

8. Customs Enterprise Architecture

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8.1 Enterprise Architecture; a brief introduction

What is architecture?

There is no universal definition of architecture.

Some one-dimensional statements are: *"the complex structure of something"* or *"the art of designing and constructing buildings"* or, more relevant to this chapter, *"the conceptual structure and logical organisation of a computer-based system"*.

A high level definition is: *"Enterprise Architecture describes a system as a sum of smaller components and how those components relate to and co-operate with each other to perform the work of the system"*.

A more detailed definition is: *"Enterprise Architecture is the organising logic for business processes and IT infrastructure reflecting the integration and standardisation requirements of the firm's operating model."*

Source: Massachusetts Institute of Technology (MIT): Centre for Information System Research

Enterprise Architecture aims at finding direct links between the business imperatives of the enterprise and the deployment of technology in order to achieve some kind of alignment between the two. This invariably leads to the possibility of putting resources to best use, 'doing more and better with what you have', and removing those resources that are not part of the solution.

The result of Enterprise Architecture is a streamlined and improved use of Information and Communication Technology in an organisation ensuring high-return-on-investment (ROI) and low-total-cost-of-ownership (TCO).

In the absence of an architectural solution, enterprises risk having:

- ICT solutions that are not directly meeting business challenges
- ICT resources being used sub-optimally with redundancies/ duplications in processes.
- The burden of maintaining infrastructure that plays little part in achieving key business goals.
- Little control over ROI or TCO.

Business is changing.

Customs Administrations are well aware of, and must be fully responsive to, the political imperatives of our times, notably the urgent need to address economic re-expansion, enablement of secure but hassle-free trade and the environment.

Customs can make major contributions to facilitating economic re-expansion through effective revenue collection and simple, effective, standard controls and procedures.

Security has added new, wide-ranging and urgent responsibilities to traditional Customs practice but these can be offset and made much more acceptable to traders if resulting border controls are focused, rationalised, standardised and co-ordinated.

Environmental protection, rising very rapidly in political ranking, is bound to bring its own set of border regulations and controls. It is vital that Customs minimise any potential cross-border trade constraints by optimal use of modern technology and uniform global standards.

All these considerations combine to give new weight and reality to the case and need for further Trade Facilitation without losing sight of the regulatory requirements. A possible architectural solution could be based on 'Single Window' oriented border control concepts.

Ever changing technologies

Not only is business changing but technology has changed and continues to change at a rapid rate. New technologies are helping Customs respond to new requirements and add new services and sometimes new users. Technology has become ubiquitous in our lives.

Political imperatives or new technologies can be the rational for Customs to re-engineer its business to keep abreast with these new developments and to provide added value.

Simply providing an electronic infrastructure will not be sufficient. Intelligent management of the infrastructure is a must. A unified approach to monitor the infrastructure and services proactively is essential. The ability to detect and identify a problem and its source without huge investment in human resources is a must.

Key component

Enterprise architecture has become a key component to control information and communication technology developments in many organisations by implementing a formal enterprise architecture process as part of the ICT management strategy. It must be said that although enterprise architecture is closely related to IT, it should be viewed in the broader context of optimisation of the business -business architecture- and process architecture.

Enterprise architecture needs to have a framework. This framework is a collection of tools, process models, and guidelines used to assist the architects with the establishment of the descriptions of organisation-specific architecture.

High quality documentation to actually capture architecture in written form may fulfil its purpose as a vehicle for communication. It may provide a unified design vision to all of the stakeholders of a development project.

Team work

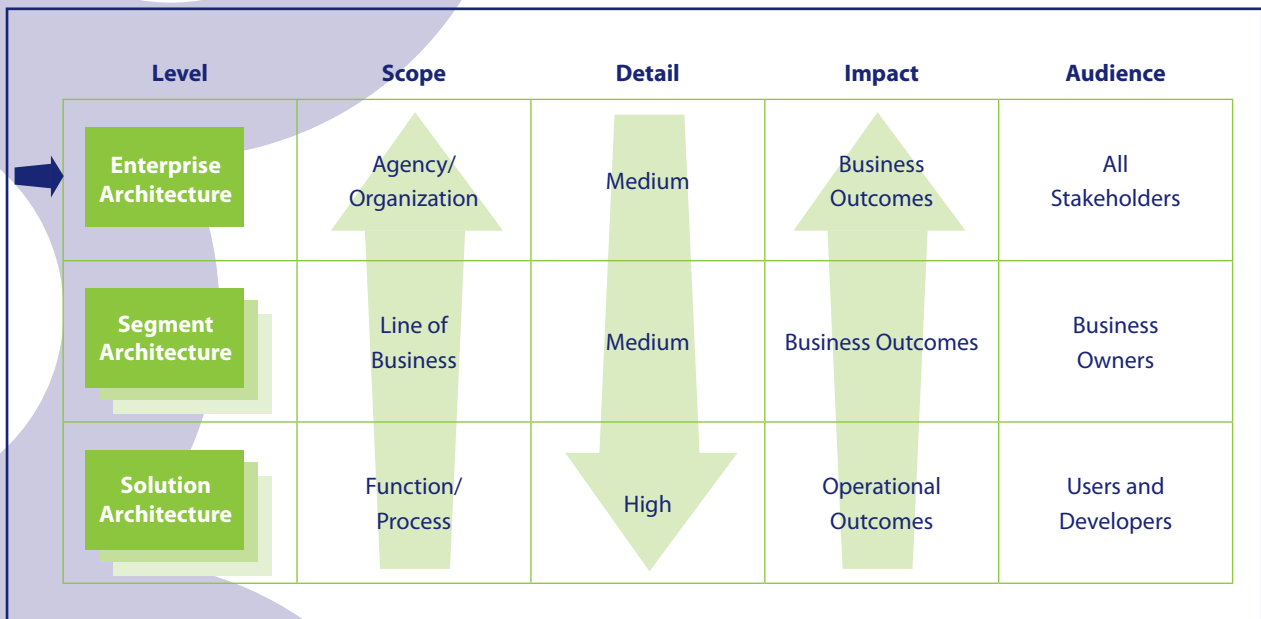
As is the case for all projects, an Enterprise Architecture development project needs a project team. Setting up an Enterprise Architecture Team from all business units involved is a delicate task. The big challenge is to foster acceptance of the Enterprise Architecture concepts and to build trust among the team members. This goal can be achieved through communication, repeated awareness-raising and constant monitoring of the ICT staff.

Finding good architects is a great challenge. They should have the ability to understand the culture of the organisation / administration, to understand where business/functional experts are coming from and what motivates them. Building and maintaining relationships is a very important goal.

It is advisable to give Enterprise Architecture projects lots of internal publicity to also emphasise the new level of sophistication, automation and process control. The role of the Enterprise Architecture Team should also be made extremely clear.. The Team should get involved in the strategic planning with business units. The Team should actually be engaged with the business experts / functional experts on how to get them where they want to go.

Creating an Architectural Steering Committee can be of great value specifically if more than one architectural project has been launched.

The place of Enterprise Architecture amongst other Architectures.



The place of Enterprise Architecture amongst other Architectures.

8.2. Re-engineering business processes and IT in Customs

Customs Administrations have to deal with continuous changes which have an impact on processes, organization, applications and technical infrastructure. It is essential to be able to adjust to these changes quickly and flexibly. The essential first step for establishing the direction in which an organization is heading is to create or update a strategic mission, vision and strategy. This information can be used to arrive at an overall strategic action plan containing projects which are distinct but which are described in broad terms. This has all been described in more detail in the first chapters of this Compendium.

However, in today's complex world, it is of vital importance for large organizations such as Customs Administrations to gain a more precise overview of the relatedness and impact of these distinct projects. There are too many goals, drivers and external influences which might interfere or conflict. Picking just one goal as the basis for starting a project may result in partial solutions, disinvestment and implementation problems during project execution.

This section describes an architecture-driven approach to getting from a strategic action plan to concrete projects that change business processes, organization, applications and technical infrastructure. In an Enterprise Architecture, the various projects are positioned and prioritized based on their relatedness and impact. Furthermore, this section emphasizes the role played by Information Technology (IT), which is a standard part of modern business. Enterprise Architecture deals with IT systems in such a way that the latter are used by the organization to support strategic goals and changes. With this in mind, IT should have a solid and permanent place in the strategic management of large organizations such as Customs Administrations.

Method framework

To gain maximum benefits, it is crucial that architectural design and the surrounding change-management and decision-making processes be closely linked. In the diagram below, a simplified framework is used to illustrate the approach:

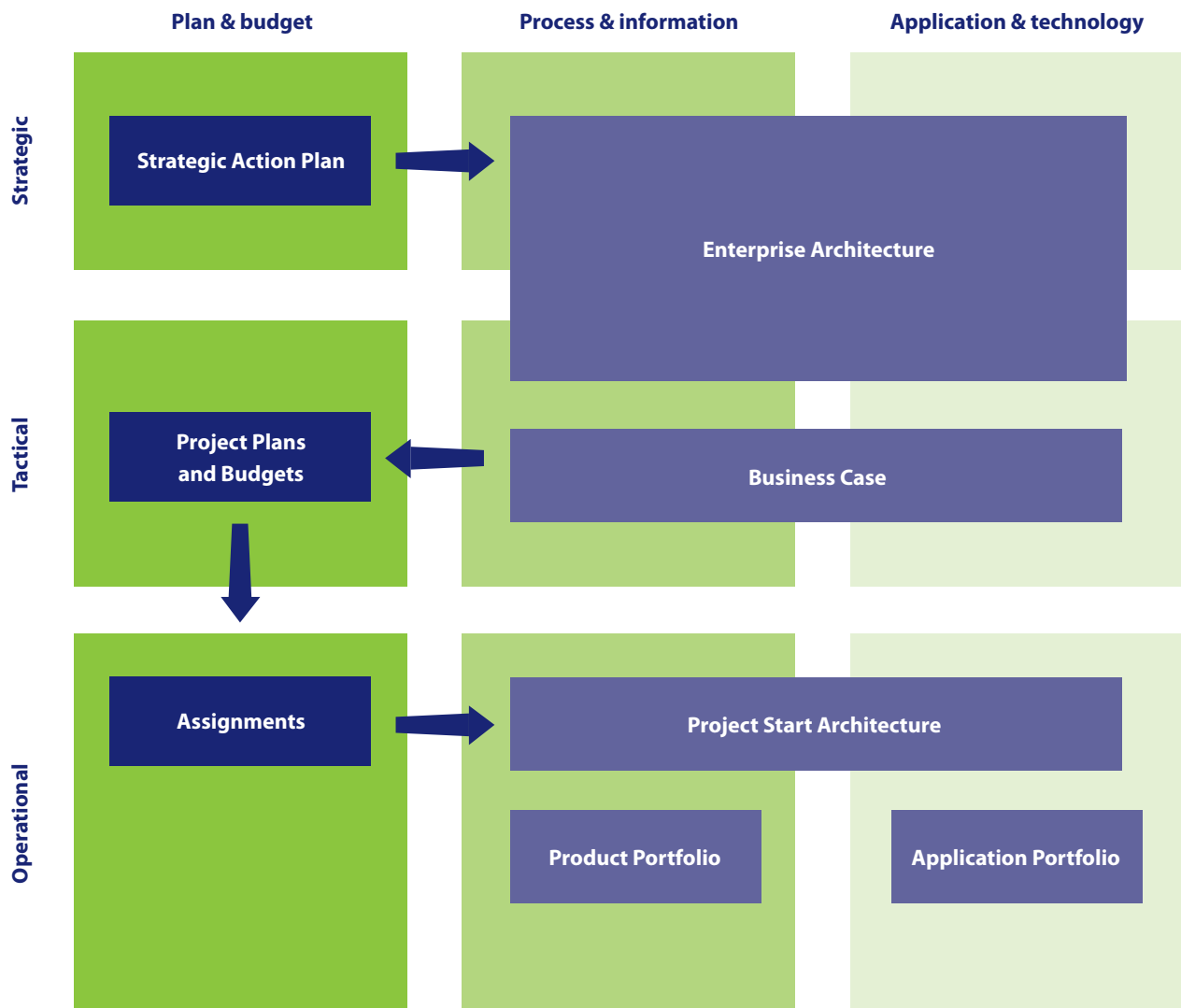


Figure 1: method framework

Key issues in this approach are:

- the notion of different levels (strategic, tactical and operational) with different time and scope perspectives, and the consistency between these levels (vertical)
- the notion of different aspects (plan & budget, process & information, application & technology) and the mutual alignment between these aspects (horizontal)
- the use of architecture to support strategic decision-making and to guide redesign and implementation projects

Levels

The first dimension of the method framework relates to the different levels.

At a *strategic level*, architecture is often called Enterprise Architecture. An up-to-date Enterprise Architecture can support management in their decision-making processes, and is also a tool to scope and guide projects. At the strategic level, it is possible with architecture management to:

- realize long-term goals;
- align changes in business processes, organization, IT applications and technology;
- combine changes and prioritize and sequence projects;
- divide the IT of a Customs Administration into multiple, autonomous areas to facilitate development;
- decide on high-level principles and make design decisions;
- indicate black spots and risks;
- indicate the impact of changes in legislation, milestones, and budgets.

At a tactical level, the Enterprise Architecture can be given more detail, covering the next 1-3 years. Furthermore, business cases and scenarios can be used as instruments to support decision-making for certain areas within the Enterprise Architecture.

At the operational level, assignments for projects are prepared and projects are executed. At this level, the role of architecture is mainly focused on feasibility and on guiding design and construction for a single project or change:

- supporting a business case before the project start;
- designing interfaces with related systems;
- usage of underlying technical infrastructure components;
- indicating project development risks and measurements.

Aspects

The second dimension of the framework relates to aspects.

The planning aspect is not directly part of the architecture, but is closely connected with it. It is almost impossible to derive the projects directly from strategic action plans. Doing so runs the risk that every action will result in an isolated, partial solution. Instead, it is better to start with the strategy, and then fill in the other aspects at the same level, before deriving the projects at the operational level.

The process and information aspect mainly focuses on the business side. The process aspect deals with the services a Customs Administration delivers to its external customers, the business processes that deliver these services, and the organizational structure. The information aspect deals with the information which is used internally and which is exchanged with external parties.

The application and technology aspect focuses on the IT side. It describes the applications or IT systems which support the business processes, and the technical infrastructure which is needed to run these applications.

Products

The third dimension of the framework relates to the various architecture products:

The main goal of an Enterprise Architecture is to act as a bridge between strategic choices and objectives on the one hand, and operational activities on the other. An Enterprise Architecture must provide an overview of all relevant aspects in order to support strategic decision-making.

It is good working practice to design and update the Enterprise Architecture periodically, for instance on a yearly basis. As part of this, goals, mission, vision and strategy are compiled and drivers and changes are identified.

Business cases are used to facilitate decision-making at a strategic or tactical level. In cases where the Enterprise Architecture is not up-to-date or lacks the right level of detail, these architecture products can be very helpful not only for decision-making, but also for inputting into the operational level.

Examples are investment decisions or make-or-buy decisions.

The Project Start Architecture aims to create a high-level design document which contains business needs on the one hand, and IT solutions on the other. A Project Start Architecture must be able to establish whether a required change is technically feasible and can be realized within the time and budget constraints.

It is good working practice to start designing a Project Start Architecture only when there is a project assignment and it is uncertain whether the required change is feasible.

The product portfolio is a catalogue of products and services the organization delivers, both externally to other organizations or customers, and internally to other business processes.

The application portfolio is a catalogue of applications currently in use by the organization. It can be used to gain a more detailed insight into the current situation, but also to flag end-of-life situations so that replacement or renewal can be planned in time.

8.3. Enterprise Architecture in Customs

This section describes in more detail a possible approach to building an Enterprise Architecture and when to do so.

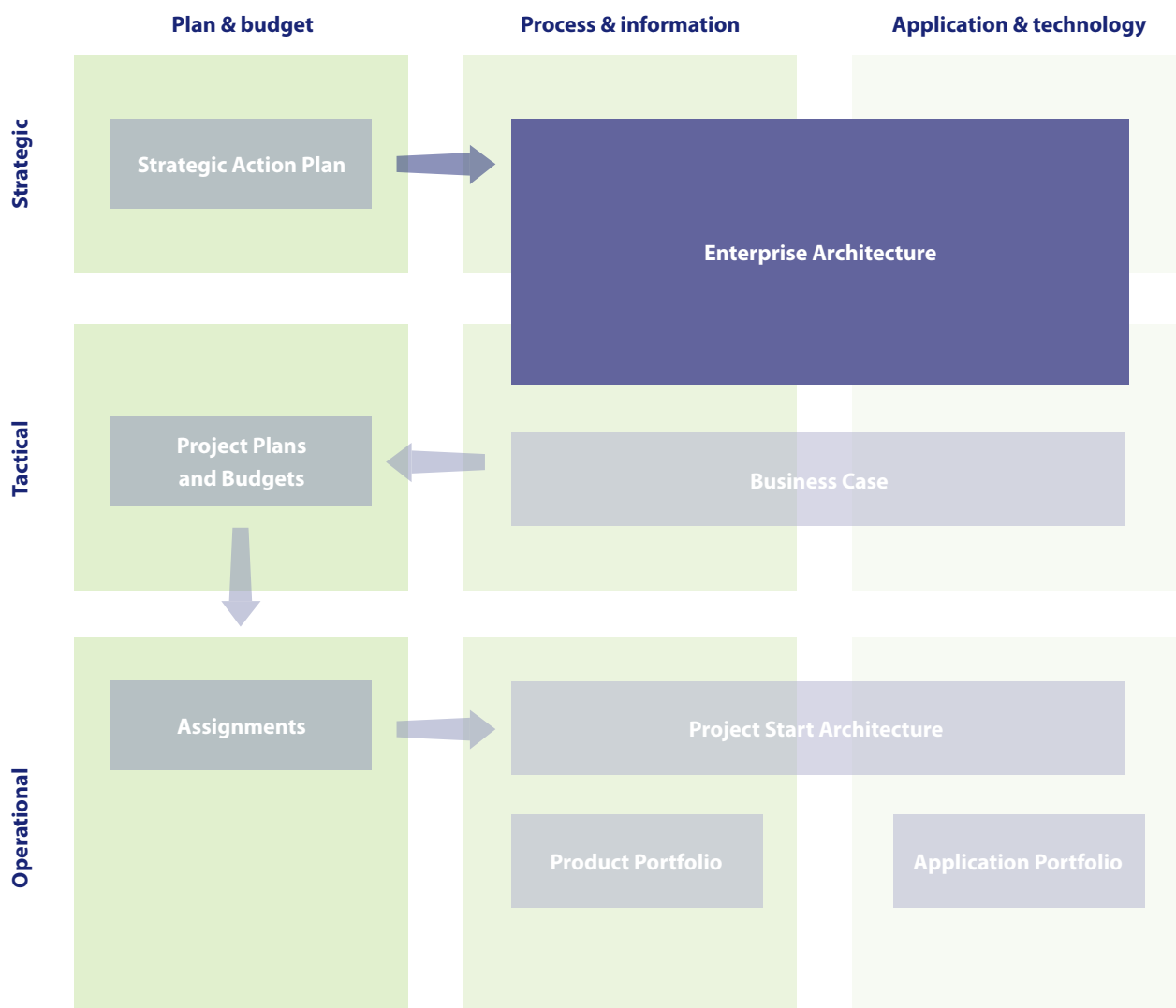


Figure 2: method framework - Enterprise Architecture

The main goal of an Enterprise Architecture is to act as a bridge between vision, strategic choices and objectives on the one hand, and operational activities on the other. In order to do this, an Enterprise Architecture must combine all the relevant aspects, at the right level of detail.

A commonly used definition of architecture is:

“The fundamental organization of a system, consisting of components, their mutual relations, the relations to the environment, as well as the principles that guide the design and evolution of the system”.

For Enterprise Architecture in Customs Administrations, this means:

“The fundamental organization of a Customs Administration, consisting of business processes, organizational entities, applications and technical infrastructure components, their mutual relations, the business services provided to the environment, as well as the principles that guide the design and evolution of the Customs Administration’s processes and applications”.

Several methods exist for setting up an Enterprise Architecture: TOGAF’s Architecture Development Method (ADM), Dynamic Architecture (DYA), Enterprise Architecture Approach (E2A), Enterprise Architecture Process Model, Federal Enterprise Architecture (FEA), etc. However, the approach chosen here is not to elaborate on one of these methods, but to briefly address the topics

which are generally included in any Enterprise Architecture.

Topics that need to be addressed in an Enterprise Architecture:

- Change drivers and requirements
- Vision
- Process viewpoint
- Information viewpoint
- Application viewpoint
- Technology viewpoint
- Roadmaps

Change drivers and requirements

An important input for an Enterprise Architecture are the changes or change drivers. Changes can be derived from objectives, and can be both internally and externally driven. At the level of an Enterprise Architecture, changes can be seen as the high-level requirements.

A possible way to determine the relevant changes needed is to examine the categories below:

Change category	Source(s)
Policy	Information from Government, Ministry, Customs on policy
Pull	Information from Customs on goals, drivers, strategy, new developments, problems and bottlenecks related to functionality
Push	Information on new developments and trends from customers, standardization organizations, market research organizations, IT vendors
Portfolio	Information from the IT department, end-of-life technology, problems and bottlenecks related to applications and technology

It is important not only to determine the changes needed, but also to analyse them:

- What will be the impact of these changes on the business processes, information, applications and technology?
- Which changes will affect the same process or application and should be combined?
- Are there conflicting changes?
- When should these changes be implemented?

An example of a change driver is the need to lower the administrative burden on traders. Analysis could result in exploiting documents and information already used by trade, in minimizing the amount of information exchanged between trade and Customs, in simplifying regulations, and so on. The results of the analysis can then be used to determine the high-level impact on business processes and applications and, finally, the projects that have to be started to implement these changes.

In an ideal situation, the Enterprise Architecture already in place is used to identify the impact of changes. When setting up an Enterprise Architecture for the first time, this is not possible and the impact should be based on experiences.

Vision

A vision provides an image of the desired future situation, expressed in the form of long-term objectives and general principles, and describes how the interests and objectives of the most important stakeholders will be served. The vision should focus on what one wants to achieve within the next 2-5 years.

The *strategy* of the organization is directly linked to the vision; it describes how the organization wants to move towards this future state. No single strategy fits all situations. However, a good strategy should address the transition from the current situation to the future situation (vision), and the diverse parts of the strategy should form a coherent whole.

Based on key stakeholders' wishes and on internal and external drivers, both the vision and the strategy can be updated by using the Strategic Management tools presented in earlier chapters of this Compendium. With this information, a Strategic Action Plan can be drawn up, containing the main strategic actions. This Action Plan provides the main input for the Enterprise Architecture.

Part of the vision consists of *principles*. Architecture principles are fundamental guiding statements or general rules that structure the way in which an organization wants to achieve its objectives. Every design decision in either the Enterprise Architecture or the Project Start Architecture should be validated against the principles.

There are many generic architecture principles in the literature. It is therefore not so much a matter of defining your own principles, as of selecting an appropriate set of principles that suits your organization and objectives.

The typical elements of a principle are:

- principle name – the name of the principle
- description – the statement of the principle
- rationale/benefits – the reasoning behind the principle and, where applicable, the traceability to business objectives
- impact – impact made by the principle

Regarding viewpoints: in a typical organization, there are many stakeholders with different roles and different concerns, i.e. top management is interested in long-term goals, business managers are interested in functionality and end-user support, IT managers are interested in standardization of technology, etc.

It is difficult to cater for all these stakeholders by means of a single design. Their interests are best met when the architecture is composed of different perspectives or viewpoints. This makes it possible to address the specific needs and requirements of different stakeholders and to communicate the architectural design in a way that is understandable to them. It is also a good way of avoiding describing everything in a single picture and thereby making a design unreadable.

Process view

The process view describes the business processes a Customs Administration executes to deliver services to its external customers, and the organizational structure of the enterprise.

Besides the primary processes, i.e. the processes that result in a product or service being delivered to the external customer, and that directly contribute to the mission and goals of the organization, it is also possible to distinguish secondary processes for internal use.

For example, the business area CARGO MANAGEMENT contains business processes related to the movement of goods, i.e. import, export, transit and warehousing. TRADER MANAGEMENT contains business processes that deal with trader licences and certificates, and inspection of traders' administrations.

Information view

The information view describes the information used within the organization, and the information exchanged with external parties. This view can also act as a glossary of terms.

For example, it can contain the definition of a DECLARATION, a TRADER, a LICENCE, etc.

Application view

The application view focuses on applications. At this level, an application is a piece of software which is meaningful for the end-user organization.

Typically, the application viewpoint could contain a set of architecture principles to guide design and construction, and landscape maps to give an overview of the current and future situation. The last section gives an example of how to construct a landscape map which can be used in this view.

		Business Areas				
		Cargo management	Tracer management	Risk management and intelligence	Data management	Support and other
Function areas	Information exchange	K				
	Risk assessment	L				
	Levy	A+D				G
	Support		E	L	F	H I
Data Areas	Declaration data					
	Tariff data	B				
	Tracer data	C				
	Employee data	J				

Figure 3 : example of a landscape map

Viewpoints are different perspectives of the same thing. It is therefore essential to keep the views in alignment. This means not only that the viewpoints can be related, but also that they have the same level of detail and the same time scope.

For example, it does not make sense to have applications which do not serve any business process. Consequently, it should be possible to link applications in the application view to business processes in the process view.

Technology view

The technology view deals with technical infrastructure components. Technology is not really specific to the Customs domain: every large organization which processes large amounts of data has to deal with technology issues which are more or less the same. The advantage of this is that a lot of generic technology products are available to support Customs applications.

The technology view can be split up into several technology areas, for example:

- network – connectivity, networking technology
- platforms – hardware and operating systems
- middleware – database management systems
- security – identification and authorization systems
- service management – service management tools, backup and recovery

Roadmaps

At this point, changes are identified and analysed, a vision is stated, and the high-level design and the guiding principles are described for all the aspects. The final step in constructing the Enterprise Architecture is to define roadmaps.

In this way, the architecture at a strategic level is an important input for action plans at a more operational level.

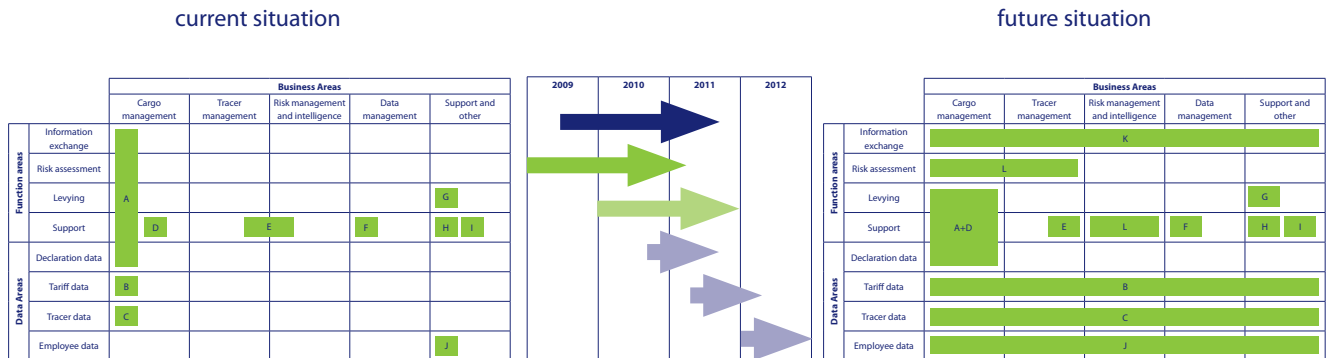


Figure 4: deriving roadmaps from landscape maps

For each business area, the projects that have to be started in order to implement the desired changes can be displayed in a high-level time schedule which includes milestones and dependencies with other projects. Every project should be explained in more detail, and a business case is probably needed to justify the investments. Then, when a project actually starts, a Project Start Architecture can be constructed to guide the project.

By way of example:

Projects in 2009

- start a project to purchase a new system L
- start a project to build a new system K

Projects in 2010

- continue with the implementation of system L
- start a project to combine system A and D
- start a project to extend system B

Projects in 2011

- continue with the project to combine system A and D
- continue with the project to extend system B
- start a project to extend system C

Projects in 2012

- continue with the project to extend system C
- start a project to extend system J

8.4. Business case

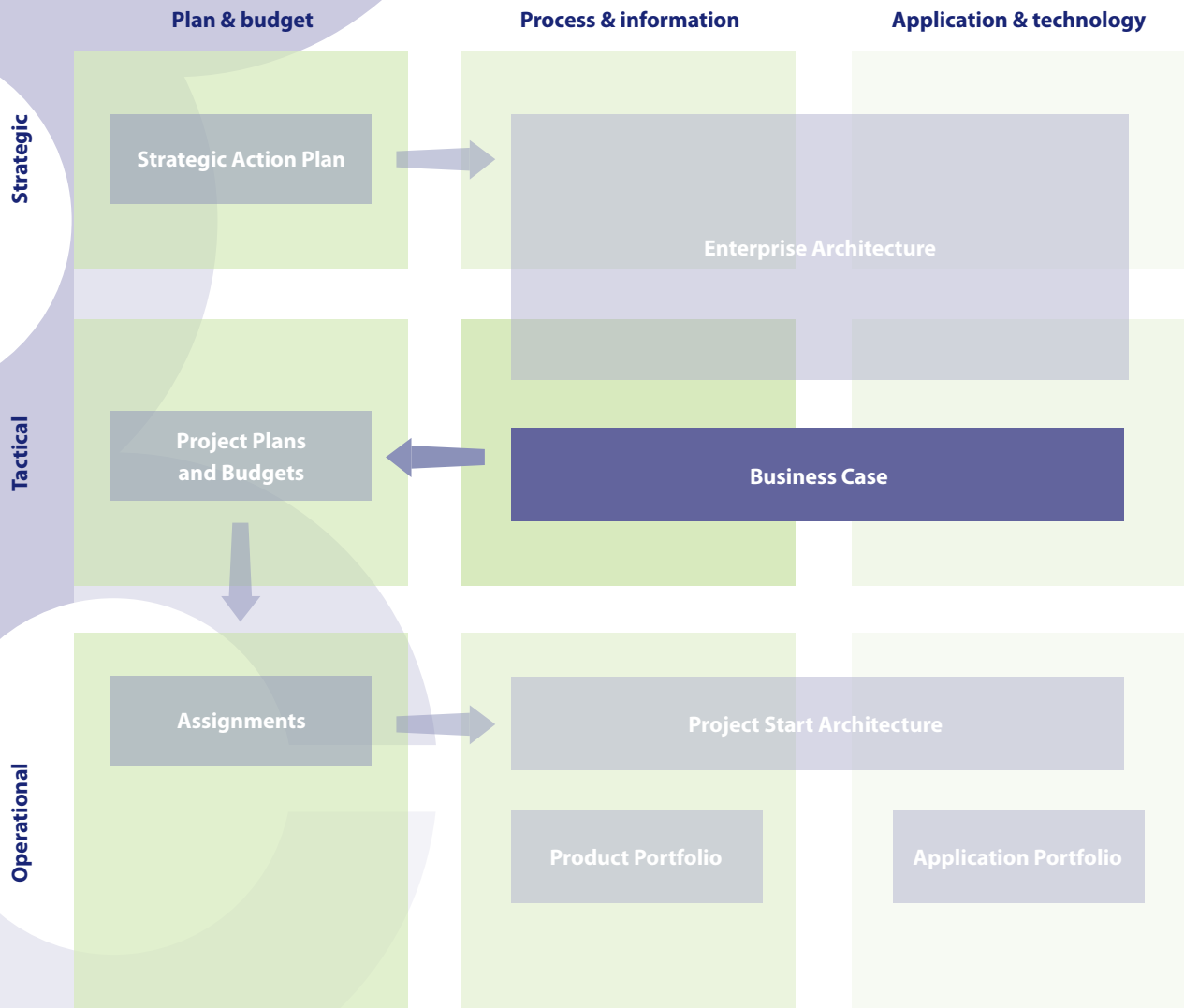


Figure 5: method framework – business case

One of the goals of the architecture is to support decision-making. An Enterprise Architecture is very useful for this at a strategic level. However, in order to decide whether to start a new project, it might be necessary to have more detailed information, or to work up more alternatives or scenarios before the project actually starts. In these situations, business cases are a good add-on to the Enterprise Architecture.

Business case

First of all, the proposed solution has to be described. An explanation should be given as to why this is the preferred solution at this time. If appropriate, alternatives should be described, with their advantages and disadvantages. This is very useful if there is more than one option to choose from but insufficient information at the Enterprise Architecture level to make a decision. An example of an alternative is when a re-use/buy/build decision has to be made.

Another alternative is to do nothing – for example, to defer the project for a certain period of time.

Projects have specific costs, benefits and risks. A business case can take these elements into account, and can be used to justify starting a new project. What are the costs of the project? Which benefits will the project have for the organization? What are the risks of the project?

- Costs mean all project-associated costs and the ongoing operational costs like licence and maintenance costs that will change as a result of the project. Describe the cost assumptions and the level of confidence in the estimates. Use total cost of ownership (TCO) analysis to ensure that all costs are recognized.
- Benefits are not only estimated savings, but also the project's contribution to business goals.
- Risks are related to successful implementation. The business case should describe the strategies to manage and mitigate risks.

8.5. Project Start Architecture

Assignments for projects are prepared and projects are executed at the operational level. At this level, the role of architecture focuses mainly on feasibility, on translating high-level goals into specific goals, and on guiding design and construction for a single project or change.

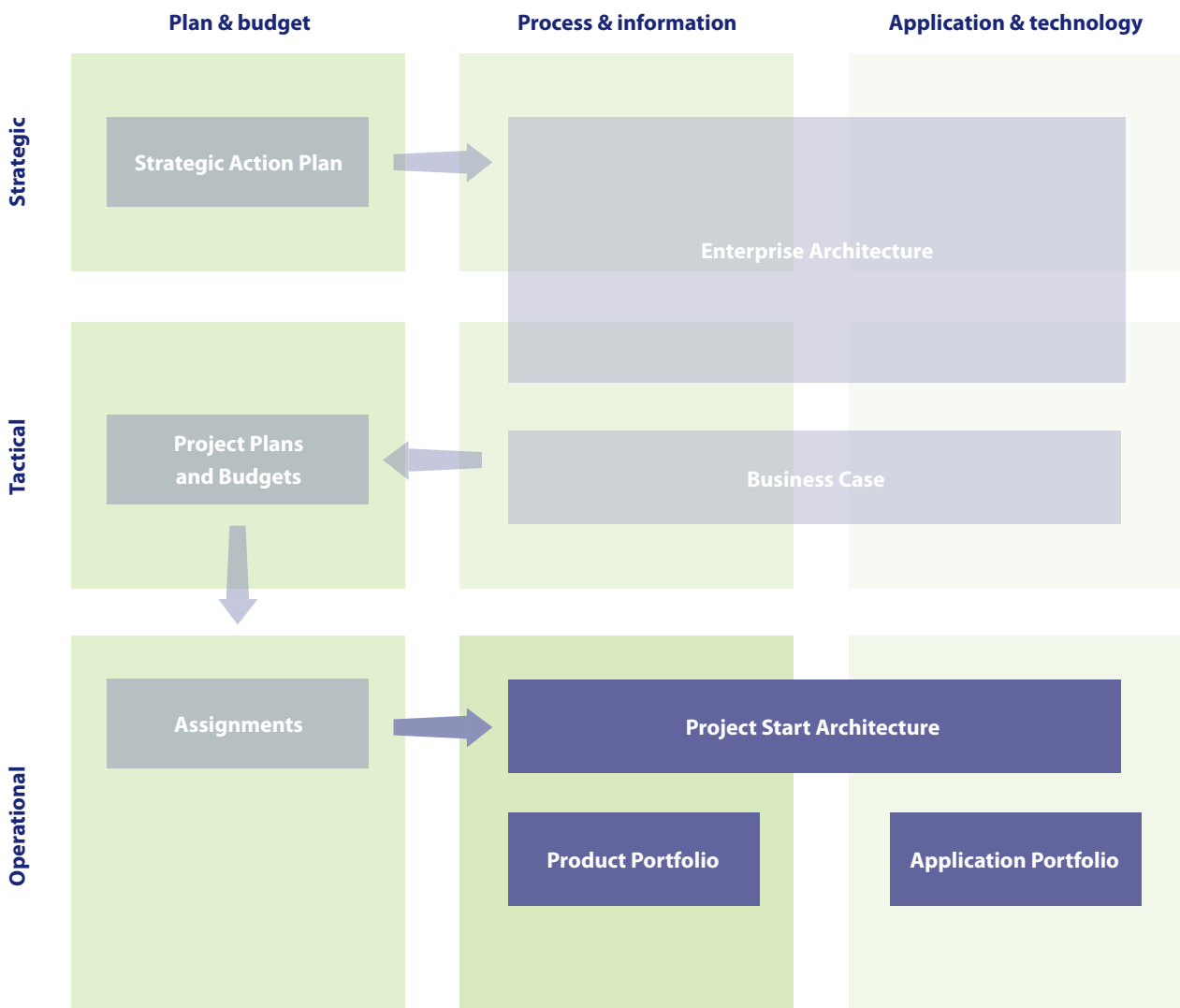


Figure 6: method framework - Project Start Architecture

To be helpful, a Project Start Architecture needs to contain 'just-enough, just-in-time' architecture. "Just-enough" here means that everything that is outside the scope of the project is not included in the architecture, and that the level of detail is sufficient to start and guide the project. "Just-in-time" means that the architecture is constructed just before the project is due to start. In this way, the architecture is always up-to-date when the project begins.

A Project Start Architecture contains project-specific information related to goals, scope and the assignment. As with the Enterprise Architecture, a Project Start Architecture also contains a holistic view of all relevant viewpoints.

8.6. Architecture usage in practice

In this section, some practical examples of using architecture are described.

Architecture principles

Examples of architecture principles:

principle name	AP.1 common use of applications
description	Development of applications that can be used enterprise-wide is preferred.
rationale/benefit	Business processes with strong similarities could be served by one application. This gives fewer applications in total. Also, common use leads to standardization within the organization.
impact	• Development of applications that can be shared should be planned. • Development of a new application is not allowed if an alternative is already available.

principle name	AP.2 common use of data
description	Data that is common to multiple business processes (for example trader information, tariff information) must be shared. Data is accessible for everyone within the organization with the right authorization.
rationale/benefit	Data is a crucial asset in executing business processes. Insufficient access to data leads to problems with efficiency and effectiveness.
impact	• One organizational unit should be responsible for the common data and its quality.

principle name	AP.3 applications are interoperable
description	Applications have the ability to interoperate with other internal and external applications.
rationale/benefit	Business processes are part of larger process chains which could be internal but also partially external. Within these chains, information is exchanged. The corresponding applications should facilitate this information exchange.
impact	• Use of open standards for information exchange. • The technical infrastructure should support interoperability with external entities.

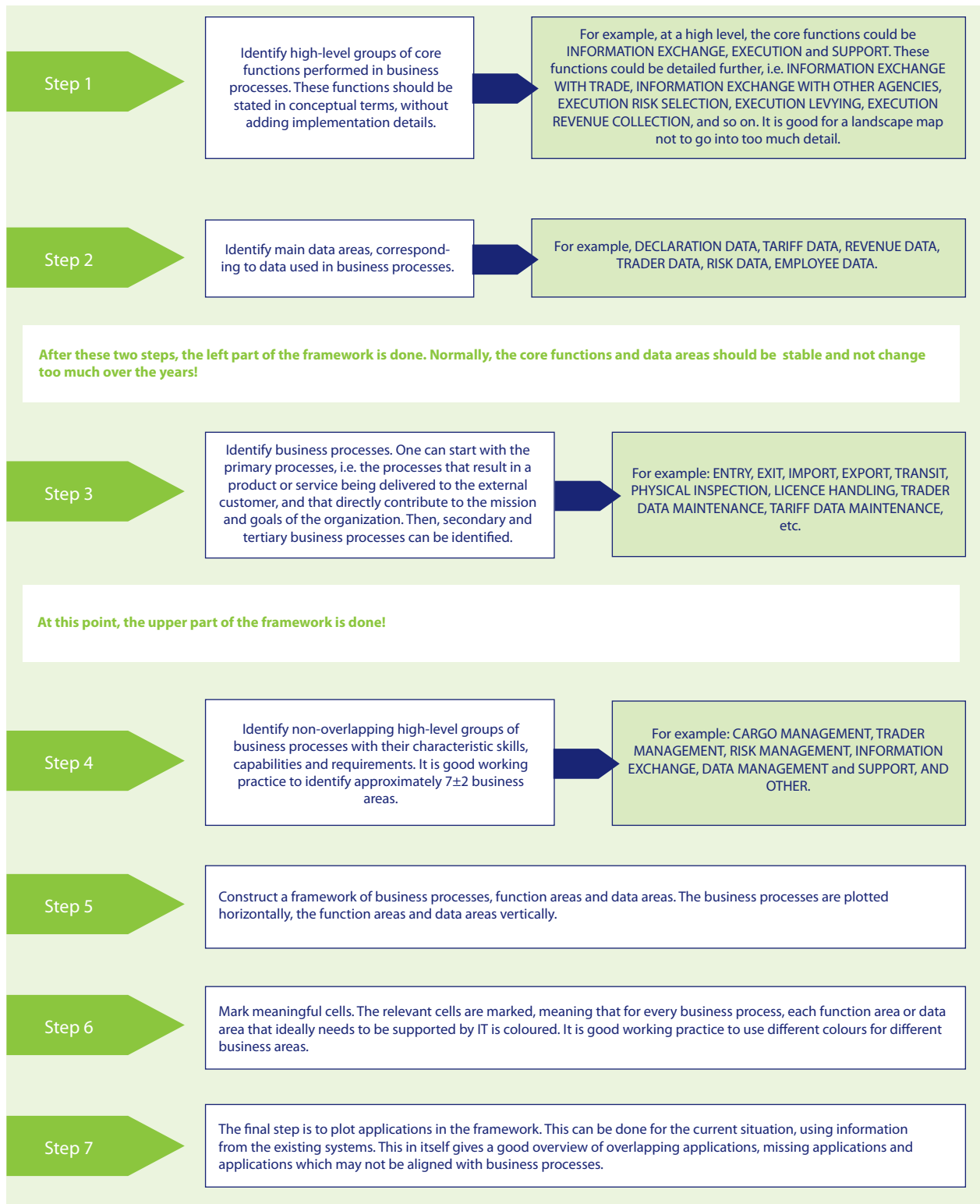
principle name	AP.4 re-use before buy before build
description	Before a project is started, management decides whether to re-use, buy or build the solution, in that order. • Re-use the existing solution if it is suitable or can be adjusted within the time and budget. • Otherwise, investigate buying a commercial solution if it is available. • Finally, build a bespoke solution if re-using and buying are not possible.

rationale/benefit	Using an existing solution is often easier and less time-consuming than developing a bespoke solution.
impact	• Buying a commercial solution often implies that processes have to follow the solution. • Commercial solutions should fit within the overall architecture to avoid isolated solutions.

Landscape maps

A typical Customs Administration uses many applications. It can be difficult to have an ongoing overview of these applications and their interdependencies. A very useful way to provide one is by using landscape maps. In a landscape map, business processes, function areas, data areas and applications are combined to give one high-level overview.

An overview landscape map could be drawn up using the following steps:



		Business Areas				
		Cargo management	Tracer management	Risk management and intelligence	Data management	Support and other
Function areas	Information exchange					
	Risk assessment					
	Levyng	A				G
	Support	D	E		F	H I
Data Areas	Declaration data					
	Tariff data	B				
	Tracer data	C				
	Employee data					J

Figure 7: example of Customs IT landscape map

Landscape maps can be used to illustrate the current applications portfolio. In addition, however, landscape maps can be used to visualize change by using the same framework for both the current situation and the future situation. In such a case, future applications are based much more on architecture principles and high-level design decisions. Using the same framework means that both diagrams are comparable and give a good overview of necessary changes.

		Business Areas				
		Cargo management	Tracer management	Risk management and intelligence	Data management	Support and other
Function areas	Information exchange	K				
	Risk assessment	L				
	Levyng	A+D				G
	Support		E	L	F	H I
Data Areas	Declaration data	A+D				
	Tariff data		B			
	Tracer data		C			
	Employee data		J			

Figure 8: example of Customs IT landscape map for the future situation

Compare and collaborate

The European Commission aims to improve the security of the external borders of the European Union and to facilitate trade. A network of all the EU Member States has therefore been established. As a result, the Customs organizations of the 27 Member States of the European Union have to act as if they form one virtual Customs. This network has been in place for many years, but new demands make further co-operation necessary.

In 2005, 10 Member States conducted a study called "Benchmarking Customs IT Architecture" to compare the current organizational contexts, business processes, systems and future ambitions of ten Member States. Enterprise Architecture ideas have been heavily used in this study. By making use of landscape maps, it proved to be possible to compare the current and future situation of different organizations at a high level.

These high-level overviews proved to be very successful, not only in providing a comparison, but also in benchmarking and identifying opportunities for collaboration. Organizations with the same problems can:

- start to jointly develop a new solution;
- incorporate the solution or solution design used by an organization which has already solved the same problem;
- fill in the framework with open-source or commercially available solutions.

It is important in this context that the landscape maps be comparable, i.e. preferably based on the same framework and level of detail, and with the same time scope.

Implementation of the WCO SAFE Framework of Standards

WCO Members have developed a regime that will enhance the security and facilitation of international trade: the WCO SAFE Framework of Standards to Secure and Facilitate Global Trade. The WCO Framework sets out a minimum threshold of principles and standards for adoption by WCO Members.

Enterprise Architecture can be a helpful instrument to identify business processes and applications that have to be changed in order to comply with the standards, and to plan the changes. There is no single answer to what is the best way to implement the WCO Framework. The right steps depend to a very large extent on the organization's current situation, strategic goals and priorities. However, some practical guidelines can be given.

Step 1 - analyse the WCO Framework of Standards

An approach could be to implement the standards one by one. This may be possible for some standards, but for others there are interdependencies. The following tables therefore show implementation per business area, and the impact of each standard on the various business areas. In this way, changes can be combined and planned at a higher level, and implementation can be based much more on business processes.

WCO Standard	Business Area	Applications and/or Technology
1.1 Integrated Supply Chain Management	CARGO MANAGEMENT	CM.1 ensure the integrity of the consignment CM.2 consistent control standards CM.3 controls at departure
	RISK MANAGEMENT AND INTELLIGENCE	RM.1 risk-assess cargo movements, either based on shared risk profiles, intelligence and Customs data, or by verification of consignment integrity RM.2 risk-assess cargo movements for Authorized Economic Operators for simplified and rapid release procedures RM.3 collect and share intelligence information between Customs organizations in order to facilitate risk assessment
	TRADER MANAGEMENT	TM.1 sealing TM.2 Authorized Economic Operators TM.3 Authorized Supply Chain
	DATA MANAGEMENT	DM.1 store declaration data based on the WCO Data Model
	INFORMATION EX-CHANGE	IE.1 exchange Customs data IE.2 exchange risk information, intelligence information and Customs data between Customs organizations IE.3 exchange declaration data with traders based on the WCO Data Model IE.4 UCR
1.2 Cargo Inspection Authority	CARGO MANAGEMENT	CM.4 -
1.3 Modern Technology in Inspection Equipment	CARGO MANAGEMENT	CM.5 usage of non-intrusive inspection equipment to support inspection
1.4 Risk-Management Systems	RISK MANAGEMENT AND INTELLIGENCE	RM.4 automated system for risk selection to identify high-risk cargo and container shipments RM.5 collect and share intelligence information between Customs organizations in order to facilitate risk assessment (WCO Global Information and Intelligence Strategy)
1.5 High-Risk Cargo or Container	RISK MANAGEMENT AND INTELLIGENCE	RM.6 automated system for risk selection and risk profile management that can be used by all cargo-management and trader-management processes
1.6 Advance Electronic Information	INFORMATION EX-CHANGE	IE.5 need for computerization IE.6 Kyoto Convention ICT Guidelines IE.7 use of Economic Operators' systems IE.8 Electronic Data Exchange standards IE.9 WCO Data Model IE.10 digital signatures
	SUPPORT AND OTHER	SO.1 ICT Security SO.2 Capacity Building
	DATA MANAGEMENT	DM.2 data privacy and data protection
1.7 Targeting and Communication	RISK MANAGEMENT AND INTELLIGENCE	RM.7 standardized sets of targeting criteria
1.8 Performance Measures	SUPPORT AND OTHER	SO.3 keep statistical reports for performance measures
1.9 Security Assessments	CARGO MANAGEMENT	CM.6 conduct security assessments involving the movements of goods with other authorities
1.10 Employee Integrity	SUPPORT AND OTHER	SO.3 encourage employee integrity SO.4 training and skills

WCO Standard	Business Area	Applications and/or Technology
1.11 Outbound Security Inspections	CARGO MANAGEMENT	CM.7 perform security inspection on request
2.1 Partnership	TRADER MANAGEMENT	TM.4 -
2.2 Security	TRADER MANAGEMENT	TM.5 -
2.3 Authorization	TRADER MANAGEMENT	TM.6 -
	CARGO MANAGEMENT	CM.8 expedited processing of goods
	DATA MANAGEMENT	DM.3 keep a register with the AEO status of traders
	RISK MANAGEMENT AND INTELLIGENCE	RM.8 reduced risk-targeting assessments regarding cargo movements of Authorized Economic Operators for simplified and rapid release procedures
2.4 Technology	CARGO MANAGEMENT	CM.9 sealing CM.10 monitoring
2.5 Communication	TRADER MANAGEMENT	TM.x -
2.6 Facilitation	TRADER MANAGEMENT	TM.x -

Step 2 – make a note of all the implications per business area

The next step is to make a note of all the implications per business area and to determine what needs to be done. Basically, this is the same table as that above, but in a different order and with the addition of possible solutions.

Business Area	Implications	Solution
CARGO MANAGEMENT	CM.1 ensure the integrity of the consignment	Declaration Handling System
	CM.2 consistent control standards`	
	CM.3 controls at departure	
	CM.4 -	
	CM.5 usage of non-intrusive inspection equipment to support inspection	Inspection Work Order System
	CM.6 conduct security assessments involving the movements of goods with other authorities	
	CM.7 perform security inspection on request	
RISK MANAGEMENT AND INTELLIGENCE	RM.1 risk-assess cargo movements, either based on shared risk profiles, intelligence and Customs data, or by verification of consignment integrity	Risk Management System: • automated calculation of risk scores based on risk profiles • manual refinement of risk scores by Customs experts • automatically transfer of declaration data from declaration handling systems to calculate risk scores • define threshold scores to distinguish between no inspection, refinement by the expert and physical inspection • access to other data sources like the register of traders with AEO status to enhance risk profiles • access to cross-information • management of risk profiles
	RM.2 risk-assess cargo movements for Authorized Economic Operators for simplified and rapid release procedures	
	RM.4 automated system for risk selection to identify high-risk cargo and container shipments	
	RM.6 automated system for risk selection and risk profile management that can be used by all cargo-management and trader-management processes	
	RM.7 Standardized sets of targeting criteria	

Business Area	Implications	Solution
	RM.3 collect and share intelligence information between Customs organizations in order to facilitate risk assessment RM.5 collect and share intelligence information between Customs organizations in order to facilitate risk assessment (WCO Global Information and Intelligence Strategy)	Intelligence System: • data warehouse which stores declaration data, risk profiles, risk scores and inspection results in order to evaluate effectiveness and produce statistics • build up cross-information (positive history, negative history, intelligence information from other Customs organizations) to use in risk score calculation
INFORMATION EXCHANGE	IE.1 exchange Customs data IE.2 exchange risk information, intelligence information and Customs data between Customs organizations IE.3 exchange declaration data with traders based on the WCO Data Model IE.4 UCR IE.5 need for computerization IE.6 Kyoto Convention ICT Guidelines IE.7 use of Economic Operators' systems IE.8 Electronic Data Exchange standards IE.9 WCO Data Model IE.10 digital signatures	Portal/Gateway System: • direct trader input • XML / SMTP channels • validation of messages

Step 3 – determine dependencies between solutions

Possible dependencies can be visualized, simply by grouping the standards per business area. The areas affected the most are CARGO MANAGEMENT, RISK MANAGEMENT and INFORMATION EXCHANGE. Careful design and planning is needed here to get compliant solutions.

Another type of dependency is that between business areas. For example, standard 1.5 describes the need for an automated risk management system. Automated risk selection needs electronic declaration information in order to work. So a possible sequence is to start with a Declaration Handling System with direct trader input or manual input. Next is the introduction of a Risk Management System to automate risk assessment. Then, a Portal/Gateway System can be developed to retrieve more declaration data electronically and prevent manual input. And finally, an Intelligence System can be set up to improve risk assessment.