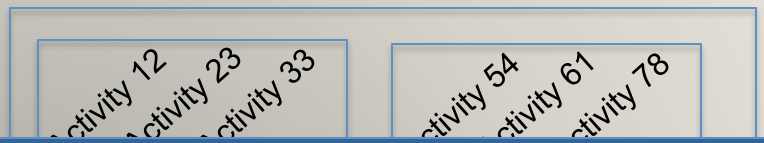
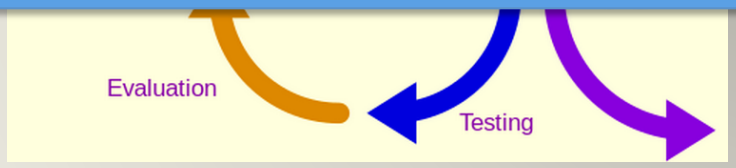
# Software development methods today





## Focus on activities in two essential things:

- Way of working
- Work




Iterative


V-Model

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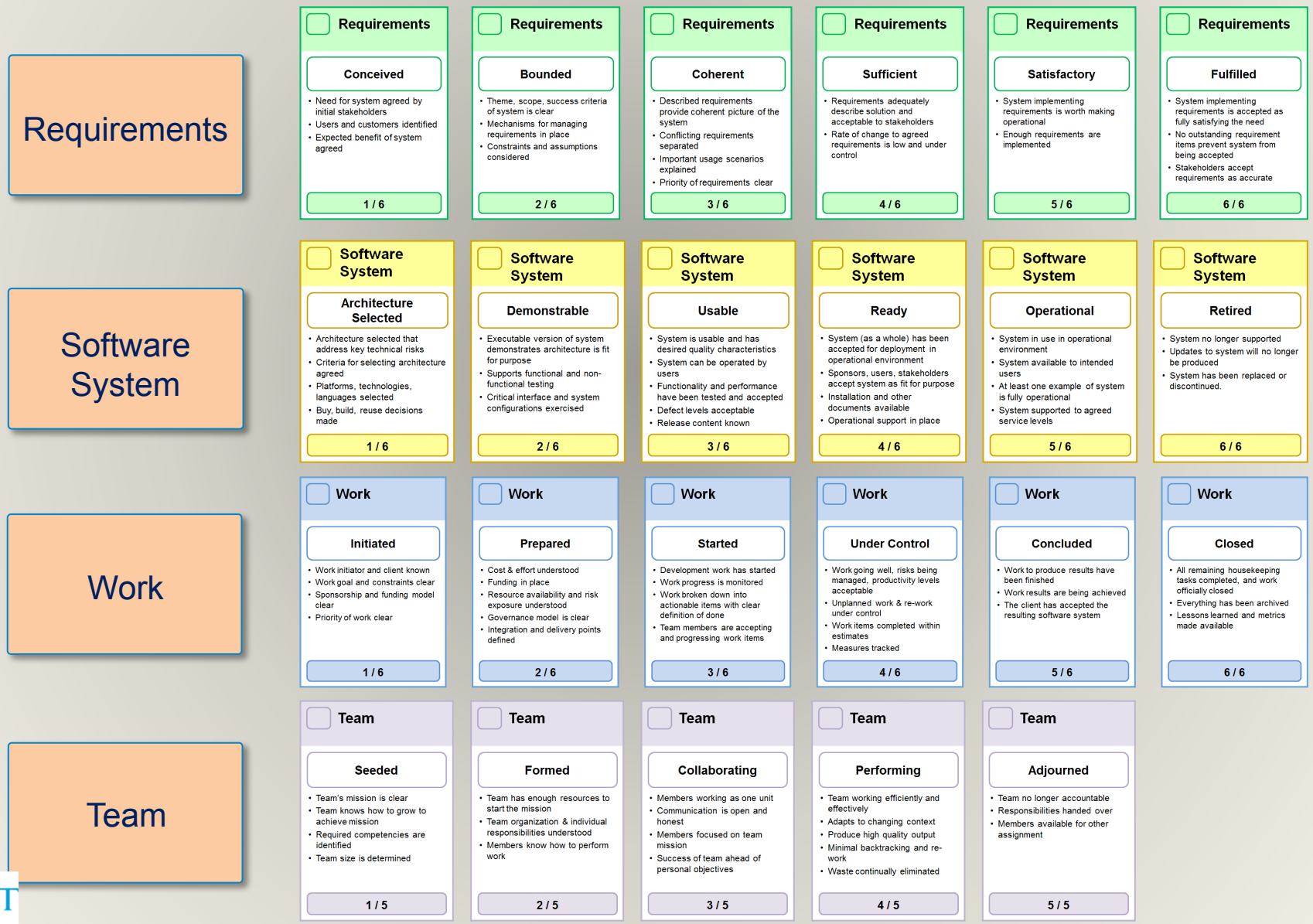
# Four of the seven essential things

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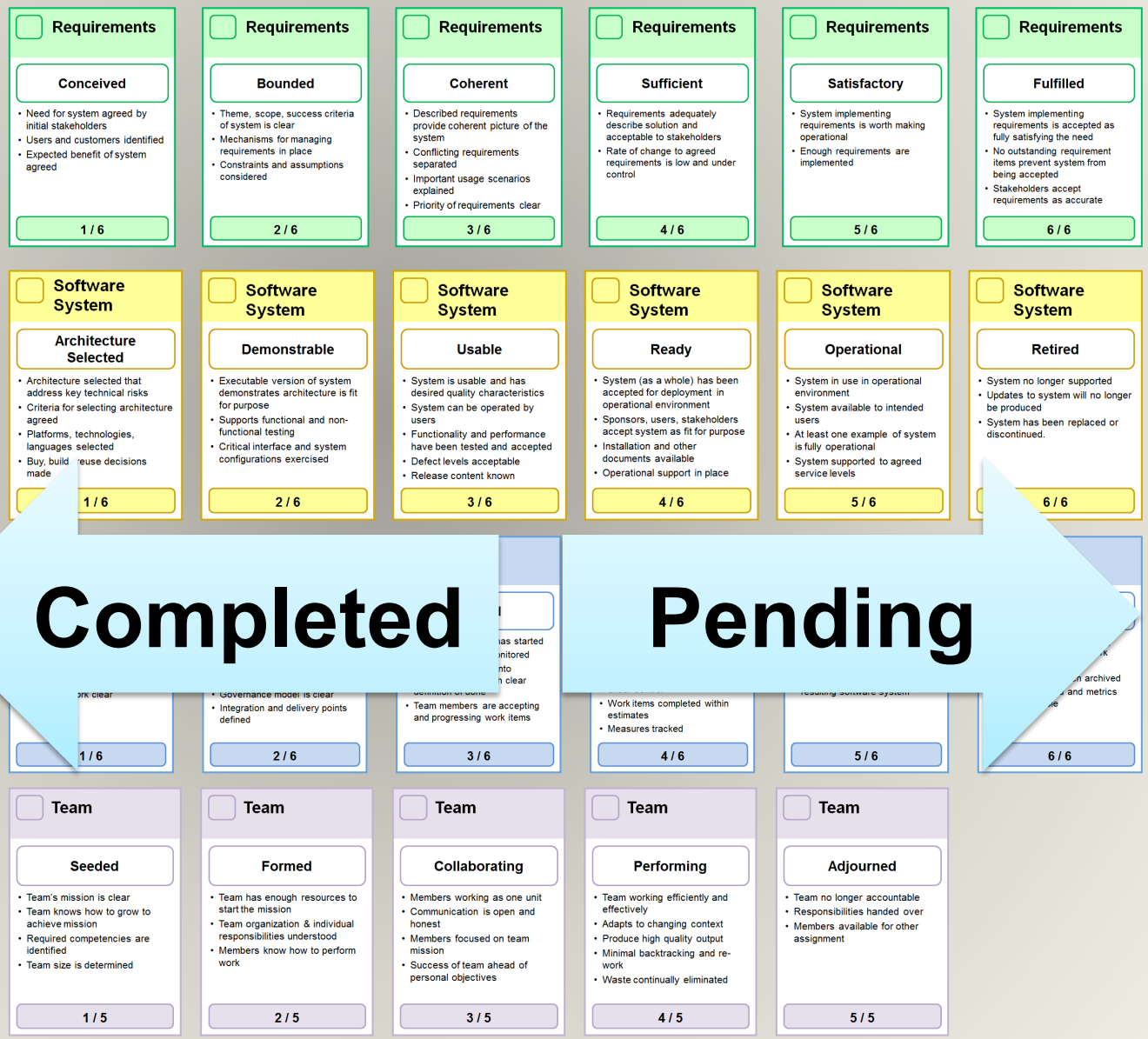
# Plan: Determine Current State

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# Plan: Determine Next State

## Requirements

### Conceived
- Need for system agreed by initial stakeholders
- Users and customers identified
- Expected benefit of system agreed

1 / 6

## Requirements

### Bounded
- Theme, scope, success criteria of system is clear
- Mechanisms for managing requirements in place
- Constraints and assumptions considered

2 / 6

## Requirements

### Coherent
- Described requirements provide coherent picture of the system
- Conflicting requirements separated
- Important usage scenarios explained
- Priority of requirements clear

3 / 6

## Requirements

### Sufficient
- Requirements adequately describe solution and acceptable to stakeholders
- Rate of change to agreed requirements is low and under control

4 / 6

## Requirements

### Satisfactory
- System implementing requirements is worth making operational
- Enough requirements are implemented

5 / 6

## Requirements

### Fulfilled
- System implementing requirements is accepted as fully satisfying the need
- No outstanding requirement items prevent system from being accepted
- Stakeholders accept requirements as accurate

6 / 6

## Software System

### Architecture Selected
- Architecture selected that address key technical risks
- Criteria for selecting architecture agreed
- Platforms, technologies, languages selected
- Buy, build, reuse decisions made

1 / 6

## Software System

### Demonstrable
- Executable version of system demonstrates architecture is fit for purpose
- Supports functional and non-functional testing
- Critical interface and system configurations exercised

2 / 6

## Software System

### Usable
- System is usable and has desired quality characteristics
- System can be operated by users
- Functionality and performance have been tested and accepted
- Defect levels acceptable
- Release content known

3 / 6

## Software System

### Ready
- System (as a whole) has been accepted for deployment in operational environment
- Sponsors, users, stakeholders accept system as fit for purpose
- Installation and other documents available
- Operational support in place

4 / 6

## Software System

### Operational
- System in use in operational environment
- System available to intended users
- At least one example of system is fully operational
- System supported to agreed service levels

5 / 6

## Software System

### Retired
- System no longer supported
- Updates to system will no longer be produced
- System has been replaced or discontinued.

6 / 6

## Work

### Initiated
- Work initiator and client known
- Work goal and constraints clear
- Sponsorship and funding model clear
- Priority of work clear

1 / 6

## Work

### Prepared
- Cost & effort understood
- Funding in place
- Resource availability and risk exposure understood
- Governance model is clear
- Integration and delivery points defined

2 / 6

## Work

### Started
- Development work has started
- Work progress is monitored
- Work broken down into actionable items with clear definition of done
- Team members are accepting and progressing work items

3 / 6

## Work

### Under Control
- Work going well, risks being managed, productivity levels acceptable
- Unplanned work & re-work under control
- Work items completed within estimates
- Measures tracked

4 / 6

## Work

### Concluded
- Work to produce results have been finished
- Work results are being achieved
- The client has accepted the resulting software system

5 / 6

## Work

### Closed
- All remaining housekeeping tasks completed, and work officially closed
- Everything has been archived
- Lessons learned and metrics made available

6 / 6

## Team

### Seeded
- Team's mission is clear
- Team knows how to grow to achieve mission
- Required competencies are identified
- Team size is determined

## Team

### Formed
- Team has enough resources to start the mission
- Team organization & individual responsibilities understood
- Members know how to perform work

2 / 5

## Team

### Collaborating
- Members working as one unit
- Communication is open and honest
- Members focused on team mission
- Success of team ahead of personal objectives

3 / 5

## Team

### Performing
- Team working efficiently and effectively
- Adapts to changing context
- Produce high quality output
- Minimal backtracking and re-work
- Waste continually eliminated

4 / 5

## Team

### Adjourned
- Team no longer accountable
- Responsibilities handed over
- Members available for other assignment

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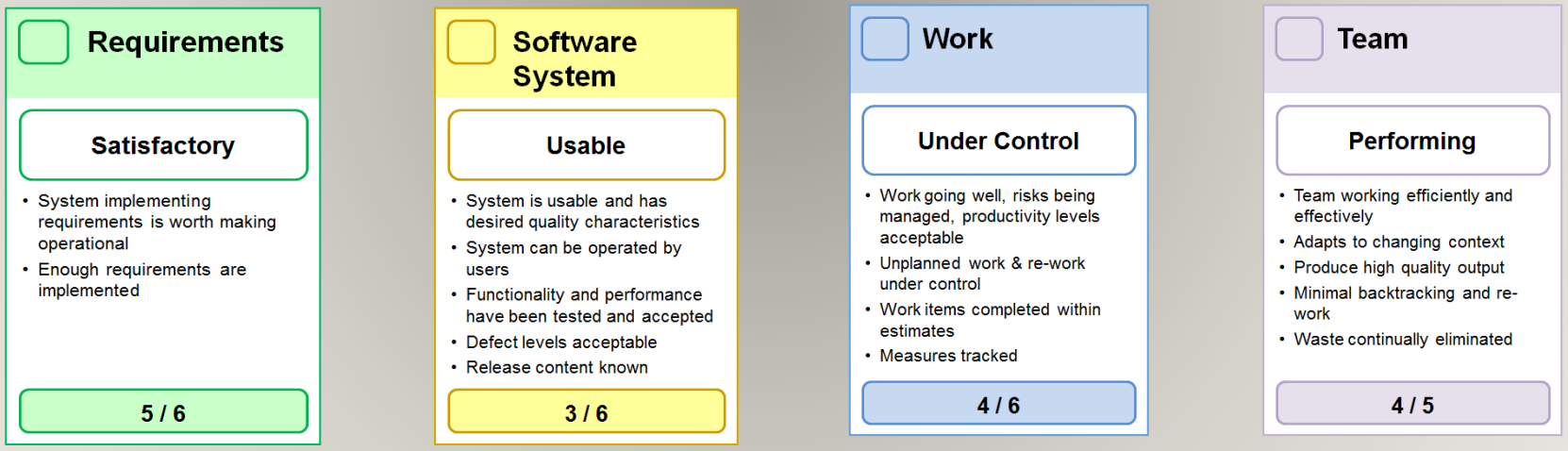
# Plan: Determine How to Achieve Next State

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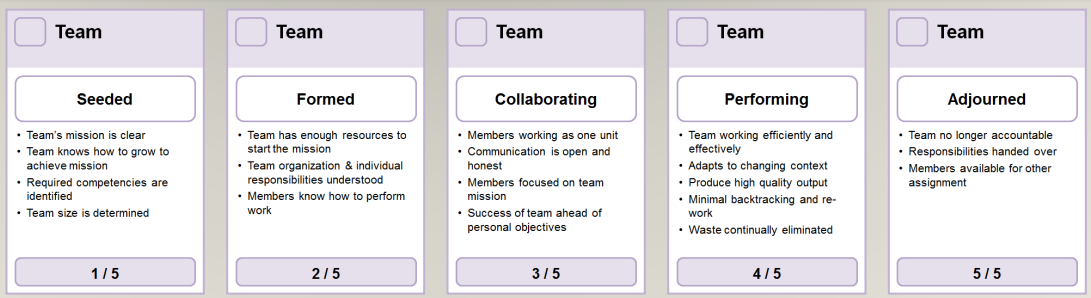
# Essence Kernel


Focus on states in seven essential things:

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

team

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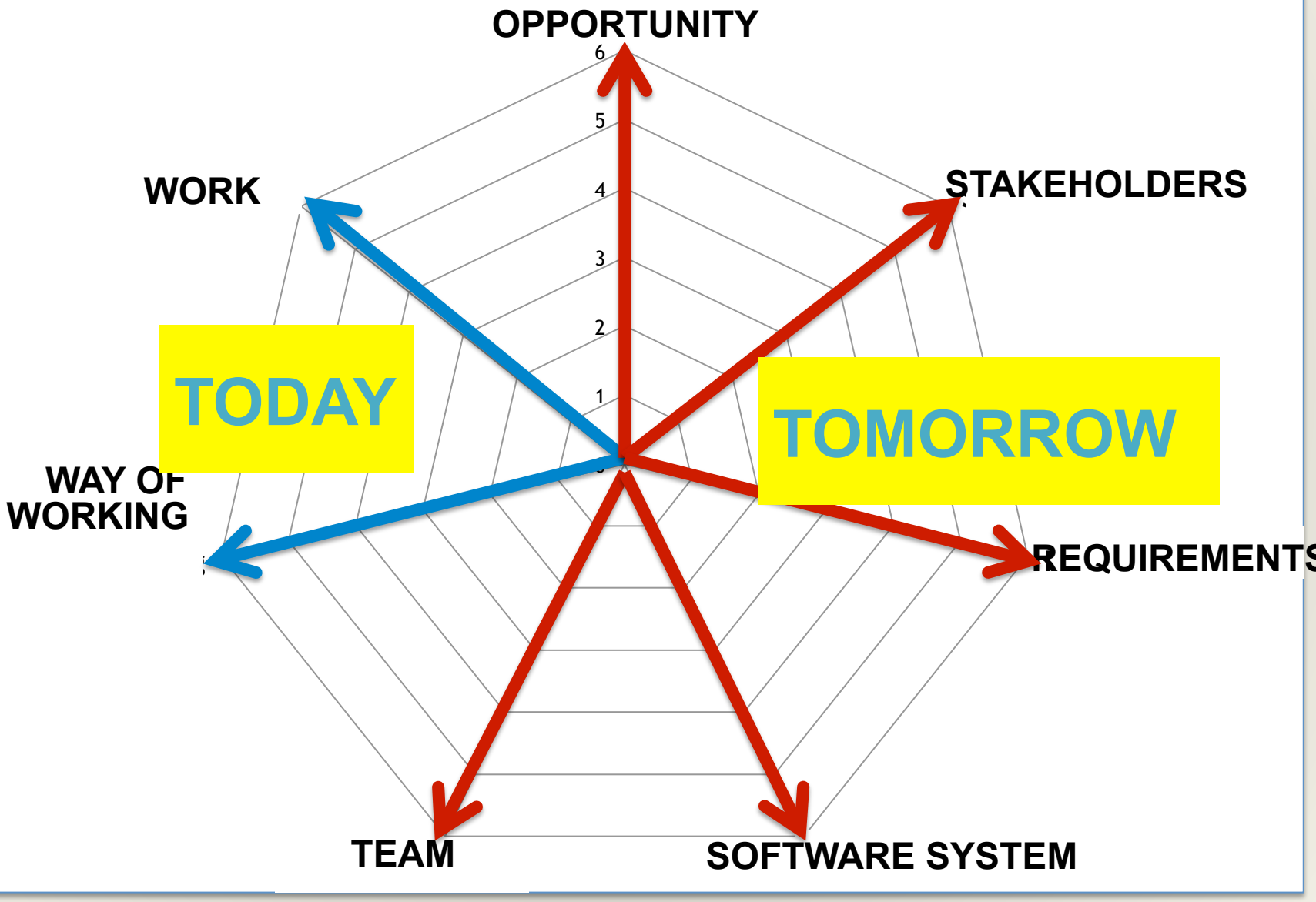
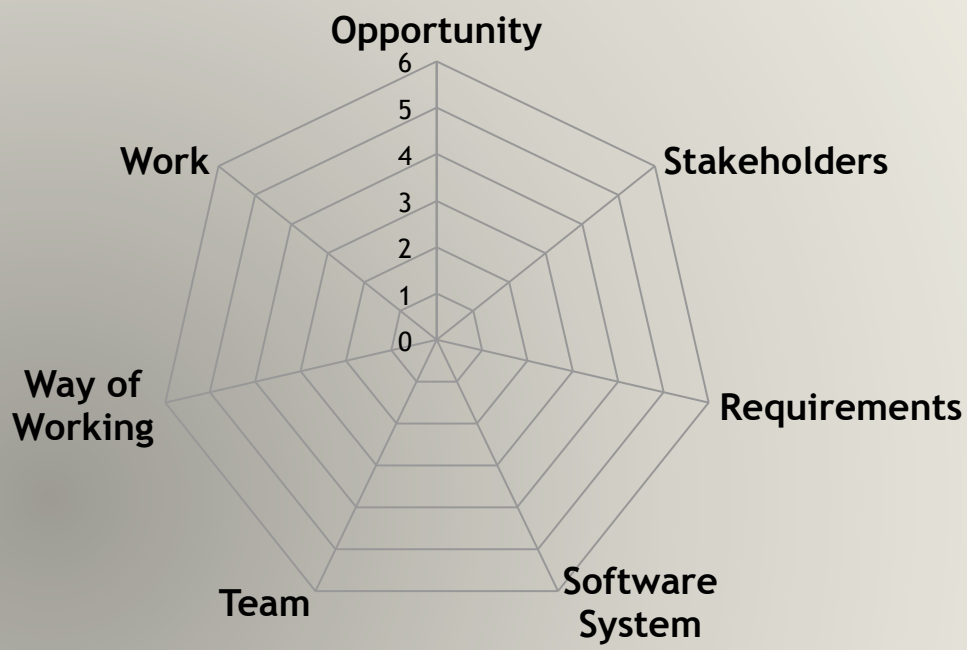
# Following essential things



# 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.<br>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.<br>The responsibilities of the stakeholder representatives have been defined. |
| Represented | The stakeholder representatives have agreed to take on their responsibilities.<br>The stakeholder representatives are authorized to carry out their responsibilities.<br>The collaboration approach among the stakeholder representatives has been agreed.<br>The stakeholder representatives support and respect the team's way of working. |
| Involved | The stakeholder representatives assist the team in accordance with their responsibilities.<br>The stakeholder representatives provide feedback and take part in decision making in a timely manner.<br>The stakeholder representatives promptly communicate changes that are relevant for |

# How does the Essence Kernel Work?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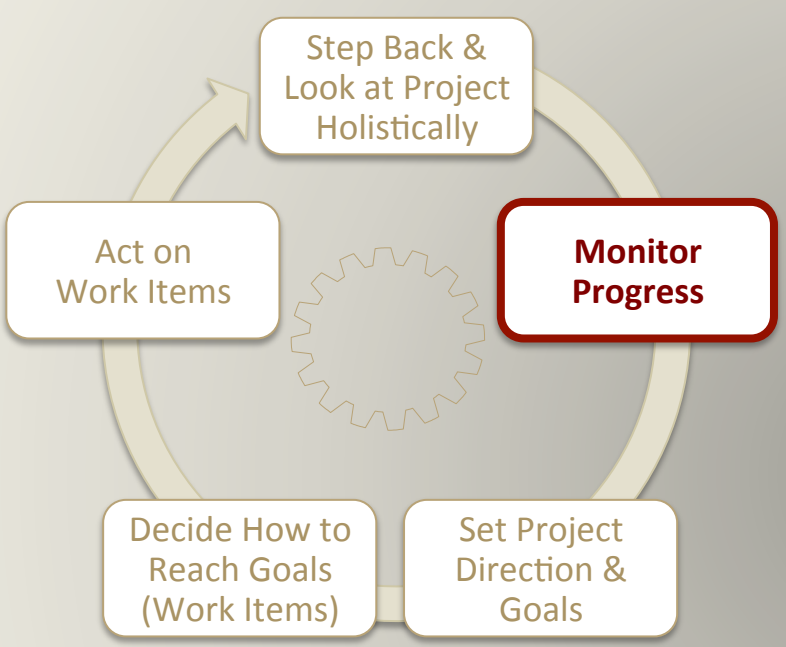


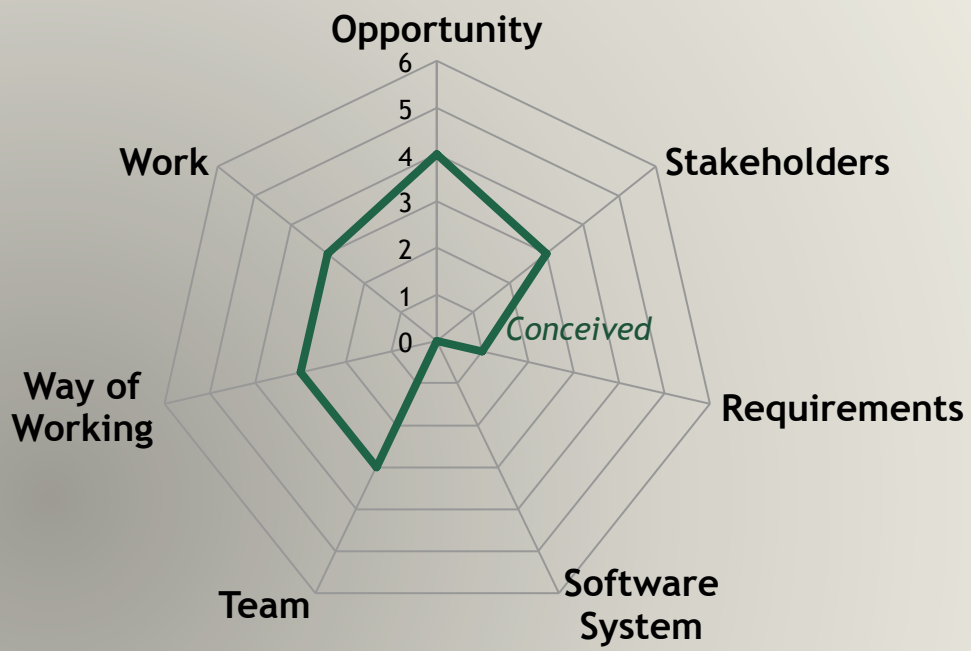


**Current State**

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

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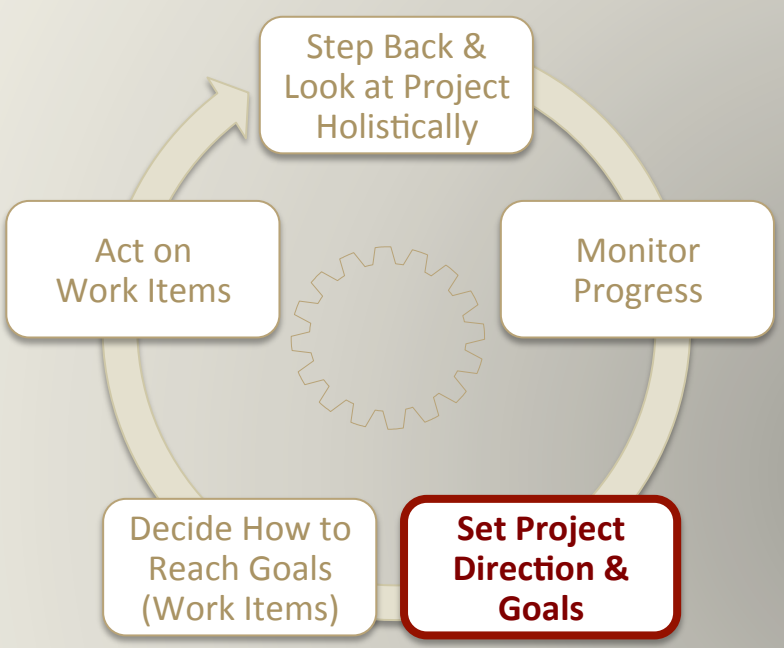
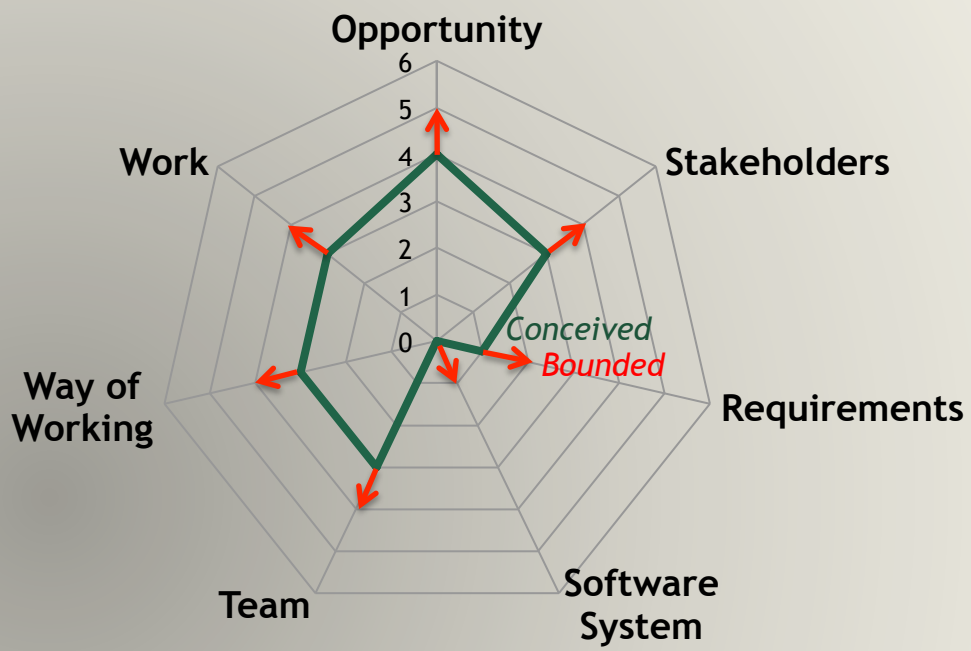
# How does the Essence Kernel Work?

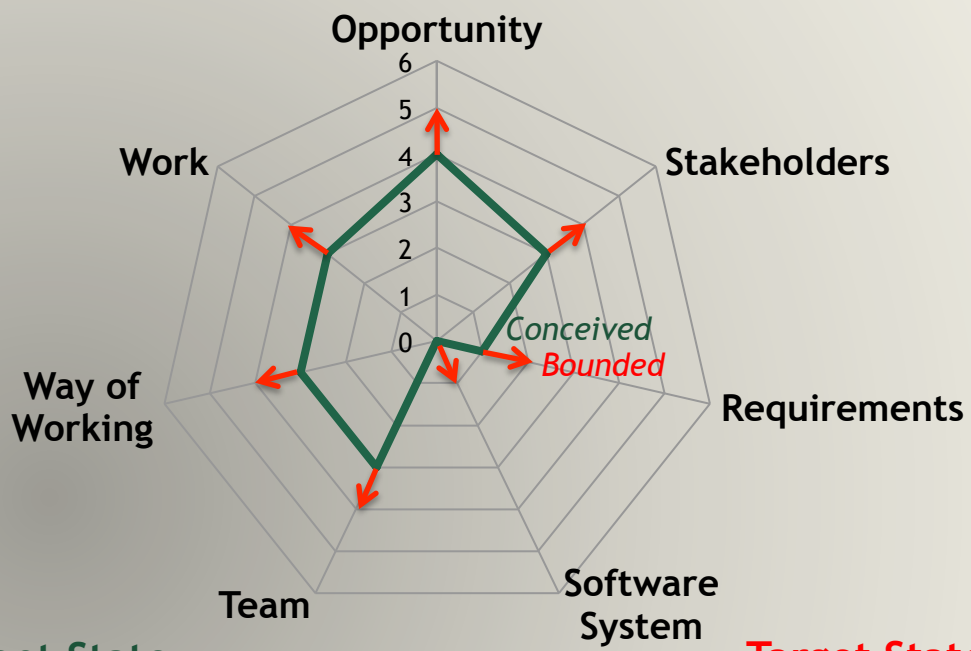



**Current State** | **Target State**

| Requirements | Requirements | Requirements | Requirements | Requirements | Requirements |
|---|---|---|---|---|---|
| **Conceived** | **Bounded** | **Coherent** | **Acceptable** | **Addressed** | **Fulfilled** |
| ▪ The need for a new system is clear<br>▪ Users are identified<br>▪ Initial sponsors are identified | The purpose and extent of the system are agreed<br>Success criteria are clear<br>▪ Mechanisms for handling requirements are agreed<br>▪ Constraints and assumptions identified<br>**Goals** | ▪ The big picture is clear and shared by all involved<br>▪ Important usage scenarios explained<br>▪ Priorities are clear<br>▪ Conflicts are addressed<br>▪ Impact is understood | ▪ Requirements describe a solution acceptable to the stakeholders<br>▪ The rate of change to agreed requirements is low<br>▪ Value is clear | ▪ Enough requirements are implemented for the system to be acceptable<br>▪ Stakeholders agree the system is worth making operational | ▪ The system fully satisfies the requirements and the need<br>▪ 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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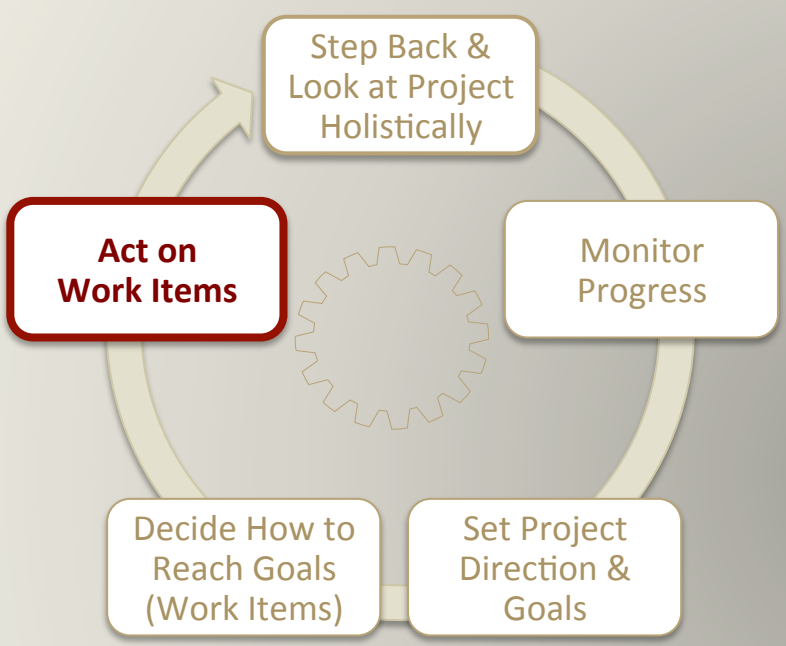
# How does the Essence Kernel Work?




**Work Items**

- ❑ Define Project Scope
- ❑ Clarify Success Criteria
- ❑ …
- ❑ …
- ❑ …
- ❑ …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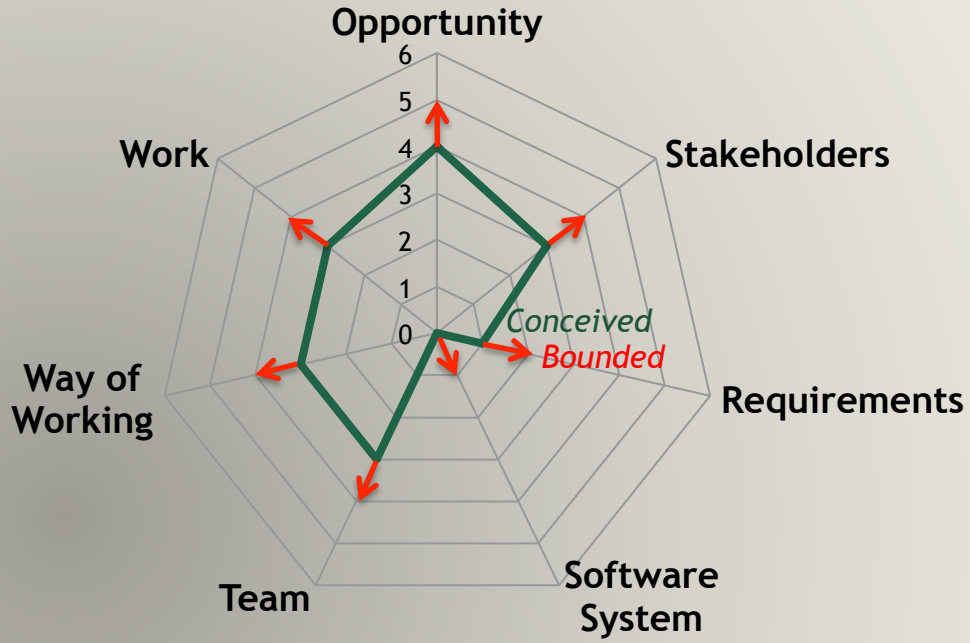
# Time has passed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TIME FOR A BREAK

# 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

# Scenario on Solving Pain Points

## Education Stream

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# Terminology used

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

# Scenario 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

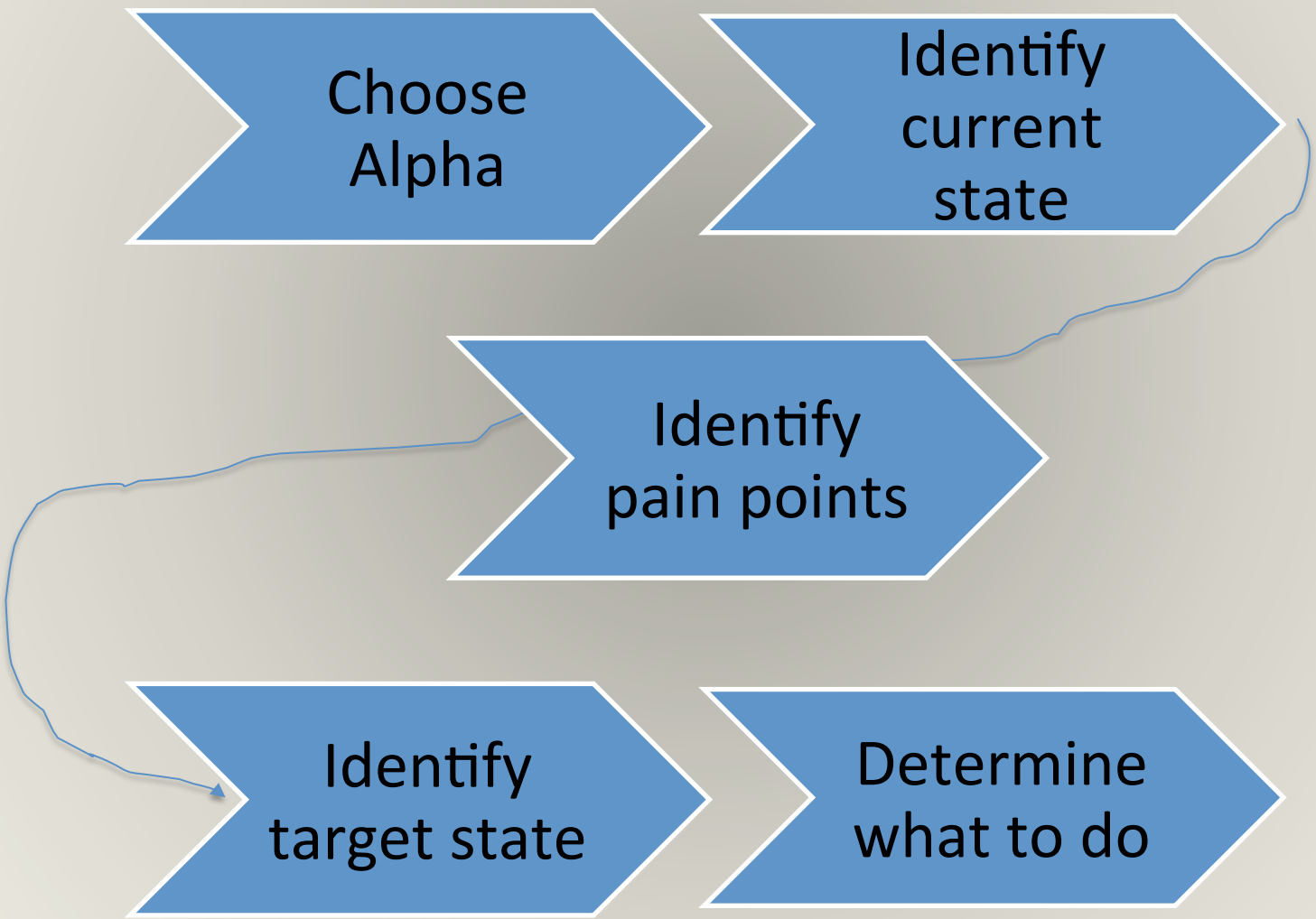
# Read on your own Scenario on Solving Pain Points pp. 2-9

# 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



# 1st Pain Point Identification

- The team brainstorms the 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

**Recognized**: 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.

**1 / 6**

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.

**2/ 6**

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

**The Represented state is the next Target state**

- the faculty group is not represented.

# 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.

**2/ 6**


# Tasks- *Stakeholders* Alpha

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

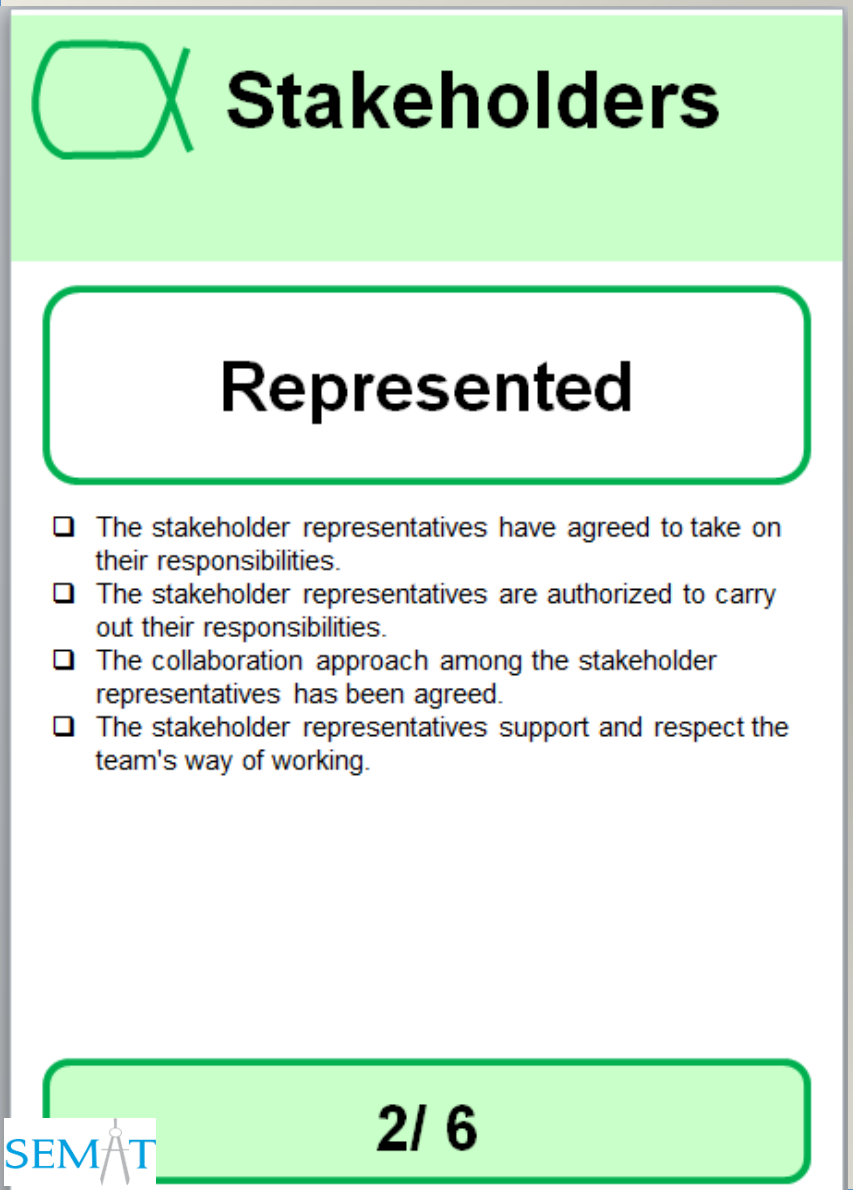
- ***Task 2***: Agree on or modify existing definition of responsibilities and collaboration approaches of the faculty representatives. Because of the iterative nature of the endeavor, the stakeholder need to agree on providing feedback on a regular basis.

# As a result. . .

- Tasks 1 and 2 receive attention

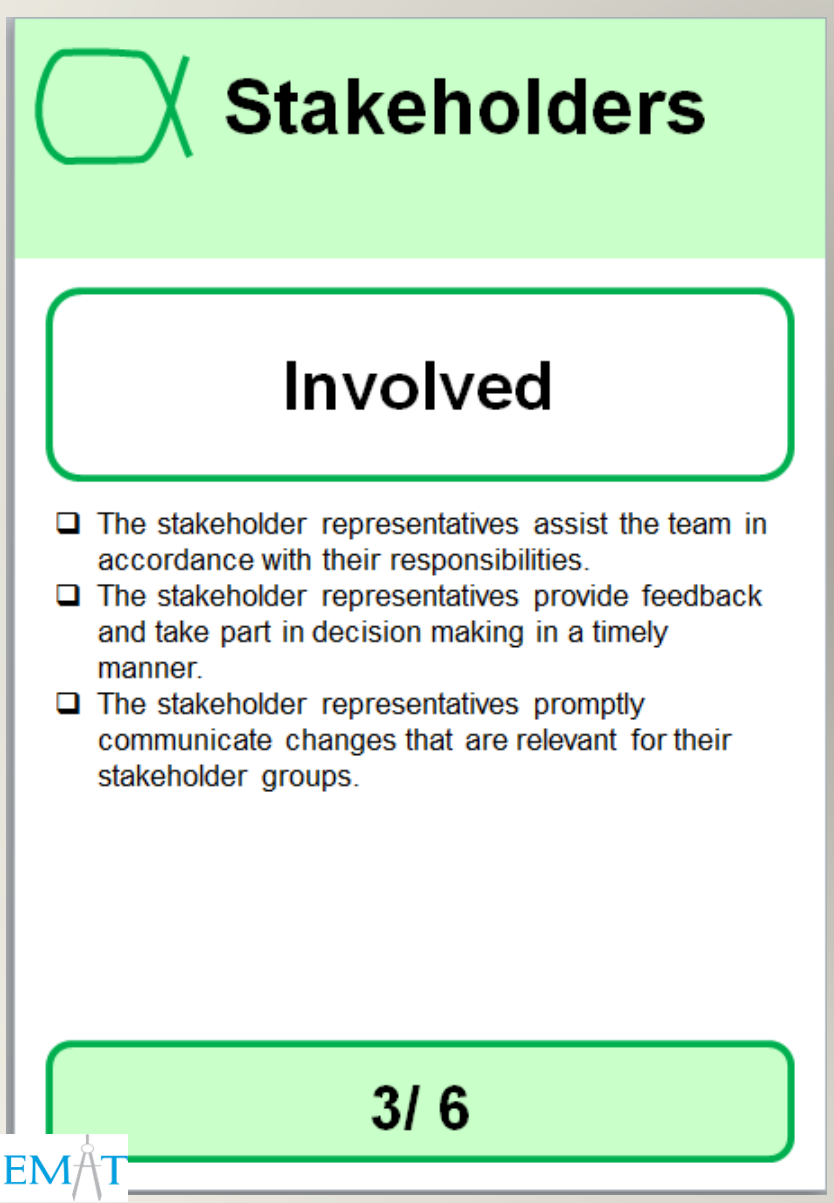
- In addition:
  - Engagement with other stakeholder groups continues
    - Administrators
    - Students
  - Work on the endeavor continues
  - To avoid over-burdening the team, additional alphas are introduced incrementally during future pain point intervention meetings

# 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




**Involved**: 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.

**3/ 6**

SEMAT

# 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

# 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


## Opportunity

### Identified

- An idea for a way of improving current *ways of working*, increasing market share or applying a new or innovative *software system* has been identified.
- At least one of the stakeholders wishes to make an investment in better understanding the opportunity and the value associated with addressing it.
- The other stakeholders who share the opportunity have been identified.

# 2nd PPI Meeting: Identify Ta… State – *Opportunity*

There is clearly a need for articulating and communicating the solution value to all faculty members.



## 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

## …rtunity

### …alue 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 s*oftware 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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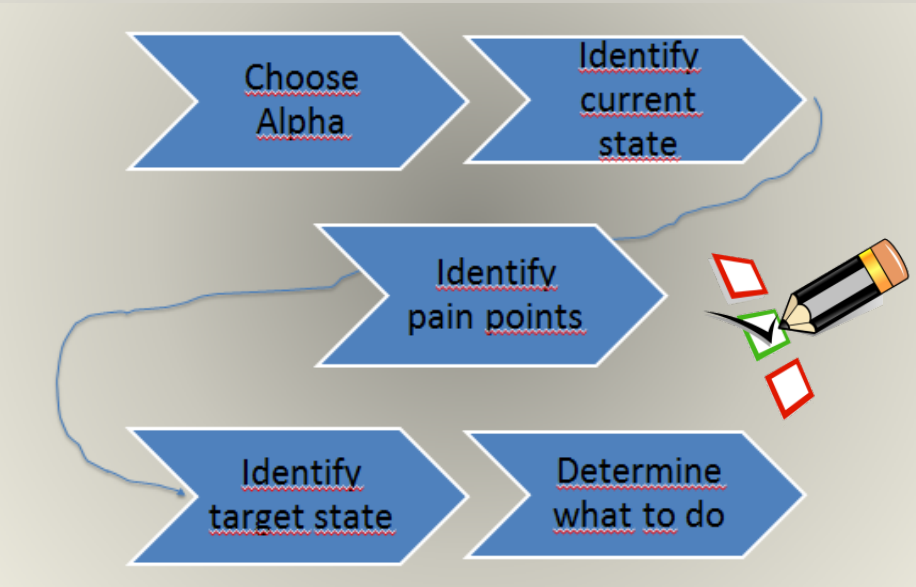
- Part 5: Kernel  cont. & Kernel Extensions

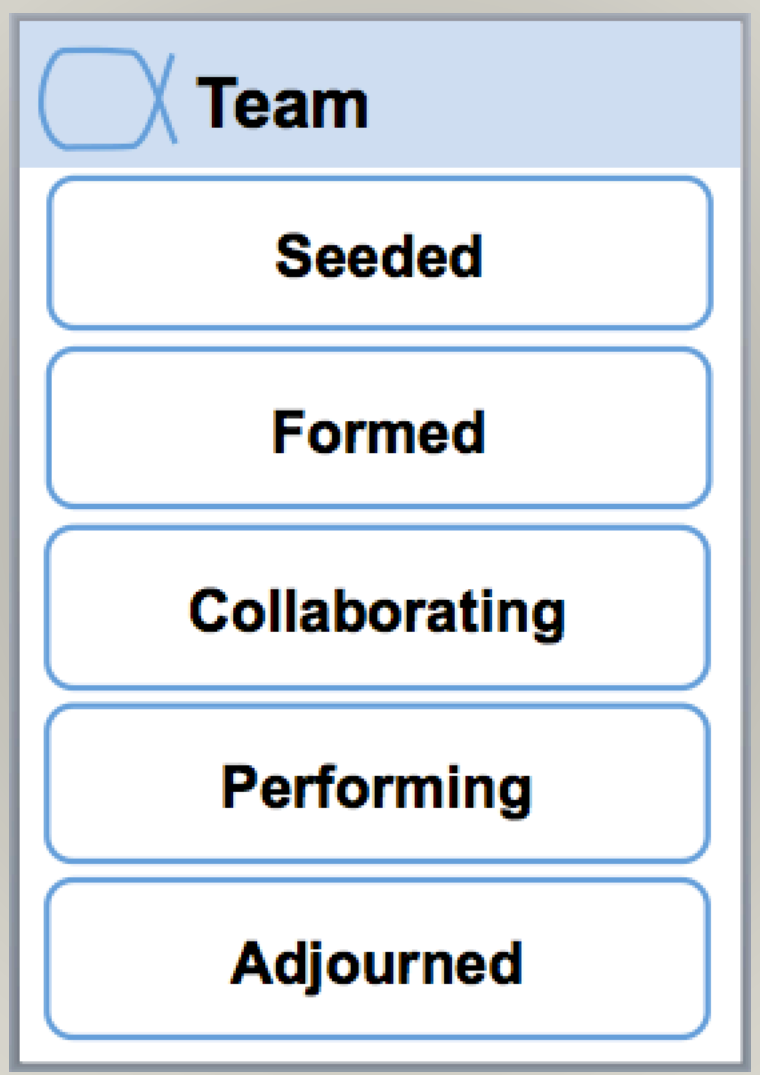
# Your turn!



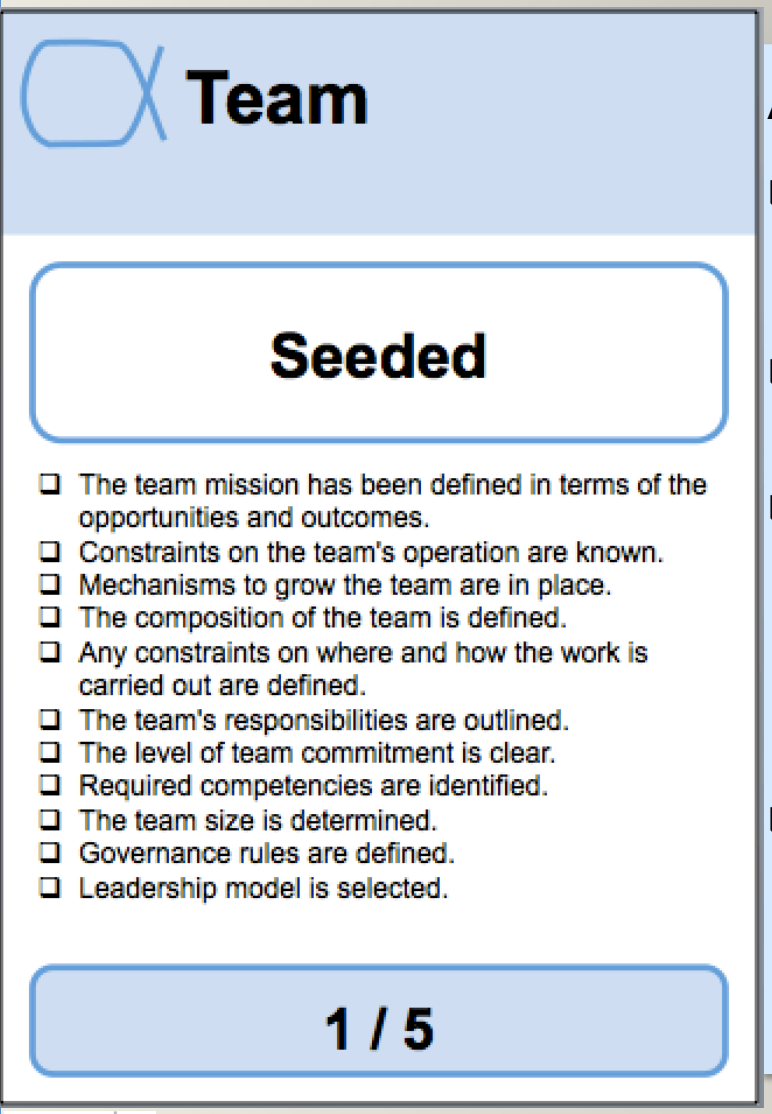

- Create a discussion group
- Read the handout for Scenario 2
- Assess the *Team* alpha
- Assess the *Requirements* alpha

# Directions for the discussion

# Let us share what we have found

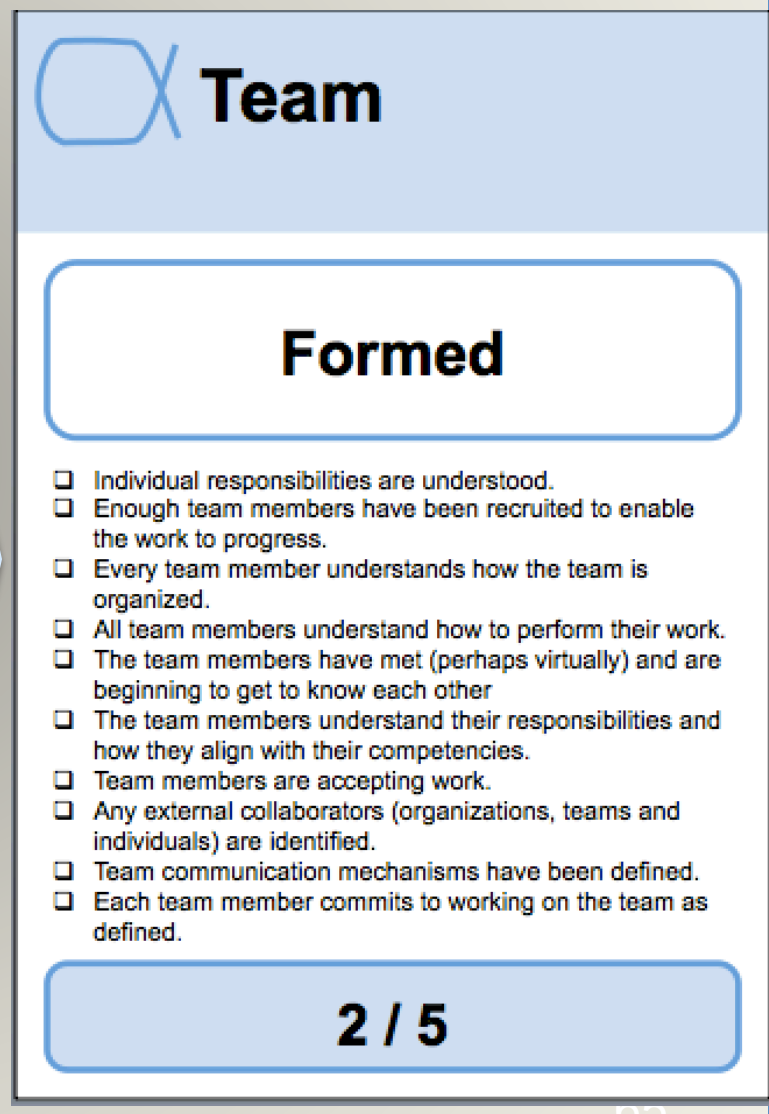


# One possible finding to share

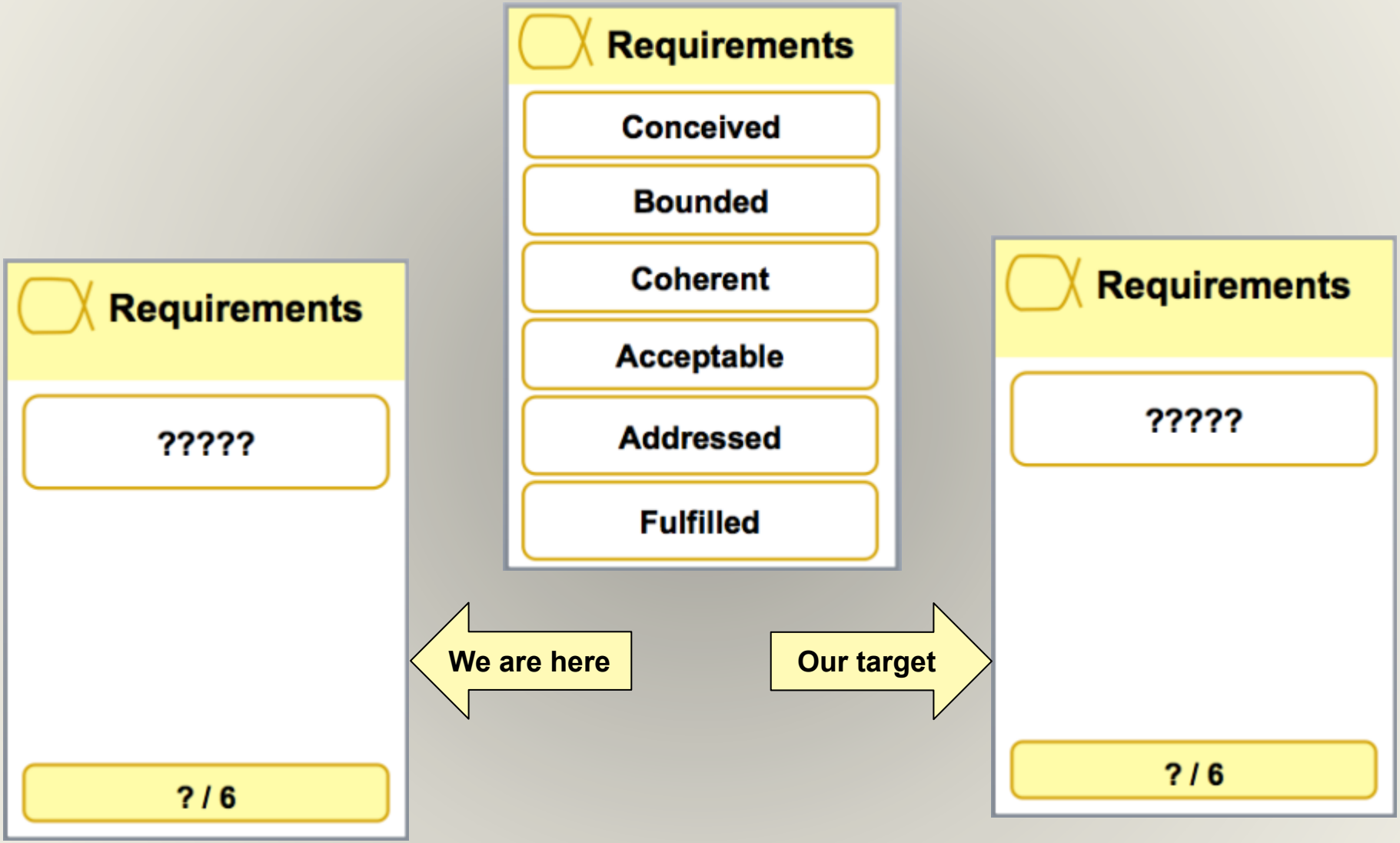



**Action Items:**

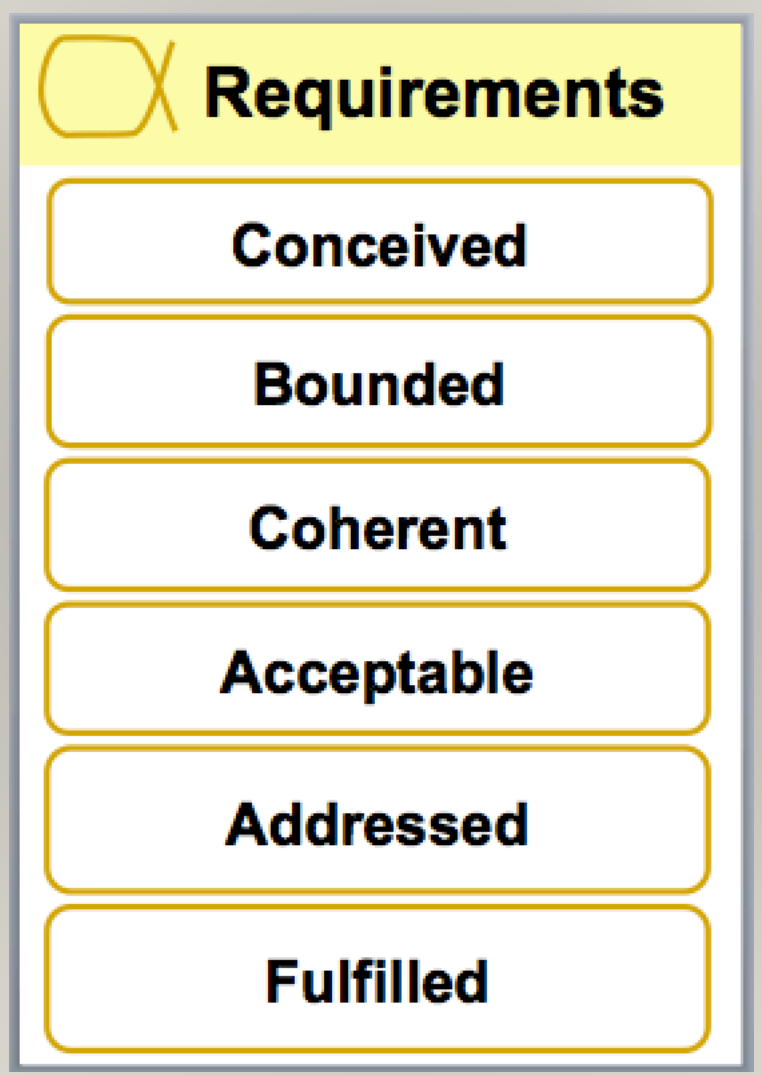
- ❑ Team needs to establish communication mechanisms
- ❑ Put a tool in place to track issues
- ❑ Team needs to work on how they deal with problems related to acceptance of stakeholders viewpoints
- ❑ Setup a session to talk about how to react to negative feedback



# Directions for the discussion



# Let us share what you have found



# One possible finding to share

## Requirements

### Coherent

- ❑ The requirements are captured and shared with the team and the stakeholders.
- ❑ The origin of the requirements is clear.
- ❑ The rationale behind the requirements is clear.
- ❑ Conflicting requirements are identified and attended to.
- ❑ The requirements communicate the essential characteristics of the system to be delivered.
- ❑ The most important usage scenarios for the system can be explained.
- ❑ The priority of the requirements is clear.
- ❑ The impact of implementing the requirements is understood.
- ❑ The team understands what has to be delivered and agrees to deliver it.

**3 / 6**

**Action Items:**

- ❑ Redefine requirement related to grading
- ❑ Obtain acceptance from faculty representatives

## Requirements

### Acceptable

- ❑ The stakeholders accept that the requirements describe an acceptable solution.
- ❑ The rate of change to the agreed requirements is relatively low and under control.
- ❑ The value provided by implementing the requirements is clear.
- ❑ The parts of the opportunity satisfied by the requirements are clear.
- ❑ The requirements are testable.

**4 / 6**

# Summary: In this scenario …

- We have acquainted ourselves with the Kernel Alphas
- We have 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 have 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 have also learned that
  - the Essence kernel provides a holistic approach to assess the health and the progress of a software project

# Agenda

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- Part 5: Kernel  cont. & Kernel Extensions

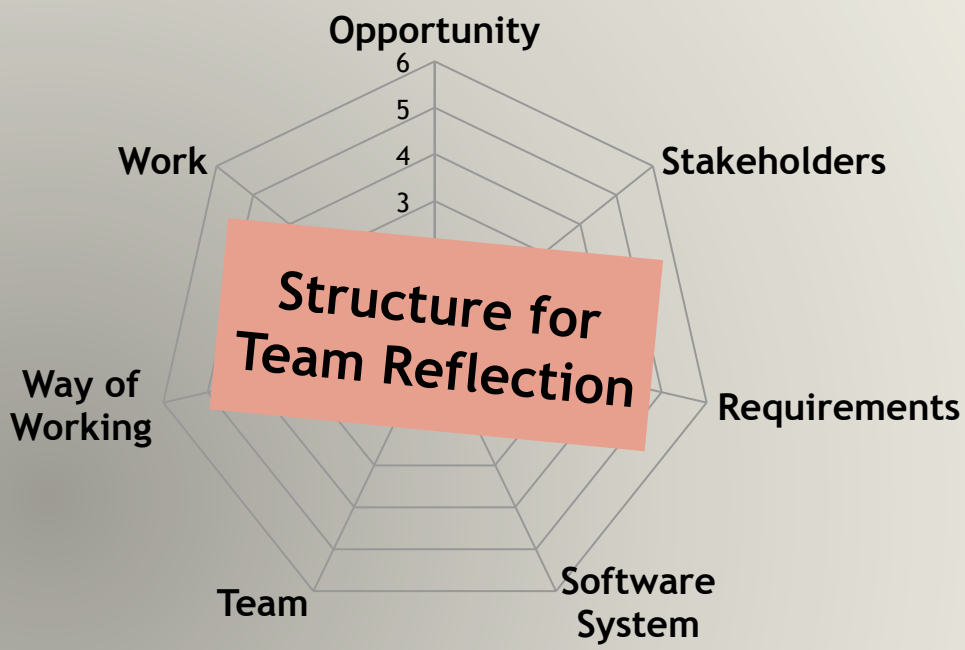
# Essence Kernel Value

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:**

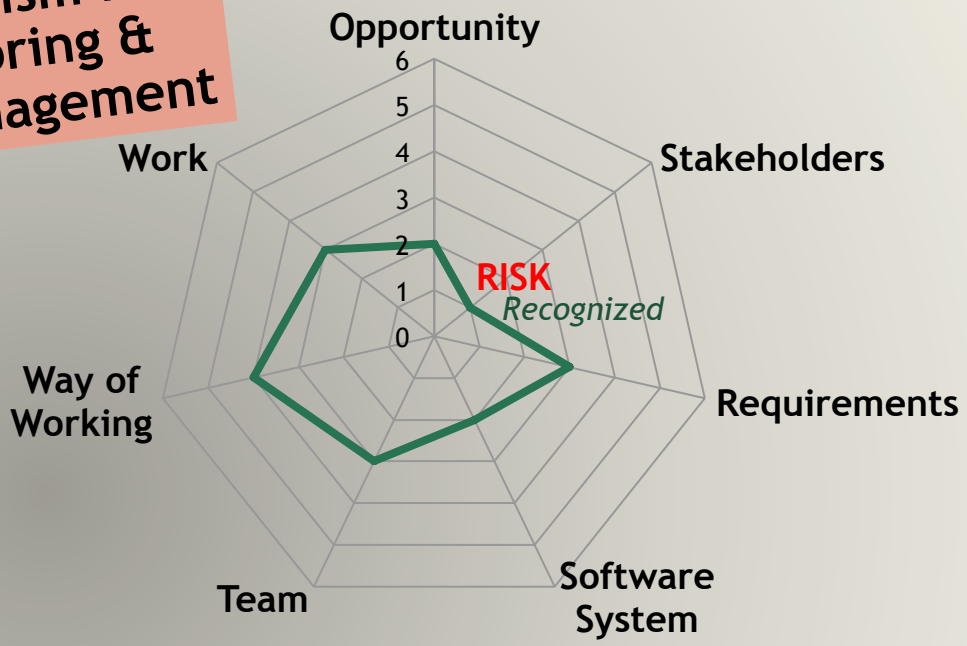
*"Essence gives us a chance to back up and look at the project as a whole, from the birds point of view."*

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

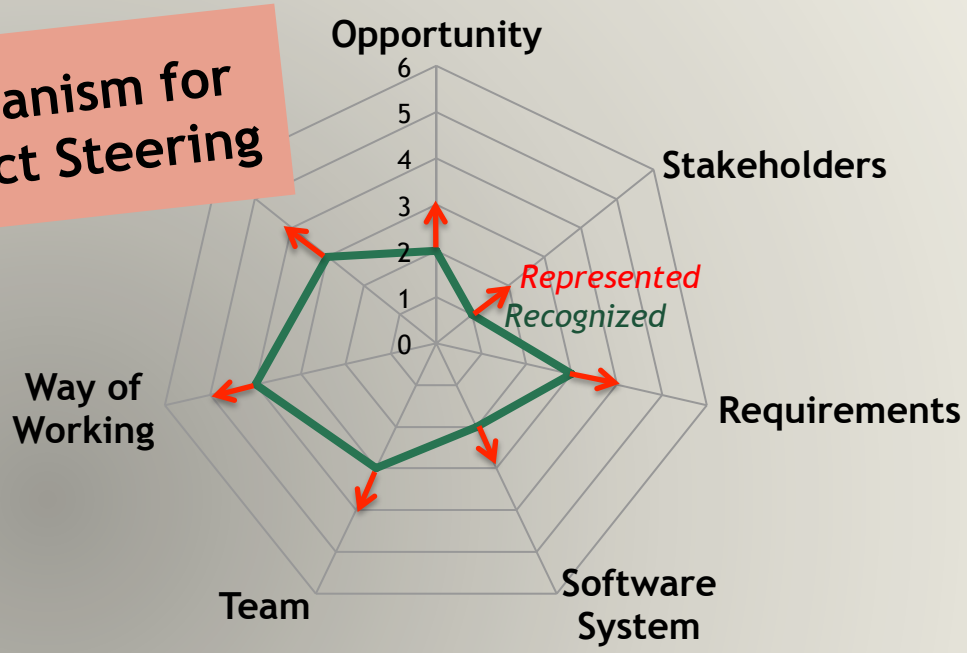
Cécile Péraire

SEMAT

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

Cécile Péraire

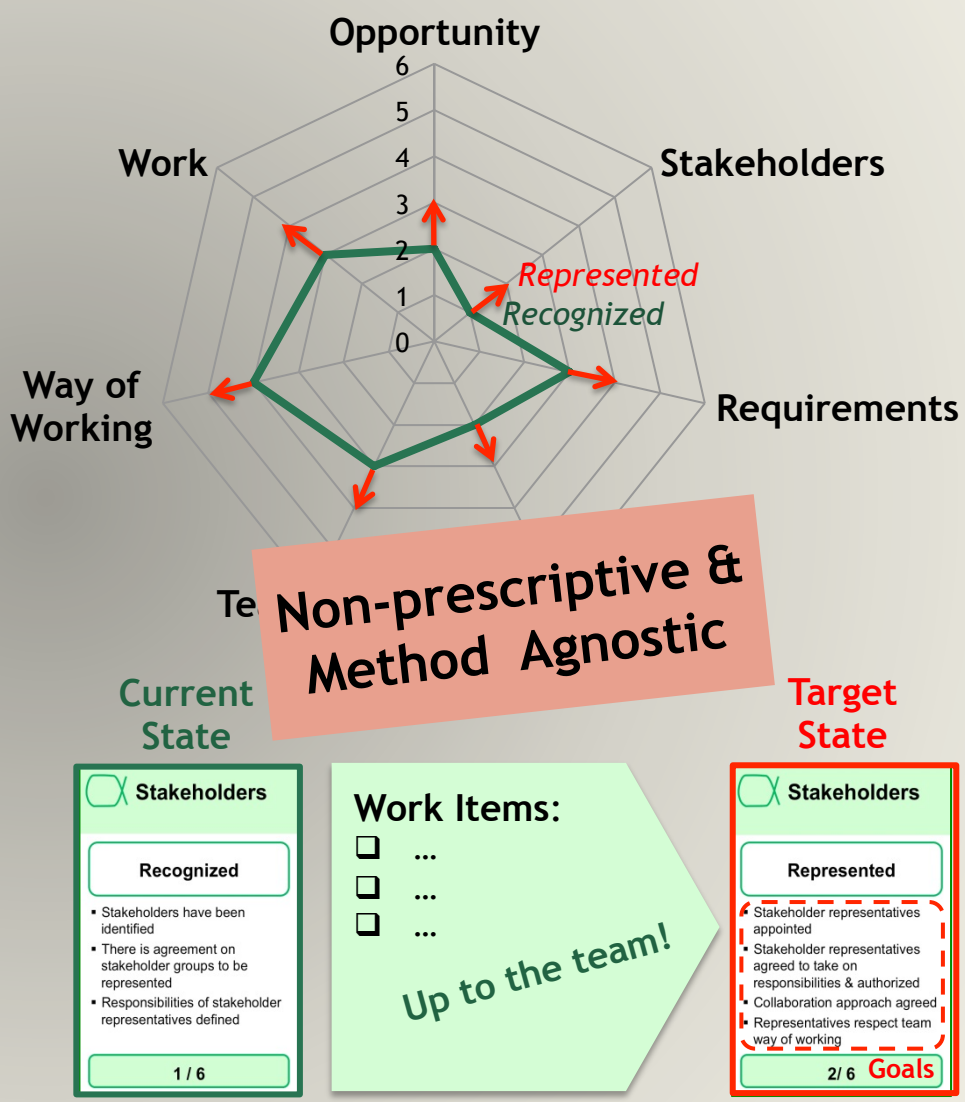
SEMAT

# 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."*





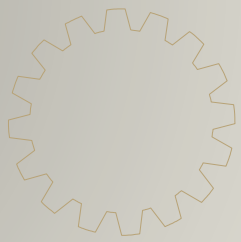

Cécile Péraire

# Essence Kernel Value

How does the approach provide value to the project team?

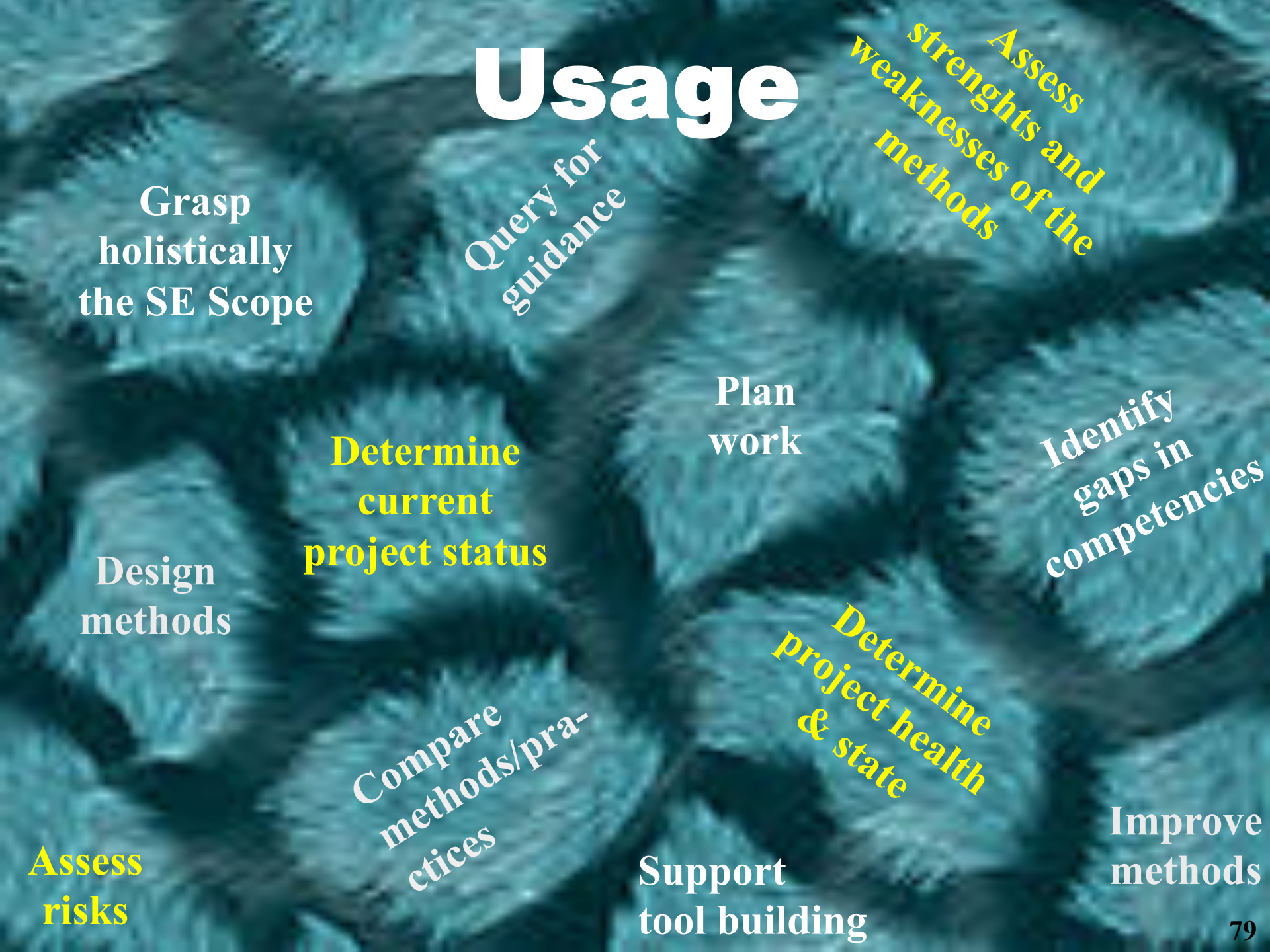
**The Essence kernel provides a structure and mechanism for:**

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



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

# Usage


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

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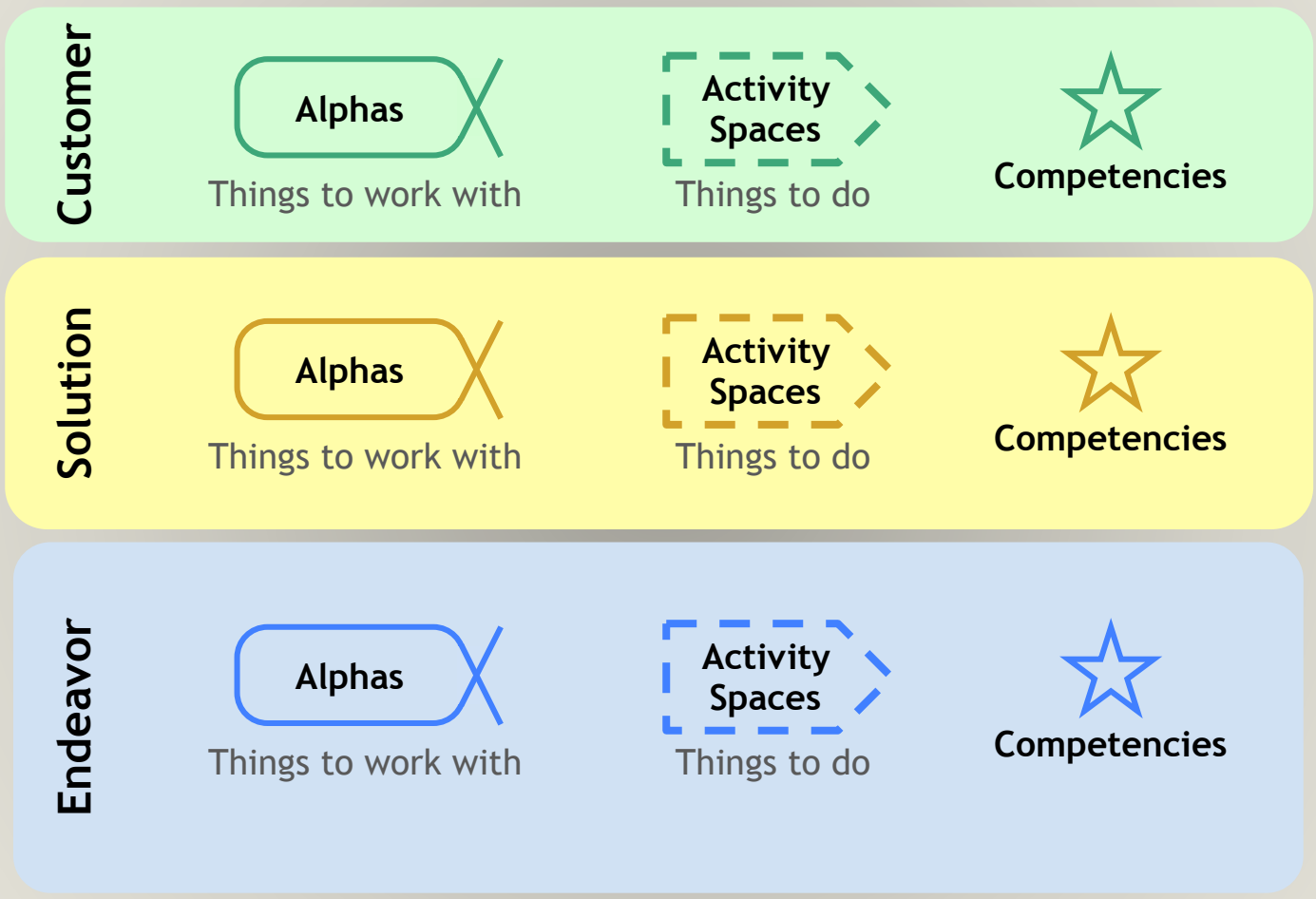
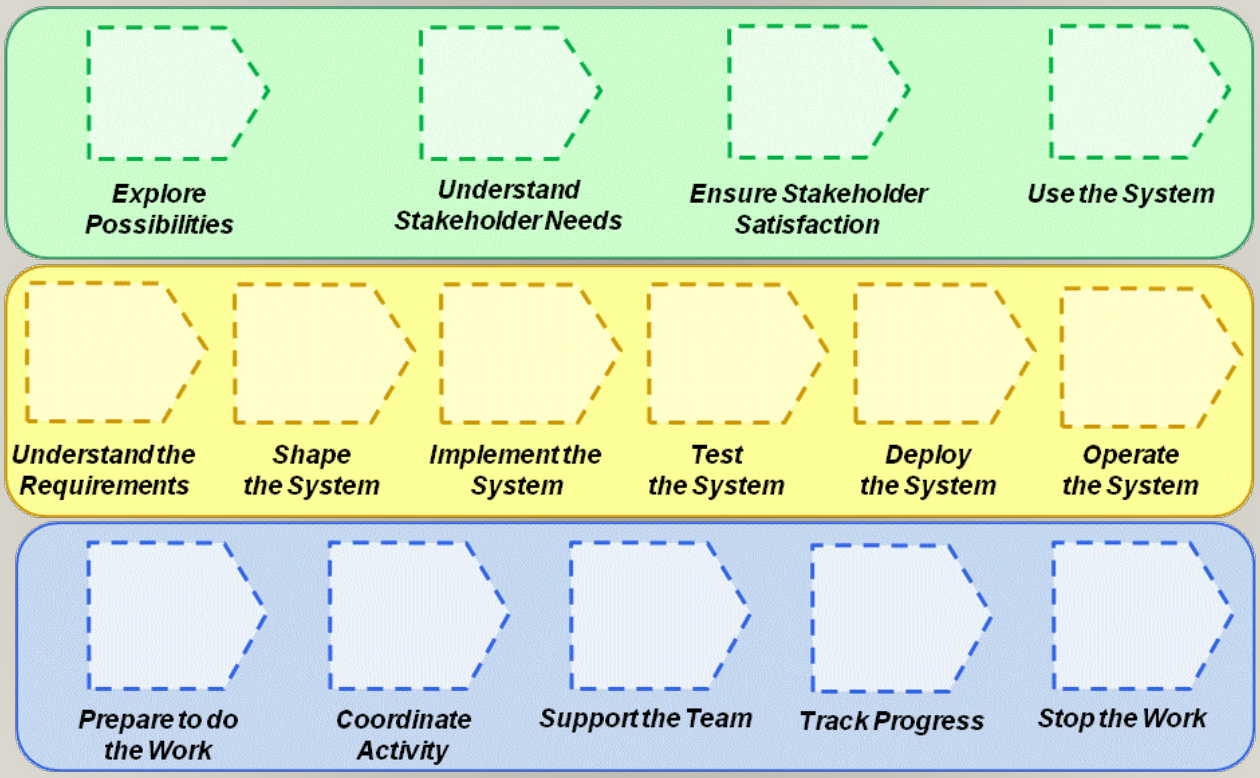
# Essence Kernel

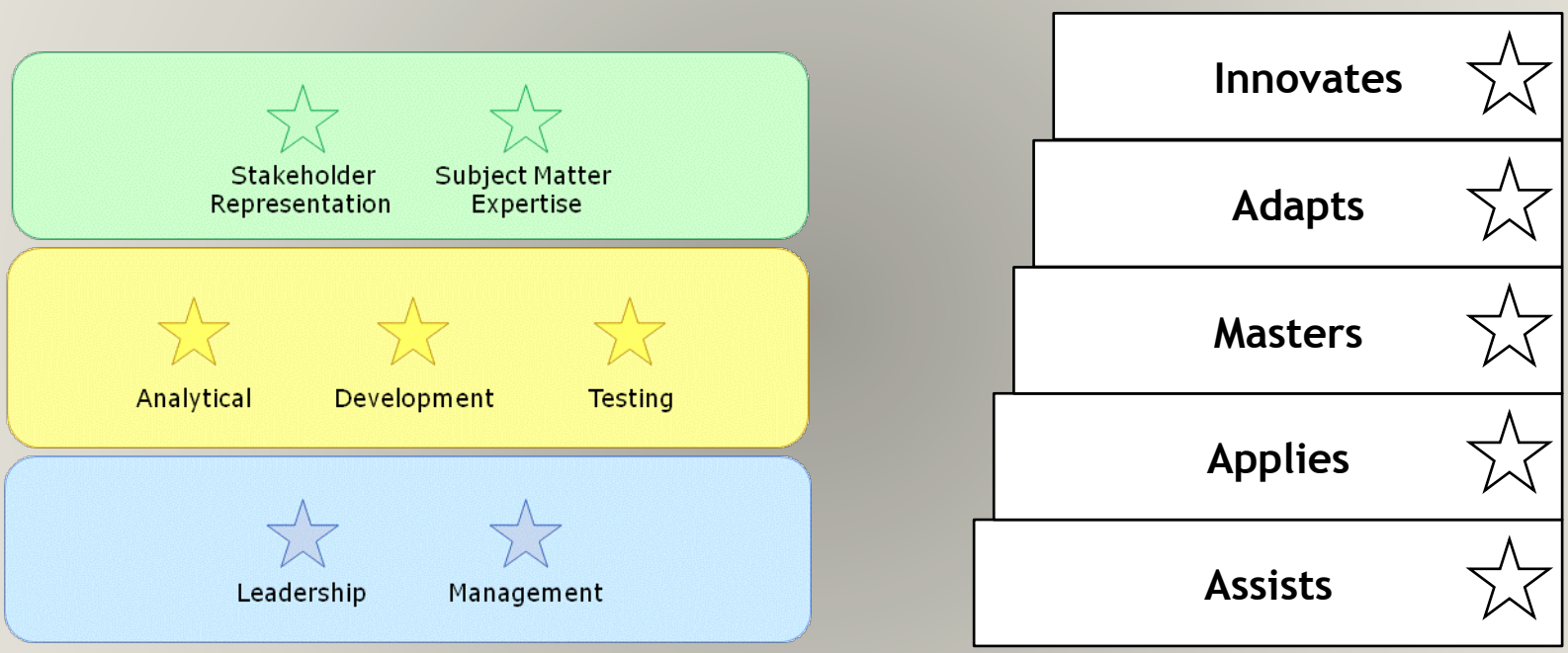


# Activity Spaces – Things To Do



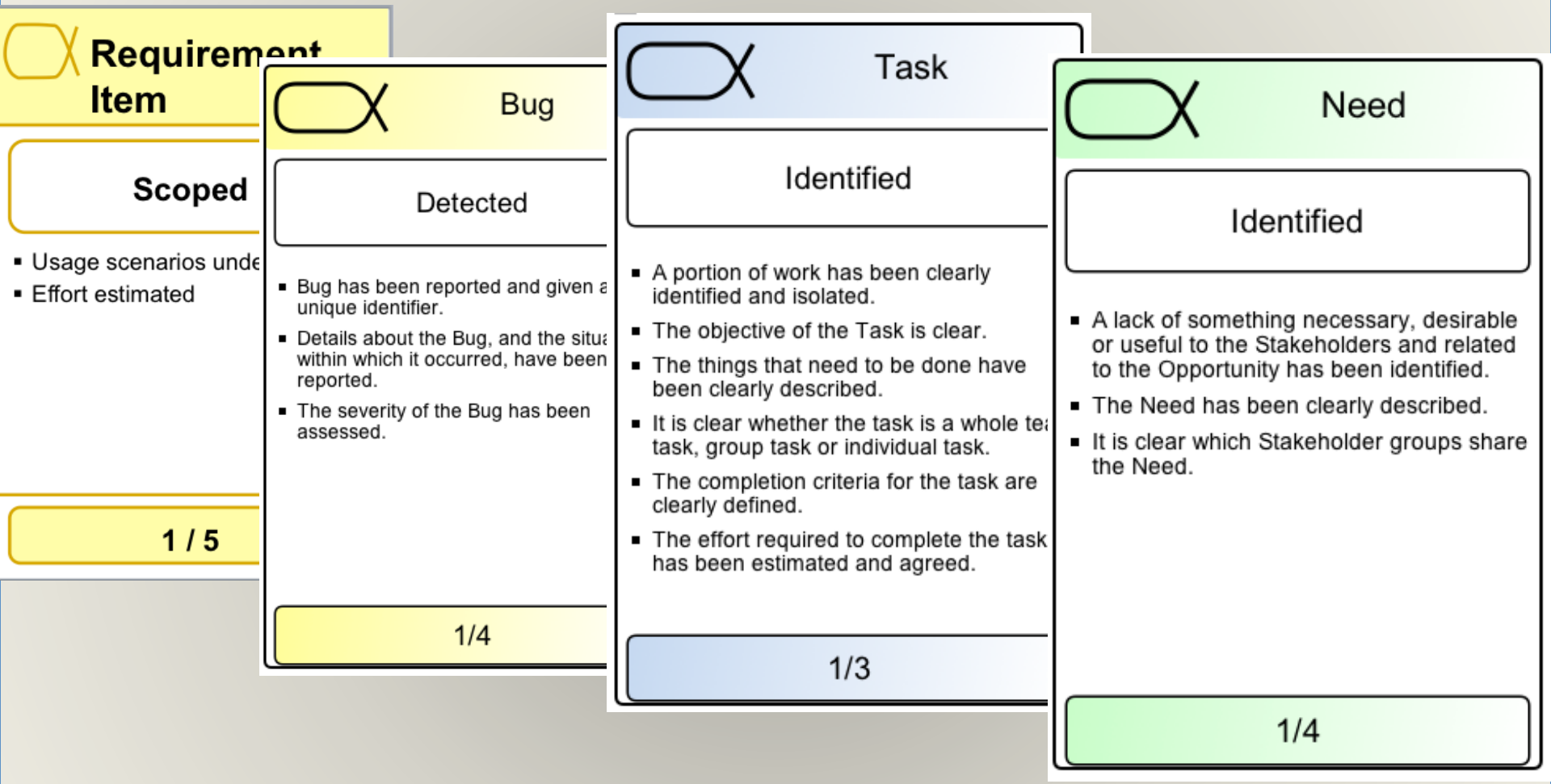

Activity based view of software engineering

# Competencies



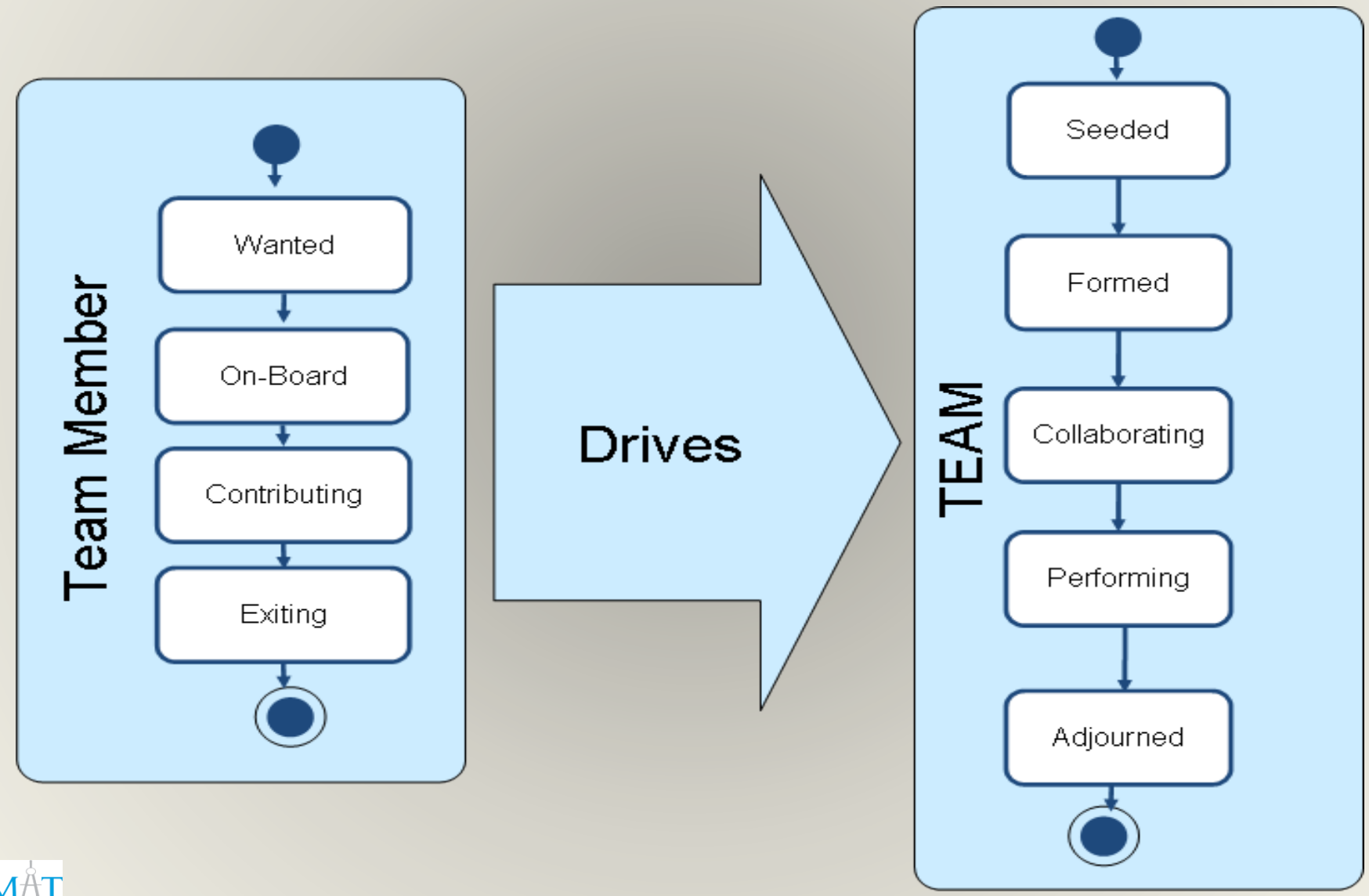

View of key competencies needed in software engineering

# Sub-Alphas

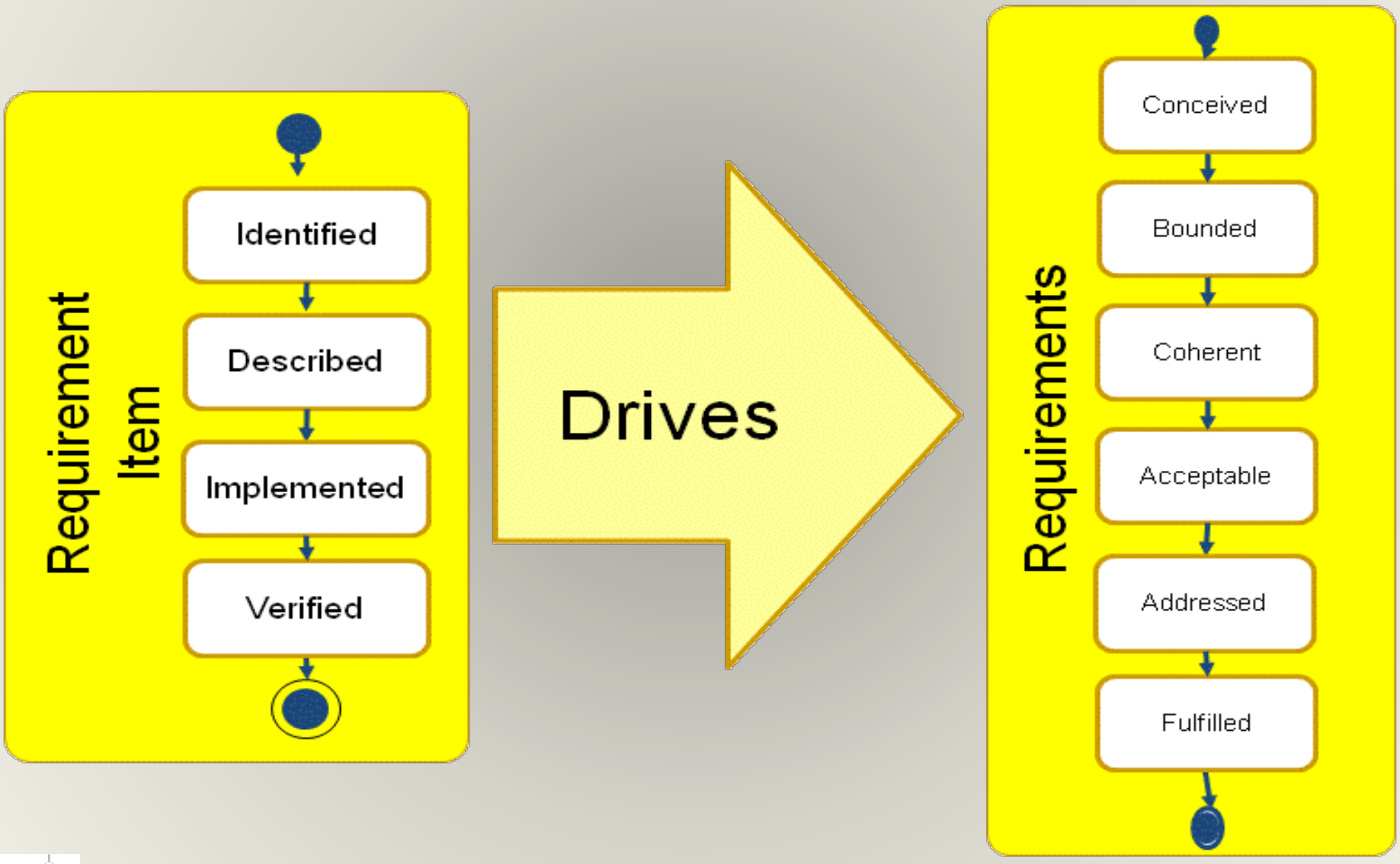



Sub-alphas could be added to the Kernel's alphas to monitor and steer other aspects of the project as needed (like user stories, bugs, tasks, etc.)

# Sub-Alpha: Team Member



# Sub-Alpha: Requirements Item



# References


- Semat.org
- Ivar Jacobson and all. The Essence of Software Engineering: The SEMAT Kernel, acmqueue, 2012.
- Ivar Jacobson and all. Agile and SEMAT - Perfect Partners, acmqueue, 2013
- Ivar Jacobson and all. The Essence of Software Engineering: Applying the SEMAT Kernel, Addison-Wesley, 2013.
- Cécile Péraire and Todd Sedano. State-based Monitoring and Goal-driven Project Steering: Field Study of the SEMAT Essence Framework, ICSE'14, 2014. http://works.bepress.com/cecile_peraire/1/
- Cécile Péraire and Todd Sedano. Essence Reflection Meetings: Field Study, EASE'14, 2014. http://works.bepress.com/cecile_peraire/31/
- SEMAT Essence Kernel Tool, http://essence.sv.cmu.edu


THANKS!