WELCOME

SCARECROW CONSULTANTS
Overview

• Introduction
• A (Brief) Overview of the FAF
• The Evidence Pattern
• Summary
• Questions
1. Introduction

• The Evidence Pattern came out of idea suggested by Colin Wood at MBSE WG Meeting
  – Transport Catapult – 2014-05-12
• Developed by Simon Perry & Scarecrow
• Presented below as a set of FAF Views
2. A (Brief) Overview of the FAF

- The FAF (Framework for Architectural Frameworks) was developed to improve the definition of Architectural Frameworks (AFs)
  - Also used to define Patterns

- The FAF is designed to force anyone defining an AF or Pattern to consider the following six questions:
  - What is the purpose of the AF/Pattern?
  - What domain concepts must the AF/Pattern support?
  - What viewpoints are required?
  - What is the purpose of each viewpoint?
  - What is the definition of each viewpoint in terms of the identified domain concepts?
  - What rules constrain the use of the AF/Pattern?
The Framework for Architectural Frameworks (FAF)

• The FAF addresses the six questions through an MBSE approach based around the ideas of ontology, viewpoints and framework

• Ontology
  – Define concepts and relationships between them

• Viewpoints and Framework
  – Define viewpoints organised into a framework
  – Viewpoints can only use concepts from the ontology

• FAF consists of:
  – An ontology
  – Six viewpoints
  – Supporting processes

The FAF is defined using the FAF
The FAF Viewpoints

• AF Context Viewpoint (AFCV)
  – What is the purpose of the AF?
    • Defines the context for the AF
    • Represents the AF concerns in context, establishing why the AF is needed

• Ontology Definition Viewpoint (ODV)
  – What domain concepts must the AF support?
    • Defines the ontology for the AF
    • Derived from the AF Context Viewpoint & and defines concepts that can appear on a Viewpoint

• Viewpoint Relationships Viewpoint (VRV)
  – What viewpoints are required?
    • Shows the relationships between the Viewpoints that make up an AF
    • Groups them into perspectives. It is derived from the Ontology Definition Viewpoint
The FAF Viewpoints continued

• Viewpoint Context Viewpoint (VCV)
  – What is the purpose of each viewpoint?
    • Defines the context for a particular Viewpoint
    • Represents the Viewpoint concerns in context for a particular Viewpoint, establishing why the Viewpoint is needed. It is derived from the AF Context Viewpoint

• Viewpoint Definition Viewpoint (VDV)
  – What is the definition of each viewpoint in terms of the identified domain concepts?
    • Defines a particular Viewpoint
    • Shows the Viewpoint Elements (and hence the Ontology Elements) that appear on the Viewpoint

• Rules Definition Viewpoint (RDV)
  – What rules constrain the use of the AF?
    • Defines the various rules that constrain the AF
«perspective»
Architectural Perspective

«viewpoint»
AF Context Viewpoint

«viewpoint»
Ontology Definition Viewpoint

«viewpoint»
Rules Definition Viewpoint

«viewpoint»
Viewpoint Context Viewpoint

«viewpoint»
Viewpoint Definition Viewpoint

«viewpoint»
Viewpoint Relationships Viewpoint

The Rules Definition Viewpoint is related to ALL the other Viewpoints and defines the Rules that constrain the Architectural Framework. Relationships to other Viewpoints are omitted from this diagram for clarity.

{The Rules Definition Viewpoint is related to ALL the other Viewpoints and defines the Rules that constrain the Architectural Framework. Relationships to other Viewpoints are omitted from this diagram for clarity.}

«viewpoint»
defines viewpoints using elements from

1..*

«viewpoint»
defines viewpoint to meet needs from

1

«viewpoint»
defines relationships between viewpoints defined in

1
3. The Evidence Pattern

• Will be presented using FAF Views
  – AFCV
  – ODV
  – VRV
  – RDV
  – VCV, VDV & example for each of the Pattern’s four Viewpoints:
    • Claim Definition Viewpoint
    • Argument Viewpoint
    • Evidence Viewpoint
    • Counter-Claim Viewpoint
3.1 AFCV showing Evidence Pattern aims

- Support definition of evidence-based claims
- Ensure linking relationships are established
- Allow claims to be made
- Allow supporting arguments to be established
- Allow reinforcing evidence to be established
- Must allow counter-claims to be made
- Claimant
- Refuter
- «concern»
- «include»
- «constrain»
- «include»
- «include»
- «include»
- «include»
3.2 ODV showing Evidence Pattern concepts
3.3 VRV showing Evidence Pattern Viewpoints

VRV [Package] Overview [Viewpoint Relationship View showing Evidence Pattern Viewpoints]

«viewpoint»
Claim Definition Viewpoint

0..* counters items on

0..* shows the arguments that support claims on

1

Argument Viewpoint

1..*

0..*

0..*

0..*

0..*

1..*

0..*

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Evidence Pattern Viewpoints

• Claim Definition Viewpoint
  – Used to define Claims for a particular Subject and to show who made the Claims

• Argument Viewpoint
  – Used to show the Arguments that support a Claim

• Evidence Viewpoint
  – Used to show the Evidence that reinforces Arguments

• Counter-Claim Viewpoint
  – Used to make Counter-Claims (or supporting Claims) about Claimable Items
### 3.4 RDV showing Evidence Pattern Rules

<table>
<thead>
<tr>
<th>Rule EP01</th>
<th>Rule EP02</th>
<th>Rule EP03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every Claim must be supported by at least one Argument.</td>
<td>Every Argument must be reinforced by at least one Evidence.</td>
<td>Every Claim must be made by a defined Claimant.</td>
</tr>
</tbody>
</table>

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<tr>
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<tbody>
<tr>
<td>Every Claim must be made about an identified Subject.</td>
<td>As a minimum one Claim Definition View, one Argument View and one Evidence View must be produced.</td>
<td>A Counter-Claim View must have EITHER one Claim OR one Counter-Claim and at least one Claimable Item (Claim, Counter-Claim, Argument, Claim-Argument Link, Evidence or Argument-Evidence Link) that the Claim or Counter-Claim supports or counters.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rule EP07</th>
</tr>
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<tbody>
<tr>
<td>The Claimable Items that appear on a Counter-Claim View must appear on another relevant View. E.g. an Argument that appears on a Counter-Claim View must also appear on an Argument View etc.</td>
</tr>
</tbody>
</table>
3.5 VCV showing Claim Definition Viewpoint aims

VCV [Package] Claim Definition Viewpoint (CDVp) [Viewpoint Context View showing Claim...
«concern»
Allow claims to be... linking relationships are established
Claim Definition Viewpoint Context
«include»
«include»

Claimant

«concern»
Ensure linking relationships are established

«include»
Support definition of evidence-based claims

«concern»
Allow claims to be made

«include»
«include»
VDV showing the Ontology Elements that appear on the Claim Definition Viewpoint
Example CDV - Definition of Claims by Safety Officer about System safety

«claimant» Safety Officer

«claim» System is safe to use

«subject» System safety

«claim» Safety requirements have been exceeded

«claim» «relates to» «subject»

«claim» «relates to» «subject»

«claim» «relates to» «subject»
3.6 VCV showing Argument Viewpoint aims

VCV [Package] Argument Viewpoint (AVp) [Viewpoint Context View showing Argument Vi...
«concern»
Support definition ... linking 
relationships are 
established
Argument Viewpoint Context
«include»
«include»

«include»
Allow supporting arguments to be established

Claimant

Support definition of evidence-based claims
VDV showing the Ontology Elements that appear on the Argument Viewpoint

```
VDV [Package] Description [Viewpoint Definition View showing the Ontology Elements that appear...
```

```
«viewpoint»
Argument Viewpoint

1..*

«ontology element»
Claim-Argument Link

1

1..*

«ontology element»
Claim

1..*

«ontology element»
Argument

1..*

supports
```
Example AV - Arguments supporting "System is safe to use" Claim

- **Claim**: System is safe to use
- **Arguments**:
  - System has been tested
  - Safety statistics are good

The diagram illustrates the support relationships between the claim and the arguments.
3.7 VCV showing Evidence Viewpoint aims

VCV [Package] Evidence Viewpoint (EVp) [Viewpoint Context View showing Evidence Viewp...

Evidence Viewpoint Context

«concern»
Ensure linking relationships are established

«include»
Support definition of evidence-based claims

Claimant

«concern»
Allow reinforcing evidence to be established

«include»
VDV showing the Ontology Elements that appear on the Evidence Viewpoint
Example EV - Evidence reinforcing the Arguments 'System has been tested' and 'Safety statistics are good'

- **Evidence**
  - Safety case results
  - Simulation results
  - Analysis of safety statistics

- **Arguments**
  - System has been tested
  - Safety statistics are good

The diagram shows how evidence (e.g., safety case results, simulation results, analysis of safety statistics) reinforces the arguments (e.g., system has been tested, safety statistics are good) through dashed lines labeled "reinforces."
3.8 VCV showing Counter-Claim Viewpoint aims

VCV [Package] Counter-Claim Viewpoint (CCVp) [Viewpoint Context View showing Counter-Claim View... «concern»
Ensure linking relationships are established
«include»
«constrain»
Support definition of evidence-based claims
«concern»
Must allow counter-claims to be made
«concern»
VDV showing the Ontology Elements that appear on Counter-Claim Viewpoint

VDV [Package] Description [Viewpoint Definition View showing the Ontology Elements that appear on Counter-Clai...
Example CCV - Counter-Claim made against an Argument-Evidence Link
4. Summary

• The Evidence Pattern defines four Viewpoints for the definition of Evidence-Argument-Claim chains:
  – Claim Definition Viewpoint allows Claims to be defined for a particular Subject to show who made the Claims
  – Argument Viewpoint allows the Arguments that support a Claim to be identified
  – Evidence Viewpoint allows any supporting Evidence that reinforces Arguments to be identified.
  – Counter-Claim Viewpoint allows Counter-Claims (or supporting Claims) to be made about any type of Claimable Item
5. Questions