

SERVICE ORIENTED ARCHITECTURES (SOA) AND WORKFLOWS

NEED FOR STANDARDISATION?

J-P. Evain

European Broadcasting Union (EBU), Switzerland

ABSTRACT

This paper is an insight into what the EBU, the collective organisation of Europe's national broadcasters, believes are key issues for the future-proof successful development of SOA in production architectures.

Apart from conventional programme production, the domain of innovative content creation to reach new audiences in different formats through different delivery medias is more important than ever. Broadcasters clearly foresee that something major needs to be done, across the board, to allow cross-media delivery and more flexibility in workflows.

The EBU believes that the use of IP-based 'SOA' architectures, as a natural extension of IT-based production, offer the potential for greatly improved interoperability over the current (often proprietary interfaces based) system design practices.

The paper will outline SOA and review the findings of the EBU study as a result of discussions with media asset management vendors in assessing the values of such an evolution in which some of them have already engaged.

INTRODUCTION

SOA seems to be the new grail, which will solve all integration and interoperability problems when connecting several systems together, including asset management tools from different providers. This might be true on a large scale but only if certain conditions are met.

Several vendors are proposing SOA based solutions. But are these implementations SOA compliant ? By the way, What does 'SOA compliance' mean?

There is often confusion between asset and workflow management. It is essential that workflow management is seen as an upper application layer using asset management tools. SOA architectures have been designed to separate these system layers.

Broadcasters are asked to clearly define their workflows. It is well acknowledged that there is not 'one' workflow but a variety of them even within each broadcasting facility. But can best practice workflows, or at least processes, be defined as a reference for asset and workflow management ?

This paper tries to participate in building a better understanding around these issues for the democratisation of SOA and promoting collaboration between manufacturers and broadcasters towards more SOA compliance.

NEED FOR EVOLUTION: A BROADCASTER PERSPECTIVE

Broadcasters face the challenge of a rapidly changing audio-visual landscape with growing competition across a variety of delivery platforms inc. traditional broadcasting, mobile and the Internet. In this context, the promise of a more efficient framework for creating, processing, managing and leveraging digital assets is a positive sign for the future. Agility and scalability are key features.

Existing broadcasting configurations necessitates different systems (ingest, edition, archive, scheduling, play-out, etc.) to interoperate.

'Create once, publish many' is an attractive concept in a cross-media environment. Whether creating enough editorial material "at once" as a content factory with sufficient foresight to cover the varying needs of the different targeted platforms is realistic, would in itself be the source of an intense debate. However, from a more technical perspective, achieving this goal could be seen as maximising the use of available resources by collaborative media teams across which similar 'roles' have similar 'needs'.

Such an evolution requires a transformation of existing infrastructures.

A strong business incentive is the opportunity to invest in a new production architecture from planning to publication. Such a new architecture shall as far as possible support re-use of legacy hardware and software assets but also favour the interoperable and scalable introduction of new tools. The notion of "interconnected technological islands" applies equally when broadcasting facilities need to communicate and exchange.

SOA IN A NUTSHELL

It is primordial to agree on the definition of SOA. Diverging interpretation would lead to non-interoperable implementations to the detriment of the original goal.

In a nutshell, OASIS reference model¹ defines SOA as "an architecture paradigm for organising and utilising distributed capabilities that may be under the control of different ownership domains... facilitating the manageable growth of large scale enterprise systems, facilitating Internet-scale provisioning and use of services and reducing costs in organisation to organisation cooperation". In SOA terms, such capabilities or functionalities are presented as *Services* to solve or support a business solution.

¹ <http://www.oasis-open.org/committees/download.php/19679/soa-rm-cs.pdf>

OASIS defines a *Service* as "a mechanism to enable access to one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description (information and behaviour models)". The technical translation of these business services are the so-called *Web Services*, which provide a format to describe information and behaviour models and associated functionalities. OASIS recommends to follow a predefined methodology to develop *Web Services*².

SOA IN BROADCASTING ARCHITECTURES

The concepts exposed above seem to respond exactly to what broadcasters need as a basis for a successful transformation of their production architectures.

SOA allows to implement asset management with the modularity and agility required to easily and flexibly integrate heterogeneous functional tools from different ownership domains (legacy and new equipment from different manufacturers, software platforms, asset management tools to ingest, browse, edit, log, document, catalogue, search, retrieve, schedule and publish digital content).

Metadata becomes the information provided by the *Services*, which now contribute to each broadcasting environment's overall logical data model implemented in database architectures.

Rights are better managed through the fine-grained control of *service* behaviours.

Scalability is unlimited as adding new tools consists of providing new *services* enhancing the overall system functionality.

Through its *Service* invocation approach, SOA provide the flexibility needed to adapt to a variety of workflows (a series of tasks connected by rules through the invocation of *services*) even within the same broadcasting facility. Broadcasters are in control and will have the opportunity to either implement workflows as their know-how recommends, or adapt to other best practices, about which knowledge and experience will be easier to share on the basis of a common technical platform. Similar roles will access and use similar tools, independently, and share digital assets more efficiently in a controlled collaborative environment for an higher expected return to investment across delivery platforms. SOA favours business driven deployments and sign the end of vertical workflows and implementation silos!

Of course, SOA has a strong IT/IP flavour but specific broadcast engineering requirements such as real time transfer, traffic and synchronisation shall not be underestimated.

Maintainability and upgradeability of system is another important factor for broadcasters to consider. SOA offers solutions to avoid upgrades, e.g. of an asset management system, conflicting with customisation made on a previous version.

² <http://www.oasis-open.org/committees/download.php/13420/fwsi-im-1.0-guidelines-doc-wd-publicReviewDraft.htm>

NEED FOR STANDARDISATION

Following a series of consultations started at IBC 2007 by a 'Tour' of asset management solution providers, and request from providers and users for more standardisation, the EBU has decided to engage into action around SOA for broadcasters.

Work has started and the approach followed incidentally coincides with the OASIS recommendation for compliance, which shall be pursued with a focus on patterns and the definition of 'services'.

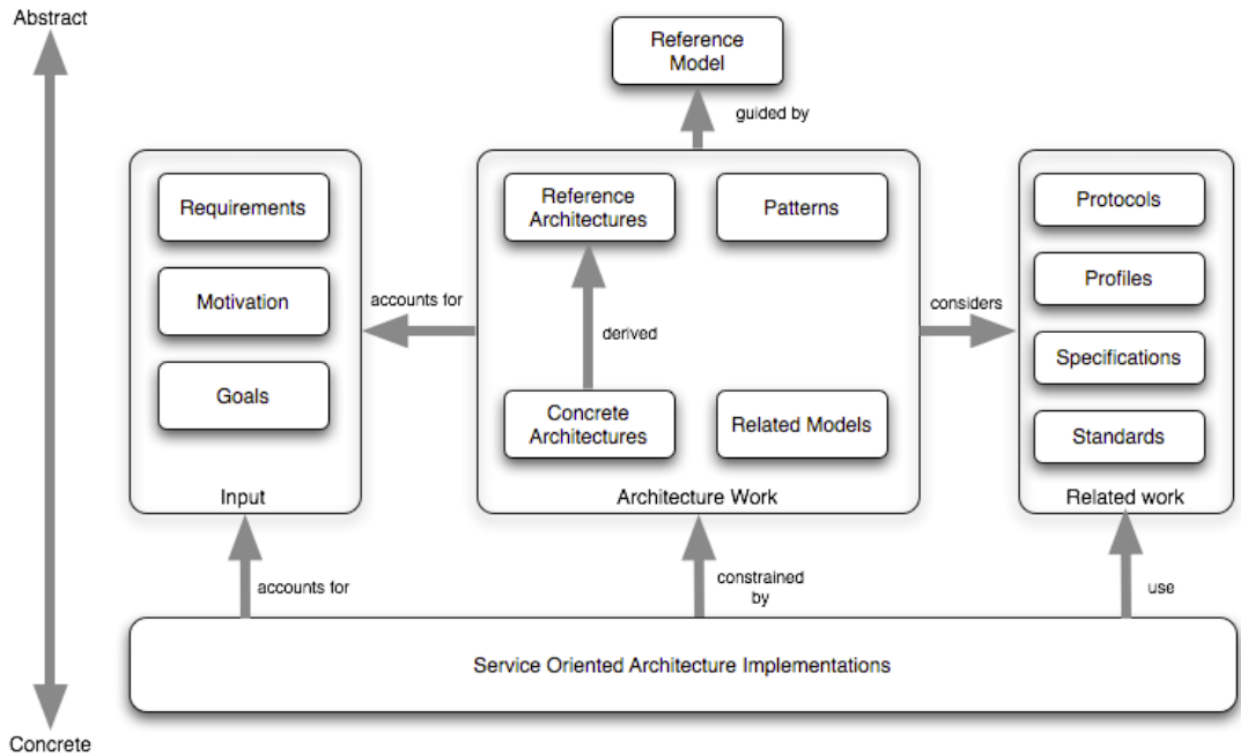


Figure 1 - The OASIS SOA Reference Model Influence in System Design

Step one consisted of agreeing on a "general TV production process model". One would recognise in this model the main production stages of content creation from planning/commissioning to publication, also reflecting the main bricks of asset management systems (planning, ingest, post production, rights management, scheduling, play-out control, etc.). According to the SOA reference model, the 'TV production process model' is part of the *Architecture Work*, derived from EBU Members' *Concrete Architectures* (meeting business *Requirements* and *Goals*), and can be seen as a *Related Model*.

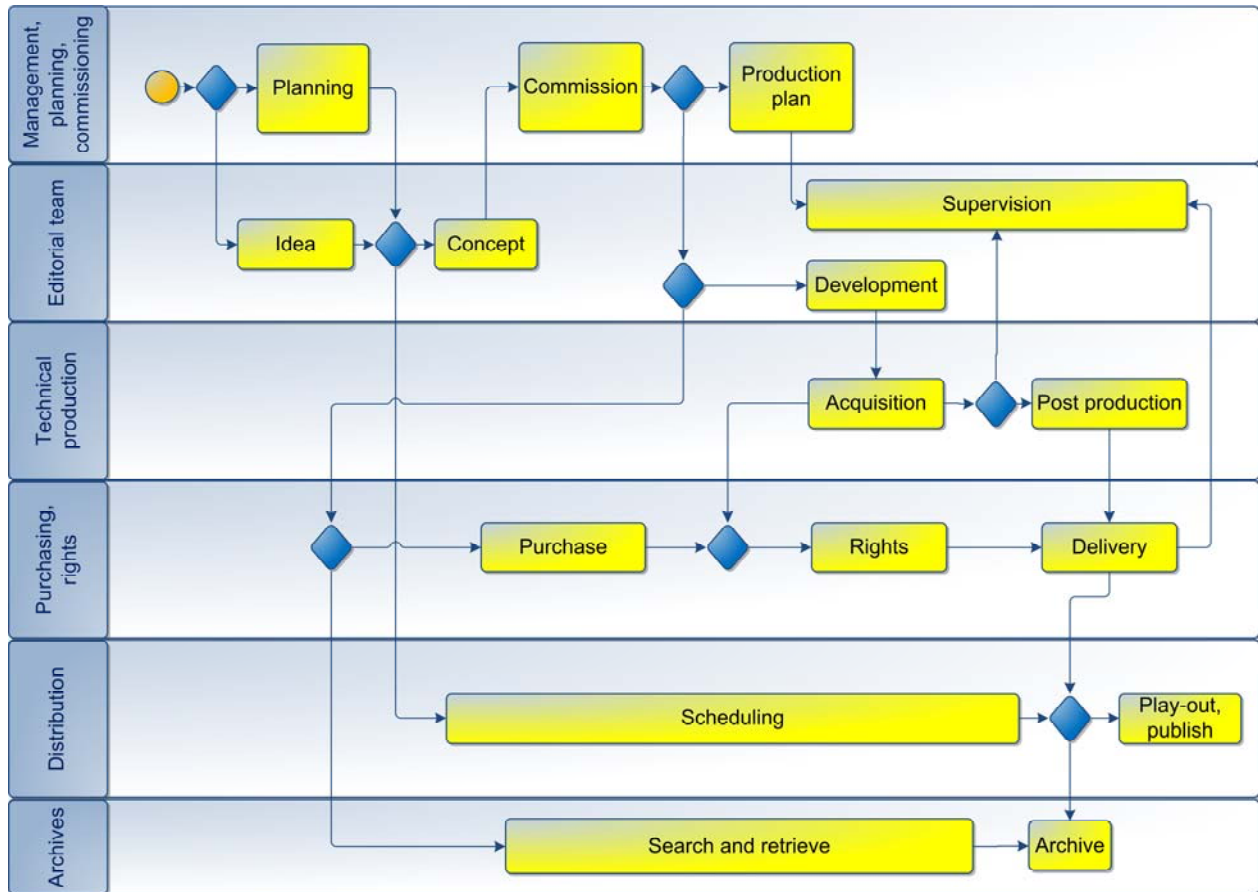


Figure 2 - EBU simplified general TV production process model

Step two is work in progress. It is planned to define best practice workflows and key processes. Although agreeing on entire detailed workflows may be over optimistic, it is reasonable to expect the identification of key business processes equivalent to the SOA reference model's *Patterns*. Two main cases are under study: 'news' and 'drama'. The study shall also say whether certain business processes are common to news and drama production like for e.g. acquisition.

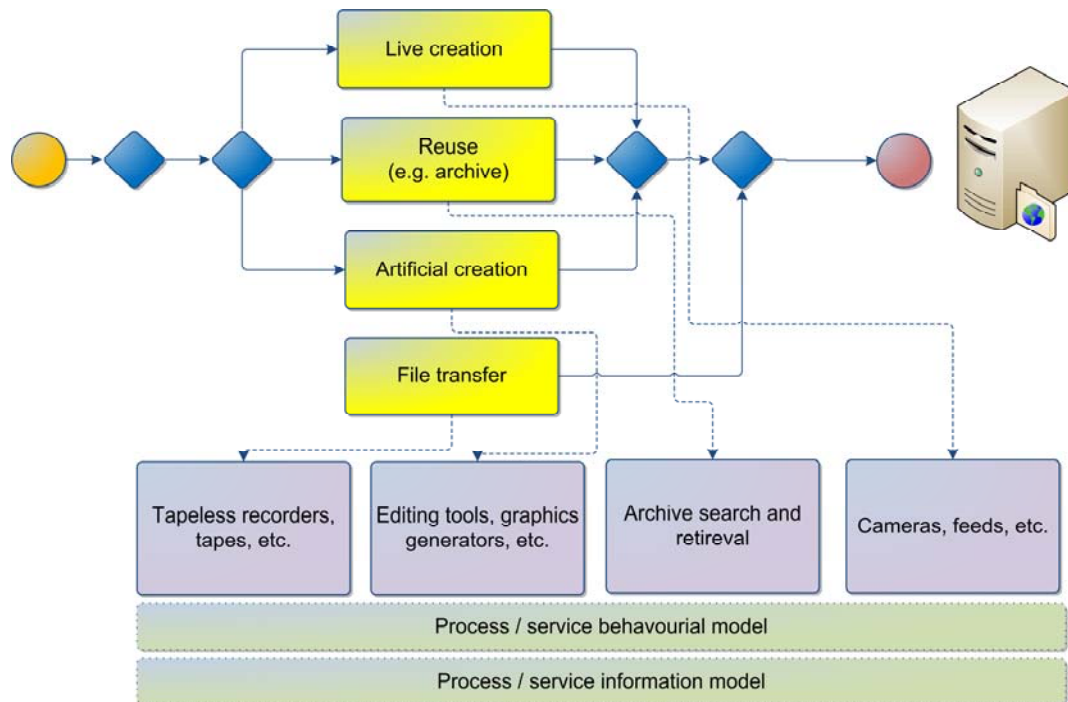


Figure 3 - EBU Acquisition Processes and Interfaces

SOA compliance will require that these *Patterns* are implemented as *Service* components defined through the *Visibility* of resources, their *Semantics*, the level of *Interaction*, an *Execution context* and associated *Real world effects*. These criteria shall also apply to declare an interface as eligible to host a *Service* (e.g. from the candidate interfaces shown above for acquisition) in addition to requirements such as reusability (similar *Behaviour Models*) and adaptability (e.g. to different *Information Models*).

In SOA, a *Service* provides access to a *Capability*, i.e. a hardware or software resource. *Service Description* provides all the necessary information to discover, connect and interact with the resource through the service interface for a predefined resulting effect.

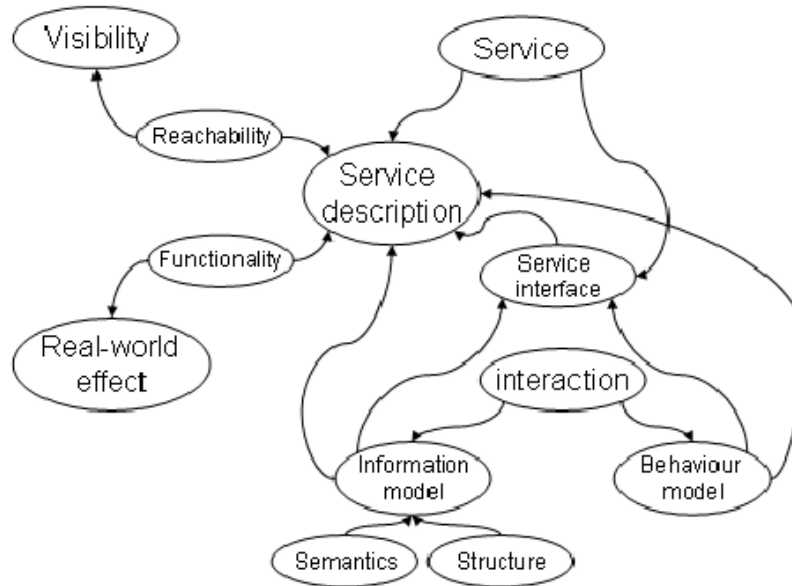


Figure 4 - OASIS SOA Web Service Compliance Model

Visibility is an essential feature as it can be seen as the SOA implementation of the consumer electronics' 'Plug and play'. A new tool would be introduced through a *Service* to be discovered and interacted with.

Interaction is the connection to workflow management. It describes how *Services* will be invoked according to predefined rules to contribute in the realisation of a business goal.

The *Information Model* is another important block. The EBU work is based on the definition of business objects: a TV or radio programme, media objects such as audio and video streams, or other assets like information about contributors, etc. These business objects are described by information collected during a variety of business processes implemented through *Services*. The *Information Model* defines what is provided by a particular *Service* (a good example is the metadata recommended by EBU from tape-less camcorders³). The information that is collected contributes to the overall production database model. The EBU will define what minimum information is required to define each business object, which will have been previously identified. The SOA *Service* concept allows for this baseline information to be refined for custom purposes. Of course, a 'basic common conceptual data model' will be derivable from assembling together all these elements of business object description but this is not the main goal of the effort as it is acknowledged that actual broadcasters' data models will inevitably differ within each broadcasting facility. Search and retrieval of content will rely on such consistent metadata although at a higher database related application layer.

The *Service Interface* also requires particular attention. Different broadcasters use different Enterprise Service Buses (ESB acts as the runtime platform for SOA), which may ask that more than one protocol (the way a *Service* communicate over the ESB)

³ http://www.ebu.ch/CMSimages/en/tec_text_r114-2005_tcm6-36484.pdf

being supported when binding is defined. More recommendations may be required on the preferred configuration of ESBs.

When it comes to implementation, *Services* become *Web Services*. OASIS⁴ has developed a Framework for Web Services Implementation (FWSI) and a Web Service Implementation Methodology (WSIM) building upon standards such as WSDL (Web Service Description Language) and SOAP (Simple Object Access Protocol).

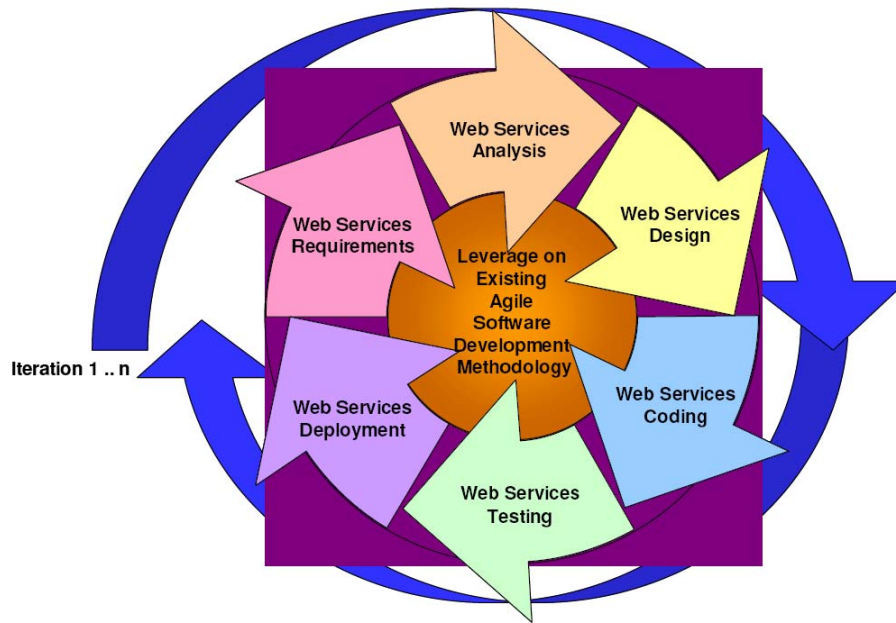


Figure 5 - OASIS Web Service Implementation Methodology Scheme

It is foreseen that harmonisation will be needed for Web Service Implementation within broadcasting facilities (in particular regarding metadata) as a necessary step to achieving higher SOA compliance.

HOW AND WHEN?

The EBU has two groups of experts (P-CP and P-MAG) working on business modelling. After agreeing on the methodology, rapid progress in being made in defining SOA *Patterns* for News and Drama production. The next step will consist of identifying sub-processes, which may lead to the identification of common interfaces eligible for generic *Web Service* implementation.

As a follow-up of on-going discussions with media asset management solution vendors, and because interfacing with production equipment will require wider and harmonised SOA compliance, more formal collaboration with the industry (e.g. representative associations) will be sought before the end of 2008.

⁴ http://www.oasis-open.org/committees/tc_cat.php?cat=ws

CONCLUSION

Migration to compliant SOA is a must. Many implementations exist today but the experience shows that more harmonisation is needed.

From a broadcaster perspective, the advantages are numerous: flexibility, scalability, upgradeability, reusability, richer controlled workflow management, easier to integrate, business and user oriented, cross media friendly, etc.

Of course, there will be resistance as this will have an impact on the market by facilitating competition. But it should be seen as the source for new opportunities.

This is just the beginning of Internet technology penetrating broadcast production for a more natural connection for more innovative future services to the consumers across a growing variety of platforms.

Collaboration between all interested parties is strongly encouraged and welcome.

ACKNOWLEDGEMENTS

The author would like to thank all the experts including from the EBU P-CP and P-MAG groups, and their respective Chairmen, Reinhard Knoer from IRT, Andreas Ebner from IRT, and Laurent Boch from RAI, who have expressed support and engaged in this ambitious project.

The author also would like to thank the asset management vendors who have accepted to share views on the future and impact of SOA in broadcasting.