



Supporting Business Process Standardisation in a Global Organisation

A case study of Shell’s Downstream Business Activity Model

Introduction

For over a decade, RivCom has been assisting various Shell companies with their business process modelling projects. Through numerous corporate reorganisations, technological changes and modifications in corporate direction and strategy, Shell’s business process models have continued to provide value to the Shell Group of companies – sometimes in ways that were not foreseen when the models were first developed. They are seen as a key strategic corporate resource and are today being used to drive a coordinated effort towards business process standardisation across the 150+ companies that make up the Group.

This paper describes RivCom’s involvement with one such model, Shell’s **Downstream Business Activity Model (DBAM)**. Working closely together, RivCom and Shell have developed a framework for model development, a process-oriented knowledge-management portal, and supporting tools and services that allow the **DBAM** to serve as the cornerstone of Shell’s efforts to standardise its global business processes.

After a brief discussion of the nature and evolution of the **DBAM**, this paper describes the challenges that Shell faced and the solutions that were developed during the most recent phase of work in 2001/2002, namely the creation of **DBAM4**.

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Background

This section provides relevant background information about RivCom's client, the Royal Dutch/Shell Group of Companies, and its **Downstream Business Activity Model**.

The Shell Group

The Royal Dutch/Shell Group of Companies is a network of approximately 150 companies around the world.

Historically, the Shell companies have been managed on a decentralised basis and given a great deal of latitude to set their own policies and products, provided that all the companies conformed to certain global standards. In many aspects, including business process development, the role of the central office was to provide guidance rather than 'command and control'.

In the past decade, however, business pressures have caused Shell to pull back from its decentralised model and begin to standardise processes, data and IT systems across the business. The motivations behind this include the increasing globalisation of all aspects of world commerce, and the growth of the Internet as a communications infrastructure that forces companies to present a globally consistent brand. The move towards standardisation began relatively slowly, but has picked up speed in recent years.

The Downstream Business Activity Model

The 'downstream' business within Shell covers everything that occurs from the point where crude oil is received at a refinery gate up to the point where refined oil products are dispensed to end users. End users range from individual motorists filling their car's petrol tank or changing its lubricating oil, to international airlines refuelling or lubricating their aircraft.

In 1991 Shell decided to develop a single model of the whole of its downstream business, covering all product ranges and all geographical zones. The resulting **Downstream Business Activity Model (DBAM)** provides a structured description of all the downstream business processes carried out by Shell companies.

The key driver behind the development of this unified model was the need to provide a basis for developing common IT systems. However, it was recognised that the model could also fulfil many other functions. For example, it could be used to provide:

- a shared vocabulary for describing the business, based on a process view rather than a functional view
- a template for defining and communicating best practice
- a basis for benchmarking, performance measurement and process improvement
- a framework against which to define job competence requirements
- a basis for cross-functional business process management
- a foundation for the definition and development of IT applications to support the business.

During the ten years following the initial launch of the **DBAM**, the model has been progressively enhanced and updated in terms of content, coverage, and also delivery mechanisms. It is now in its fourth major release.



RivCom's role

Throughout the development and enhancement of the **DBAM**, RivCom has provided ongoing support services to the Shell staff who are responsible for both the custodianship of the model and the provision of internal business process advice and support within the Shell businesses.

RivCom's enabling role has included:

- facilitating and supporting the **DBAM** custodians in their internal consultation with users and business stakeholders
- proposing enhancements to the model based on this consultation and checking the quality and internal consistency of the resulting content
- providing editorial, graphic design and production support for the publication of the model and its accompanying documentation in printed and electronic form
- monitoring relevant standards and technology and proposing optimal publishing and content-management solutions in the light of the evolving state of the art
- developing and implementing the agreed publishing and content-management solutions.

Evolution of the DBAM

This section describes RivCom's role in helping to evolve the **DBAM** from a static printed document into a network of navigable information, and then into an integrated environment for the development of interoperable business process models.

DBAM2: A sophisticated design

RivCom became involved with the **DBAM** in 1992, when we were asked to publish **DBAM2.1**. Our primary role at that time was to provide editorial and publishing services, including developing a design that would guide users to the information they needed – a non-trivial task in a document where all the information is interrelated and there are numerous 'paths' that a user could follow.

The approach adopted was to publish **DBAM2** as a series of documents:

- a wallchart
- an overview guide
- a full reference manual
- a series of case studies of the model's application within the business.

RivCom provided a clean design and created detailed process descriptions and explanatory information. Equally important, we designed a publishing system in which the information contents were stored in a relational database that was dynamically linked to Microsoft Word documents, so that content integrity could be checked using database tools, while readability and ease-of-use were checked in the Word environment, with two-way update between the two.

DBAM3: Electronic delivery of a rich feature set

In 1997 Shell wished to take advantage of new forms of information distribution that were coming into existence, initially CD-ROM and later the 'Shell Wide Web' (Shell's corporate Intranet), in order to expand the features of the **DBAM** and make it more readily accessible across the global organisation.



By that time, RivCom had become involved in the creation of a new information standard called XML, which was ideally suited to addressing many of the issues associated with managing, storing and publishing structured information of the kind that appeared in Shell's models. At RivCom's suggestion, Shell agreed to be an early adopter of XML. RivCom ported the **DBAM** content into XML format and developed XML-based publishing mechanisms that allowed the same information to be published in three forms: as a printed document set, as a CD-ROM, and in a web browser.

The availability of electronic forms of delivery enabled us to design much richer ways to navigate the model. Users could now 'drill down' or 'swim through' the processes and activities in the model. These were new ways of looking at business models that hadn't been possible in a world of paper-based documents.

Electronic delivery also allowed the **DBAM** to move from being an essentially static reference document to being a repository of corporate knowledge. In this new incarnation, each process or activity in the model could be associated with evolving information such as

- internal best practice guidelines and examples
- external world-class performance examples

as well as its defining characteristics, such as

- its underlying business purpose
- a description of how it is performed (its constituent subprocesses or subactivities)
- a list of its inputs (linked to the activities that created them) and outputs (linked to the activities that use them).

Underpinning all of these accomplishments was the fact that the information was now stored in a standards-based format (XML) that could easily be transformed into any desired output medium. Going forward, it would now be much easier to take advantage of new delivery technologies as they became available.

DBAM4: Enabling distributed development of interoperable models

By early 2001, as Shell moved towards adopting common business processes and IT systems in order to address the challenges of an increasingly interconnected world, it was recognised that the **DBAM** needed to change in equally fundamental ways.

Throughout its evolution, the **DBAM** had remained a single, high-level model covering the whole of Shell's downstream business. But the set of processes within the business was too complex to be represented in a 'single view' model. Increasingly, parts of the organisation that needed to perform more detailed analysis were creating their own, lower-level process models to fill in the gaps. The danger, however, lay in the possibility of different parts of the Shell Group developing a range of different, overlapping, non-interoperable models – a situation that ran counter to Shell's desire for common processes, collaboration and shared systems.

The project to create **DBAM4** began in February 2001 with a series of workshops and interviews conducted by RivCom in order to determine the required vision and direction for a new release of the model. As a result of these activities, a decision was taken to update the **DBAM** from a standalone model into a framework, toolset and architecture for developing and publishing models. The goal was to enable the development, by distributed teams, of multiple



interoperable models that would share core structures, vocabularies and navigation.

RivCom's challenge was to figure out how to accomplish this ambitious goal, and then to deliver it within a reasonable timeframe and budget.

Creating DBAM4: Challenges and solutions

This section describes RivCom's role in helping Shell create **DBAM4**. It begins with an overview of the **DBAM4** development project, then lists some of the major challenges we faced and the solutions that were developed to meet those challenges.

Overview

DBAM4 is the most recent major upgrade of Shell's **Downstream Business Activity Model**. In commissioning this upgrade, Shell's primary business motivation was to convert the **DBAM** from a standalone model into a framework, toolset and architecture that would

- facilitate business process harmonisation and, where appropriate, standardisation across the organisation
- enable the adoption of new technologies and business paradigms
- support the development of detailed analyses of specific business areas that had been prioritised for near-term improvement.

RivCom played four key roles in this project:

- to serve as the '**DBAM** consultants' for the duration of the project, working in partnership with the **DBAM** custodian
- to provide continuity of knowledge of the core model (because we had been closely involved with the development of the model through three major upgrades over a 10-year period)
- to propose and implement the new framework and architecture
- to develop and document the toolset and supporting methodology.

DBAM4 was developed in four phases:

- Phase I: Vision and Direction
- Phase II: Develop Models for Review
- Phase III: Publish Models
- Phase IV: Develop Framework.

Work on Phase I began in February 2001, and we completed Phase IV substantially on time and within budget in July 2002.

Challenges

DBAM4 had to facilitate the development by distributed teams of multiple models that, despite their separate evolution, would be interoperable and share core structures, vocabularies and navigation. In order to succeed, the project team had to address a number of significant challenges:

- Despite Shell's global constituency, the office in charge of supporting processes harmonisation was quite small and operated as an advisor, with no 'command and control' remit.
- The decentralised project teams creating the models were largely comprised of businesspeople (subject matter experts) who lacked a shared methodology and had little or no experience of process modelling.

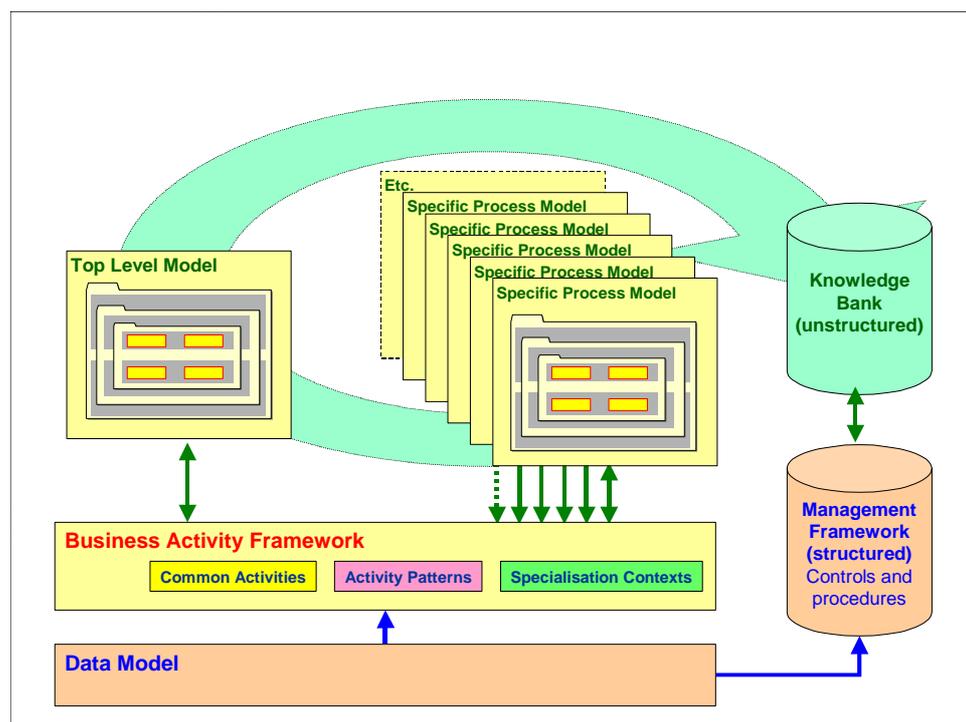
- The information to be managed was complex, diverse and substantial in volume.
- The models being developed at that time were inconsistent in terms of terminology, approach and structure.
- As a result of the previous points, the modelling teams' need for support (e.g. training, workshop facilitation and content analysis) exceeded the resources available.
- No mechanism existed for sharing process-related knowledge across the business and teams were often unaware of the existence of other relevant models that had already been developed, leading to redundancy and inefficiency in the model-development process.

Solution

Over an eighteen-month period, RivCom worked closely with the **DBAM** team within Shell to meet these challenges. The solution we adopted was to transform the **DBAM**, in a series of iterations, from a single (albeit comprehensive) business process model into an integrated business-process-modelling environment, supported by a fully documented methodology, tools, templates and an interactive website on the Shell Wide Web.

Architecture

The architectural overview diagram below illustrates the key components of the solution.



Creating this architecture involved the following tasks:

- developing a **top-level model**, simplified and updated from the previous **DBAM**, to provide a view of the overall business to which all stakeholders could relate
- developing a modelling methodology and supporting tools and templates to allow teams of domain specialists to work separately on the **specific models** that provide more detailed representations of particular functions or sectors within the overall business



- creating a **business activity framework** consisting of **common activities**, **activity patterns** and **specialisation contexts**, to provide a centralised linking mechanism that enables processes and activities in any of the models to be associated with similar processes and activities in other models
- building a **publishing environment** that allows the top-level and specific models, and the business activity framework, to be made available on an integrated website
- designing an **auto-generated website** containing the full suite of process models, which allows navigation directly between activities and processes that are related to one another via their mappings to the business activity framework
- linking the processes and activities in the models into Shell's global **knowledge bank** in order to provide access to relevant documentation, best practices and other supporting materials
- developing a single **data model** to underpin the business activity framework and to drive specialised business applications that implement relevant business controls and procedures within a formal **management framework**
- providing **full linkage** between the management framework and the knowledge bank, so that the business knowledge that underlies acknowledged best practice can be directly related to the performance measures and controls that ensure processes are carried out in accordance with that best practice.

Tools support

All the content, data and linkages making up the models are created using a lightweight toolset that operates in Shell's standard desktop environment. To achieve this, we developed a set of templates and user-interface tools within Microsoft Word and Excel using Visual Basic Automation. These enable Shell businesspeople to create highly structured information with relative ease, and within a familiar and friendly environment, without having to learn new skills. There are no complex rules to apply and very little training required, yet the resulting models are sufficiently well structured to integrate seamlessly into the DBAM environment.

Modelling methodology

The RivCom–Shell team adapted an existing modelling methodology that had been developed for Shell by a major consulting firm, tailoring it to meet the specific requirements of Shell's business process standardisation initiative, and to the lightweight toolset developed to support the multi-model environment described above.

Modelling and mapping support

Despite the intuitive nature of the environment and the tools provided to work within it, the modelling teams required a certain amount of 'hand-holding' in the early stages, to help them get the maximum value out of what the environment had to offer. This was particularly true in the area of 'mapping to the business activity framework', which was the least familiar, though probably the most powerful, of all the features that were implemented.

The best results were obtained by having two people work together on creating the mappings from the models to the framework: one who was closely involved with the model being mapped and another who had previous experience and familiarity with the framework. On a second iteration, the 'model expert' could become the 'framework expert' in a new pairing, and so knowledge of, and



familiarity with, the framework could be progressively disseminated through the modelling communities within Shell.

Evolving the business activity framework

The business activity framework evolved both in structure and in content during the course of the project.

As a first step, a **common model** was developed. This model was designed to be extremely generic, representing those features that were 'common' to the full range of sub-businesses currently existing or liable to emerge in the foreseeable future within Shell's downstream environment. The common model comprised two independent dimensions: a structured set of **common activities**, such as "Develop market" and "Sell", and a further structured set of **activity patterns** such as "Manage project" and "Define strategy". These common activities and activity patterns provided the starting point for the business activity framework, to which the processes and activities in any actual business process model could be mapped.

The next step was to map the top-level and specific models which already existed within the **DBAM** environment to these initial two dimensions of the business activity framework. In performing this mapping, a third dimension to the framework was progressively created: a structured set of **business contexts** within which the common activities and activity patterns are carried out in the businesses described by the models.

While common activities and activity patterns are expressed through verb phrases, business contexts are expressed through noun phrases, each of which is the 'preferred term' for a business area, business entity or business object – for example, "retail", "trading partner" or "warehouse". These business contexts take the activity framework from the generic to the specific, transforming a relatively abstract set of process and activity descriptions into as concrete and specific a set as is deemed necessary to make sense of the business areas being modelled.

Developing the core data model

The business contexts that emerged from the work of mapping the business process models to the business activity framework provided the starting point for developing a core **data model** that will underpin the whole **DBAM** environment. Essentially, these business contexts represent the specific business areas, entities and objects within which or on which the common activities and activity patterns are performed in the real world. Performing an in-depth structured analysis on the business areas, entities and objects, as well as on the types of inputs, outputs and reference data that flow between activities in the process models, yields a rich and powerful data model which is both robust and rigorous in its abstract structure and deeply rooted in the concrete realities of the business it needs to serve.

The data model will, over time, provide the basis for the development of a management framework of business controls and standards-compliant tools that will drive the actual execution of the processes and activities described by the business process models. In the near term, it is already providing an important benefit by helping to define a common language that can be used all stakeholders of the DBAM when they discuss the nature and flows of information in Shell's business processes and related IT systems.

Standards-based infrastructure and web-publishing environment

The data describing the top-level and specific business process models, the common activities, activity patterns and business contexts of the business activity framework, the underlying data model, and the rich network of links between all of these – all of this is stored and manipulated as XML files conforming to the XML Topic Maps and NewsML standards. These standards are robust, powerful and



generic, and make it possible to repurpose the source data in a variety of ways, both now and in the future. For example, after each significant update to the core data set, a series of transformation scripts written in XSLT, the standard transformation language for XML documents, is run on the data to automatically update the website through which users can interact with the models on the Shell Wide Web.

A business process-oriented knowledge portal

The **DBAM** website on the Shell Wide Web has rich, intuitive functionality that allows users to do many things, including:

- drill down into any business process model
- move between processes and activities in different models to see how they relate to each other
- locate good practice advice relating to any given activity or similar activities in other models
- identify the entities in the underlying data model that represent data created, used or consumed by any given activity
- locate other activities within which the same data entity is used.

These capabilities are made all the more powerful by the fact that the **DBAM** website is fully integrated with Shell's worldwide corporate knowledge base. Users of the site can contribute additional relevant knowledge and resources to that knowledge base, creating specific linkages between any new piece of knowledge they wish to add or link to, and specific items within any of the models that exist within the environment. This powerful capability is likely to bear fruit over a considerable period. It will be interesting to discover over time how and where it will yield the greatest business value.

Conclusion

The challenges involved in moving from traditional to web-based business processes are considerable for any enterprise. In the case of an organisation as large, complex and well-established as Shell, these challenges become all the more daunting.

Developing a unified model of its downstream business has put Shell in a good position to move forward into the world of standards-based and web-enabled business processes. However, a unified model is not enough unless it is also a flexible and adaptable model. As RivCom worked with Shell on this issue, one of the main challenges we faced was this: on the one hand, how to make the **DBAM** general enough to cover the business's diversity and allow for its necessary adaptability; and on the other hand, how to make it specific enough to capture the defining characteristics of Shell's particular business and provide a representation of it that is meaningful and informative to Shell management and staff.

We believe that the **DBAM4** architecture, framework and toolset successfully meet that challenge.

Historically, it has often been necessary to make a painful trade-off between 'doing it right' (building a solution that is elegant and robust and likely to be durable against forthcoming change) and 'doing it now' (building a system that can be rolled out and used within a reasonable timeframe and to a limited budget). We are fast approaching a position where no such trade-off is required. The emergence of powerful global standards for information exchange and system interoperability, and the ready availability of high-quality free or low-cost software that implements these standards, is beginning to make it possible to do it both 'right' and 'now'.

Supporting Business Process Standardisation in a Global Organisation:

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Working with RivCom

The values that RivCom has cultivated throughout its existence make it possible for us to provide invaluable support and assistance to even the largest and most demanding business process management and design initiatives.

The Shell story described in this paper has been made possible by the fact that we are

- an agile and responsive small team
- experienced in business process analysis and design
- committed to the use of open standards
- ready to make innovative use of appropriate tools
- pragmatic and adaptable
- vendor-neutral
- customer-focused
- able to provide tailored solutions to difficult problems.