Advanced Networked Systems Architecture

Design Process and Meta-Architecture Bibliography

Abstract:

This bibliography documents the various documents produced by the Author as part of the Design Process and Meta-Architecture work, and comments upon their present status and relevance to his understanding of the present state of the ANSA Meta-Architecture.

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CONTENTS

1   THE DESIGN PROCESS

1.1   FS.2.1 Architecture Design Manual

This is an early and unfinished version of the ADM which was converted to AO.1 at the change of project phase. There is some material that might be of use to historians and plaigurists, but not otherwise of interest.

1.2   FS.30.0 Diagrams

This document discusses the diciplines needed for drawing diagrams, to ensure that they are clear and consistent. This is not merely a drafting issue, as the clarity of architectural representations have a major effect on the comprehension of the architecture by out audience, and the different representations are appropriate to different audiences.

This document records a crucial link between **perspectives** in the Design Process, (partial) **models of the system** as percieved by designers and system users with limited points of view, and the choice of **dimensions** of a multi-dimensional architecture.

1.3   ADM Release 1

This folder contains the material that constituted Release 1 of the Architecture Design Manual. It consists of the Release 1 slides, AO.1 (See below), and the Design forms associated with Release 1.

The original intention was to add detailed expositions of the various stages in the process, but the project moved on (supported by the ADM), and the additional material was never justifiable.

The present status of the ADM is that the material is still valid as a design process scaffolding that supported and guided the work of ANSA in the early stages. It is relevant to new team members and collaborators as it provides a historical perspective on how ANSA achieved its present view of architectures, and how the initial requirements material was analysed. Its main utility now is probably that it could form the basis of a design process supporting ANSA Users, and as such would be supportive culture rather than a mandatory part of conformance to ANSA.

The main ADM topic that was developed further is the Meta-Architecture which is covered in 2 below.

1.4   ADM Release 1 Slides

The slides are divided into presentations for the first two sections of the design process, covering the overview and requirements analysis phases.

1.5   AO.01.01 Architecture Design Manual Section 1 - Overview

This document is the main overview of the ANSA architecture Design Process. It is still of relevance (vide 1.1 above), but some of the ideas (such as modelling) will probably appear rather dated.

It is an important document as it forms the main design process basis for the Meta-Architecture work.

1.6   AO.2.0 Architecture Design Manual Section 2 - Requirements Analysis

This document expands on the Requirements Analysis phase of the design process, comments very much as for AO.1 above.

The document is incomplete, much of the material being copied from earlier documents (FS.2.1), and some of the sections need completion. It was never issued.

1.7   AO.8.0 Architecture Design Manual Section 8 - Support Tools

This document provides the only write up of the LISP based tool developed for supporting the Design Process.

Although the tool was tested and works, the Human Interface received some criticism, and I do not feel that the internal data structures are at all suitable. However this does prove the feasability of tool support to the requirements analysis phase.

Future work on tools, if such ever become a part of ANSA, could well be based on this work.

2 THE META-ARCHITECTURE

2.1 AO.14.1 On the Dimensionality of Architectures

This was the first document within ANSA that identified the multi-dimensional nature of Architectures. It gives background, discusses the need for dimensions and coordinates, discusses the selection criteria for dimensions, and how they may be calibrated. It then goes on to discuss whether there might exist a theoretical basis for manipulating architectures (rather badly termed an algebra), the need for models as part of ANSA, and the presentation of slices through the problem space as 2 dimensional pictures on paper or screen.

2.2 AO.16.2 The ANSA Climbing Frame

This document records the initial architectural framework and dimensions, discussing the procedure used to select them, the requirements for coordinates, the range of properties selected for consideration, the criteria used to select dimensions, and each of the dimensions and coordinates selected.

Subsequent work has added to the dimensions and coordinates used by ANSA, but this document remains the best available material on how dimensions were selected, and what most of them are.

2.3 AO.17.1 On the Building of Models

This document was the first attempt to describe the basic concepts of object, type, name, property, dimension, boundary, attribute, interface, classes and inheritance, model, paths and rules. It uses a more or less mathematical notation in order to attempt to introduce some rigour (rather than formalism).

The document is of some interest archaeologically, and some of the concept definitions should be taken forward into any discussions of the concept definitions.

2.4 AO.26.2 What is an Architecture ?

This document begins to develop a theory of architectures (erroneously called an algebra), and introduces some notation and representational conventions. It goes on to discuss types as sets of values (cf Cardelli), and the ways in which types might be defined within the architecture. It then uses the notion of state (cf VDM) to define a possible type for the data structure needed to hold definitions of particular architectures (one of which would of course be ANSA, and others would be ANSA specialisations).

The document then goes on to discuss predicates (not very well on re-reading !), operators, and so to rules and the forms they might take. This is extended to a simple statement of how we might define conformance to ANSA.

2.5 AO.39.01 Example specification and tutorial

This document is the response by the author to a challenge from team members who did not see the relevance of the previous two documents to the specification of architectures. As such it probably failed to enlighted anyone, but it does form a record of the way in which a basic mathematical tool kit can be applied to the specification of the structural side of architectures. The techniques used appear to be substantially different from those in LOTOS (at least to me), and this document provides the only record of the approach.

The document covers an outline of the example problem, a description of the theoretical foundations for the work, an overview of the notation used, a tutorial description of the specification (using mathematical expressions embedded in english text), and finally appendicees containing the specification itself, and presentation slides relating to the example. In all there are 52 pages, much quite hard going. I believe that study of this example is crucial to an understanding of the specification of architectures, although too large a task for most of the team at present.

2.6 AO.62 The ANSA Recipe Book

This document identifies the need for Recipes (functions that generate parts of the architecture based on some parameterised objective such as reliability), discusses the form that Recipes might take, and how these fit into the Meta-Architecture. The document then goes on to consider the meaning of specialisation of the ANSA architecture.

2.7 AO.63 Abstraction

This document considers the meaning of Abstraction, how it relates to decomposition, and whether it should be used as a dimension of the ANSA framework. It concludes that the dimension should be decomposition, and that abstraction is the cognitive process used by the designer to help select appropriate compositions. Most of the views of abstraction are culled from outside references, and this is usefull background material.

2.8 AO.67 Decomposition

This is an incomplete document describing the decomposition dimension (following AO.63). The material is a useful input to the ANSA framework documentation, but will need completion.

2.9   AO.82.02 Key Architectural Concepts
AO.KC Key ANSA Concepts

These documents are an attempt by HJW to pull together the definitions of the various concepts used by the ANSA meta-architecture and architecture. Much of the material appeared elsewhere, but has been modified in the light of comments received.

These documents are really the precursors of AO.105, and AO.107 below.

2.10   AO.104.00 The Meta-Architecture, Introduction and justification
AO.105.00 The Meta-Architecture, Definitions of concepts
AO.106.00 The Meta-Architecture, Examples and DIY guide
AO.107.00 The Meta-Architecture,Specifications
AO.108.00 The Meta-Architecture, Slides and presentations

These documents form the first 5 parts of what was intended to be a definitive write up of the Meta-Architecture as developed by HJW. Limitations of time and resources have stopped the writing of these documents.

Their present status is that large amounts of material have been copied from previous Meta-Architecture documents, introduction and background material has been added, and some (but **not** all by a long way) of the reviewing and consolidation has been done.

The value of these documents at present is that they provide a consolidation of previous words in one place, and indicate what additional material should be added. Should ANSA ever wish this work resumed, these documents would form the basis for doing so.

2.11   AO.115.00 Design Process and Meta-Architecture Bibliography

This document.

2.12   AO.NN Global type definitions

This document contains early (Oct '86) definitions of types, and basic architectural structures. The material is largely preparation for, and is included in AO.39 Example Specification and Tutorial.