



Hewlett Packard
Enterprise

HPE Enterprise Maps

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Windows and Linux Operating System

Concepts Guide

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Contents

Chapter 1: Understanding HPE EM	7
Chapter 2: Document Map	9
Chapter 3: Business and IT Alignment	10
Enterprise Portfolio Management and Business Alignment	10
Business Alignment Assessment	11
Enterprise Architect and Solution Architect Roles	11
Business Capability	12
Business Capabilities and Structure Maps	13
Business Capability Investment Analysis	14
Business Capability Risk Map	14
Chapter 4: Architecture Transformation	16
Chapter 5: Cloud Transformation	17
Chapter 6: Survey Overview	18
Chapter 7: Model Viewpoint	19
Chapter 8: Lifecycle Overview	21
Chapter 9: Artifact Validation	22
Chapter 10: Shortcut Relationship	23
Chapter 11: Product Integration	26
Chapter 12: Data Import and Export	27
Chapter 13: FinPlanner - Case Study	28
FinPlanner Solution Design	28
Modeling Business Architecture	29
Defining Core Business Functions	29

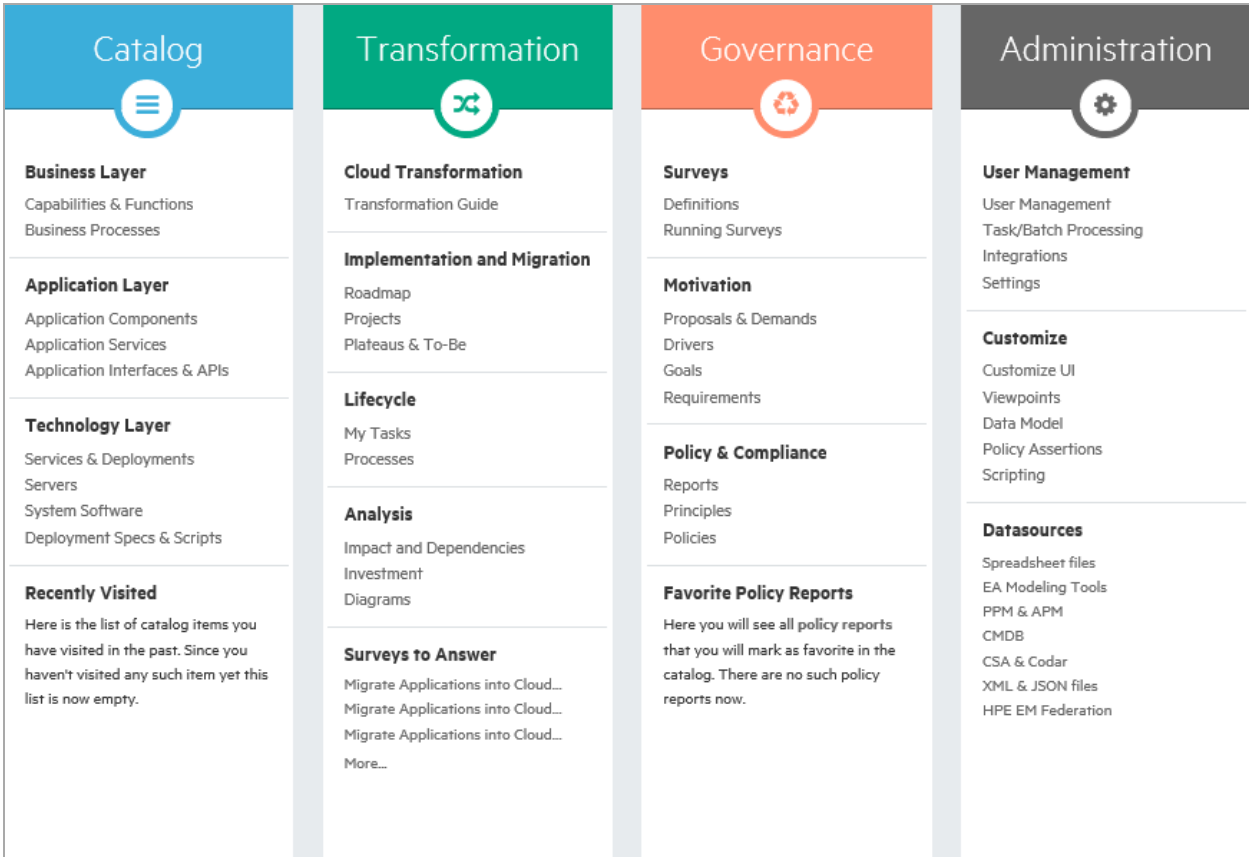
Defining Application Services Integration	30
Modeling Application Architecture	31
Modeling Technology Architecture	31
FinPlanner Initial Installation and Setup	31
FinPlanner Sparx EA Project	32
FinPlanner Summary	33

Chapter 1: Understanding HPE EM

Enterprise Maps is a software product that is an amalgamation of the IT infrastructure of an organization aligned to its business strategies, and is based on [Archimate 2.1](#) and [TOGAF](#) standards which defines a full set of architecture elements.

HPE Enterprise Maps (HPE EM) logically constructs enterprise architecture models aligned with projects, and enables you to capture and use information from various tools and across multiple locations. You can use HPE EM tools to manage your architecture model and establish a solid baseline for making informed decisions about your IT assets and infrastructure. Investments can be planned more logically after detailed analysis, thus avoiding wastage of IT resources.

Prior to using the product the user needs to understand the objective and usage of the product. This guide explains clearly and concisely the fundamentals of the HPE EM product. It emphasizes upon the architecture and tools used in implementing the business strategies and bringing to life the methodologies designed for the purpose.

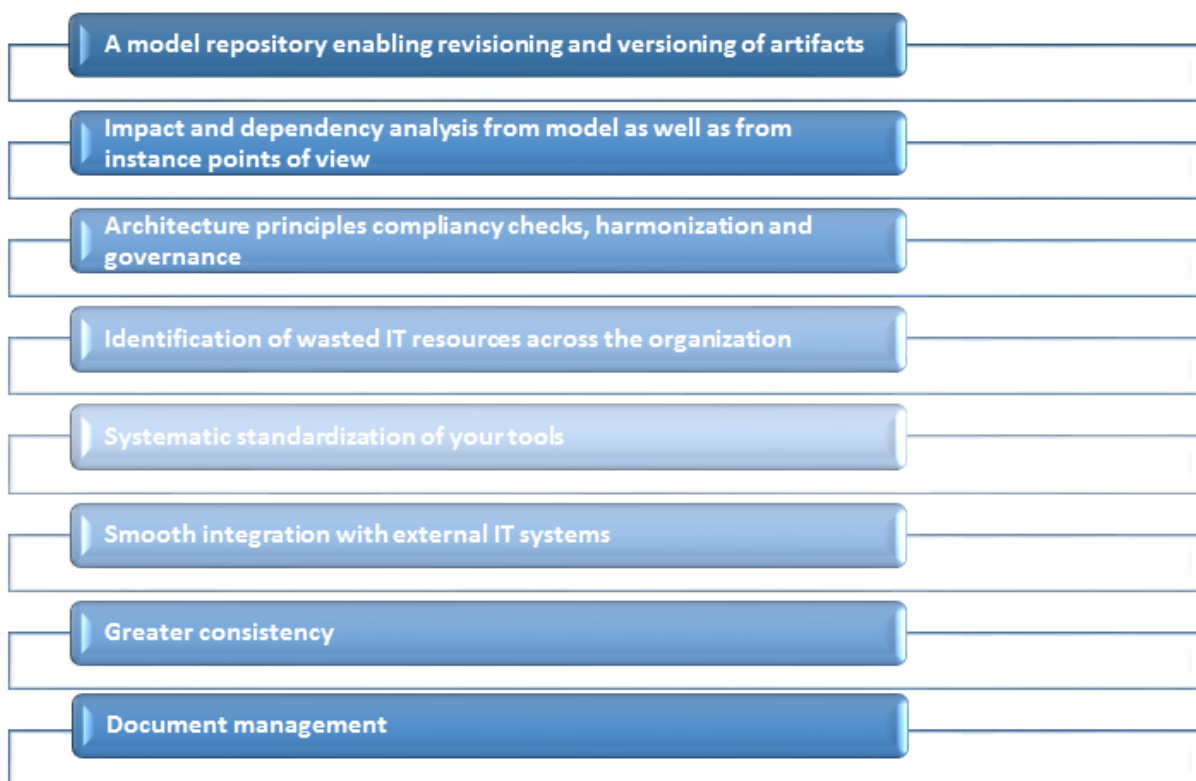


The home page above provides a synopsis of the elements in the enterprise architecture of HPE Enterprise Maps. Upon installing the product the users need to start filling up data into the catalog using the import and integration methods. A brief explanation is given below:

- **Catalog:** similar to Archimate 2.1 model Enterprise Maps comprises of several layers which form a part of the HPE EM catalog and can be navigated through the "Catalog" in the *User Guide*.

- Transformation: enables improvising, through efficient reporting capability. Allows for creation of dashboards with different layouts, or reports with personalized configuration. Further planning can be clicked off accordingly. For more details see, "Cloud Transformation" and "Architecture Transformation" in the *User Guide*.
- Governance: ensures adherence to standards, compliance, KPIs, time-lines and quality. These controls accelerate the process of decision making and execution. For more details see, "Surveys" and "Reports" in the *User Guide*.
- Administration: as an administrator you can customize and manage the UI scripts. You can exercise control on user rights and execute the integrations into HPE EM which you will learn more about in the *Administration Guide*. For more details on usage of this element see, "Administration Overview" in the *Administration Guide*.

The key takeaways to expect from HPE Enterprise Maps are:



The HPE EM product comes with a 60 days trial version. The licensed version can be purchased online.

HPE EM has been designed with the objective of providing a holistic solution for the IT infrastructure lifecycle ensuring proper allocation of resources through artifacts and documents, linking of inter-dependent elements via relationships and browsing through navigator, monitoring the dependencies through reporting across the enterprise, presenting new proposals for approval, integrating data from supported plug-ins and creating repositories and all this to be managed by role based profiles.

The Concept Guide provides an overview of the old and new features and functionalities in HPE EM which are covered in the upcoming topics. Refer the "[Document Map](#)" on [page 9](#) to see the list of topics.

Chapter 2: Document Map

The following topics are covered in this guide:

["Business and IT Alignment "](#) on page 10

["Architecture Transformation"](#) on page 16

["Cloud Transformation"](#) on page 17

["Survey Overview"](#) on page 18

["Model Viewpoint"](#) on page 19

["Lifecycle Overview"](#) on page 21

["Artifact Validation"](#) on page 22

["Shortcut Relationship"](#) on page 23

["Product Integration"](#) on page 26

["Data Import and Export"](#) on page 27

["FinPlanner - Case Study"](#) on page 28

Chapter 3: Business and IT Alignment

In today's dynamic environment, business success requires alignment of strategic business objectives with the information technology transformation. The collaboration between business and IT helps in quicker decision making once it is evident how IT impacts planned business objectives.

Objectives of business alignment include:

- Ensuring IT investment priorities are aligned with business strategy
- Making Demand Management transparent
- Achieving effective and efficient IT delivery
- Maintaining a transparent view of IT support

Both IT and business are evolving, hence instead of using outdated and incomplete enterprise architecture information stored in common sources such as diagrams, spreadsheets, or slide decks, HPE EM makes it possible to align those and additionally fulfill the following towards business alignment:

- **Comprehensive information:** structured data which contains information for each area of Business Alignment (business capability, projects, requirements, application, etc.)
- **High quality information:** continuously updated information that is mutually semantically consistent
- **Available information:** information that is centrally stored, managed, and available for analysis, planning, and control purposes.

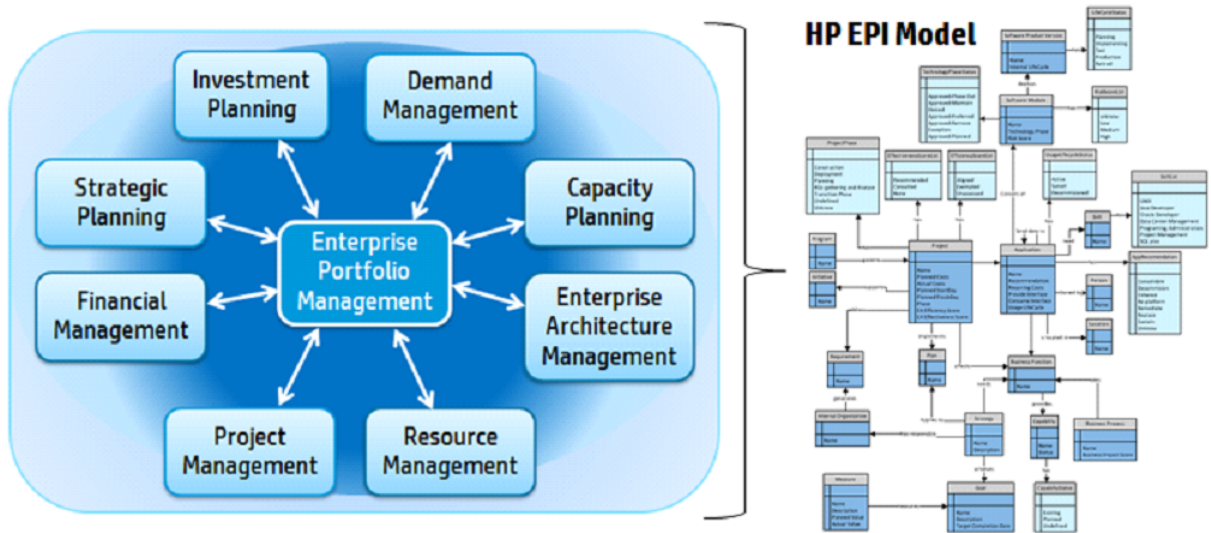
Once all of the above is achieved, the next step is to start with the implementation in line with the process.

This section covers the following topics:

- ["Enterprise Portfolio Management and Business Alignment " below](#)
- ["Business Alignment Assessment" on the next page](#)
- ["Enterprise Architect and Solution Architect Roles" on the next page](#)
- ["Business Capability" on page 12](#)

Enterprise Portfolio Management and Business Alignment

Enterprise Portfolio Management (EPM) implements business alignment strategy based on information model called the Enterprise Portfolio Information Model (EPI Model). The model consists of about 17 information entities. The rest are codebooks. It is therefore not extremely complex and at the start of implementation, can be generated as a generic design, and later be modified according to customer needs.



Enterprise Portfolio Management and Enterprise Portfolio Information Model

The EPI model covers all areas falling under Enterprise Portfolio Management. In addition to the enterprise architecture, it comprises of associations with business strategy, business capability, business requirements, and projects.

Business Alignment Assessment

The first step in business alignment is a diagnostic phase that focuses on critical IT gaps as defined by the organization’s business components. The baseline state is shown diagrammatically as well as in tabular form and both report types can be used to drive conducive discussions with senior management. After the baseline reporting on the current state is complete, the next step is to specify appropriate Key Performance Indicators (KPIs) and metrics, and to configure the initial settings of your enterprise portfolio management process and associated procedures.

The task flow of the business alignment assessment process is:

1. Identify mandatory assets in Enterprise Portfolio Information (EPI)
2. Specify business capabilities (both current and planned)
3. Analyze and import existing EPI
4. Map business capabilities to IT resources, assets, investment and strategy, etc.
5. Deliver the first business alignment assessment
6. Define KPIs and metrics for improvement

Enterprise Architect and Solution Architect Roles

The enterprise architect must ensure that the new design solution conforms to the accepted and endorsed principles of enterprise architecture governance and work with the solution architect to drive successful solution delivery. The key activities of the enterprise architect role in the process of new business capability delivery are to:

- Develop concept
- Assess alignment and impact
- Build into solution architecture approach (with vendor selection and contract negotiation as key sub-tasks)
- Develop solution architecture (after the solution architect defines development methodology)

The enterprise architect's focus is the business and IT alignment and the successful execution of a common approach to building enterprise architectures across the whole organization. Both enterprise architect and solution architect roles are critical to the new business capability delivery process.

The enterprise architect's activities guarantee the establishment of a solution concept that conforms to EA governance rules as well as business needs, and defines the architectural approach. The control function of the enterprise architect can also be shown by visualizing an individualized architectural solution.

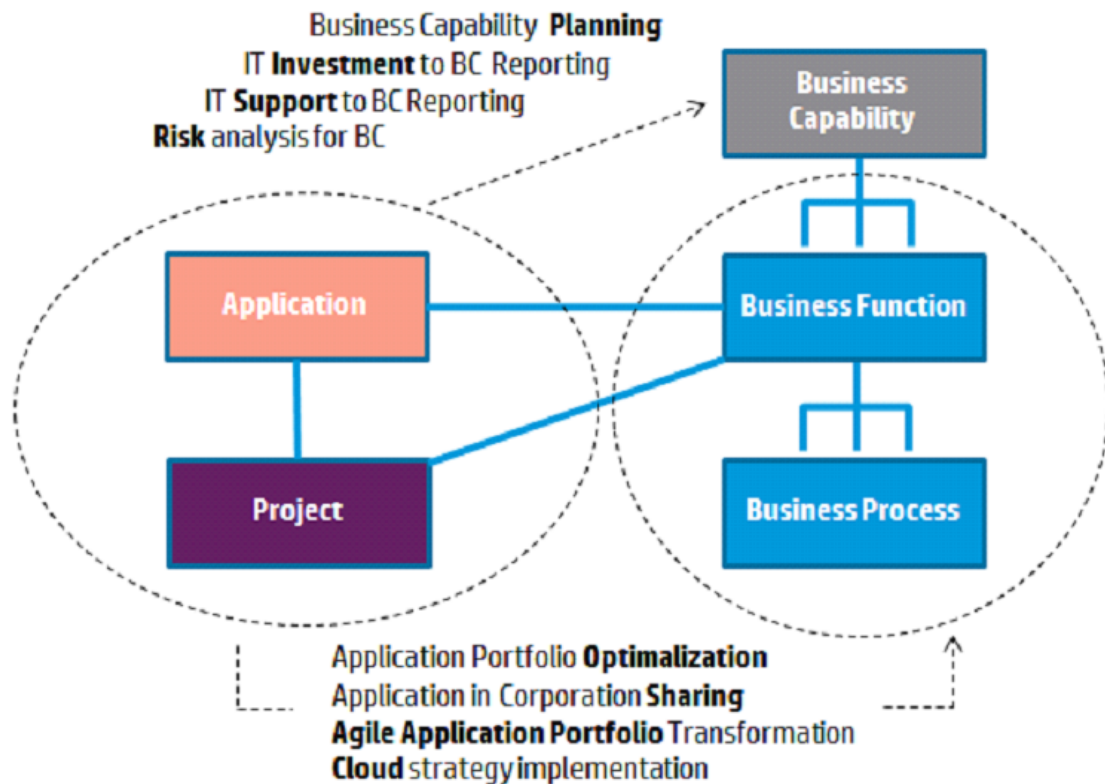
Business Capability

As deemed important, business capability is defined in the list of necessary organization skills available for actualizing business plans, regardless of whether they are supported by IT assets or infrastructure. Planning the development of business capability is the first level towards implementing the strategic business objectives of the enterprise.

The definition of business capability for your organization must cover the following:

- How to capture the business's varied interests
- What are the building blocks of the business
- How to represent stable business functions
- Are the business lines unique and independent from each other
- Are the business lines abstracted from the organizational model

Basic EPI Entities, Relationships, and Business Alignment Areas



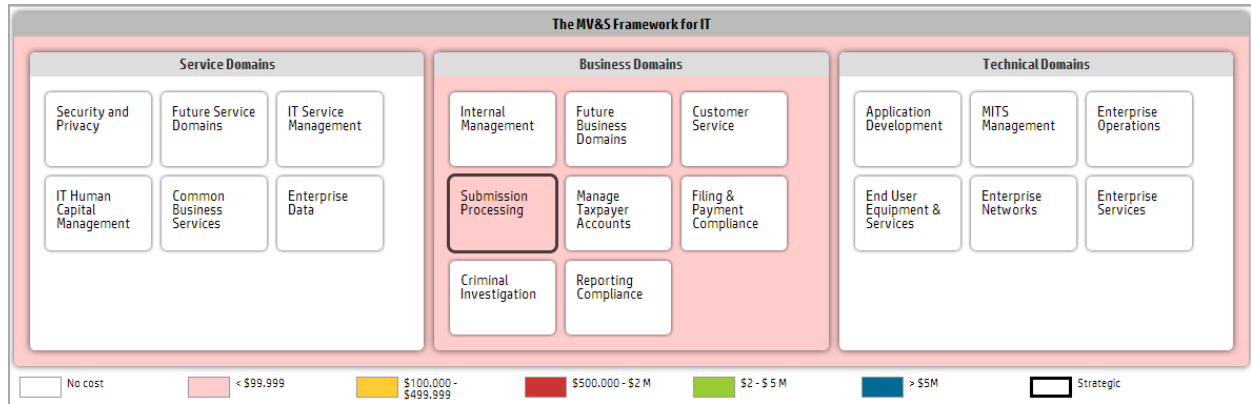
In Enterprise Maps business capability is represented in the following ways:

- "Business Capabilities and Structure Maps" below
- "Business Capability Investment Analysis" on the next page
- "Business Capability Risk Map" on the next page

Business Capabilities and Structure Maps

A summary diagram of business capabilities for the business segment is represented below by a business structure map. This map provides a comprehensive view of all the necessary business skills grouped into higher architectural segments (for example, sales and marketing, risk management, etc.). Each industry segment has its own business structure map that covers all businesses within that segment. Enterprise Maps (HPE EM) helps you to prepare for and implement business alignment strategies by providing a generic business structure map that you can use.

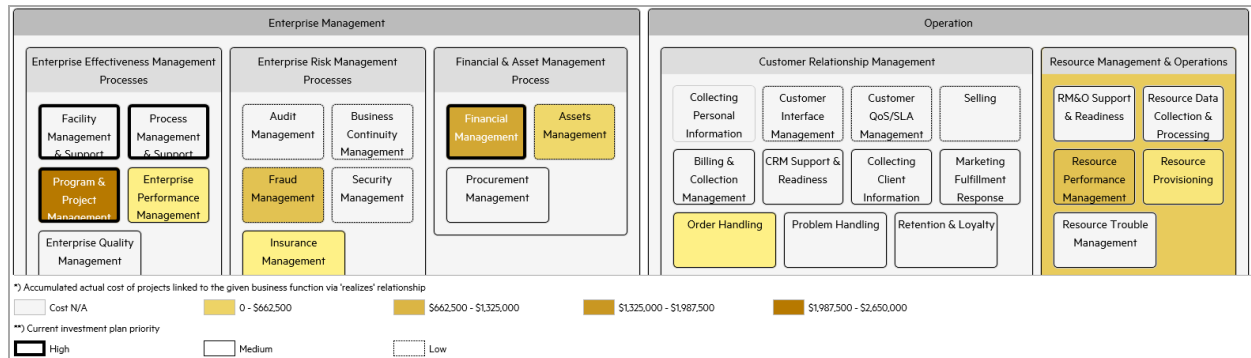
Structure Map Showing Business Capabilities of Finance Organization



Business Capability Investment Analysis

Capability investment analysis requires many steps to complete. The diagrammatic view allows senior management to easily see the measures of investment conformity to the project (shown as shaded colors) and strategically important capabilities (shown as highlighted areas). You can then provide drill-down to a list of concrete projects by a given capability. For more information, see "Structure Maps" under Reports in the *User Guide*.

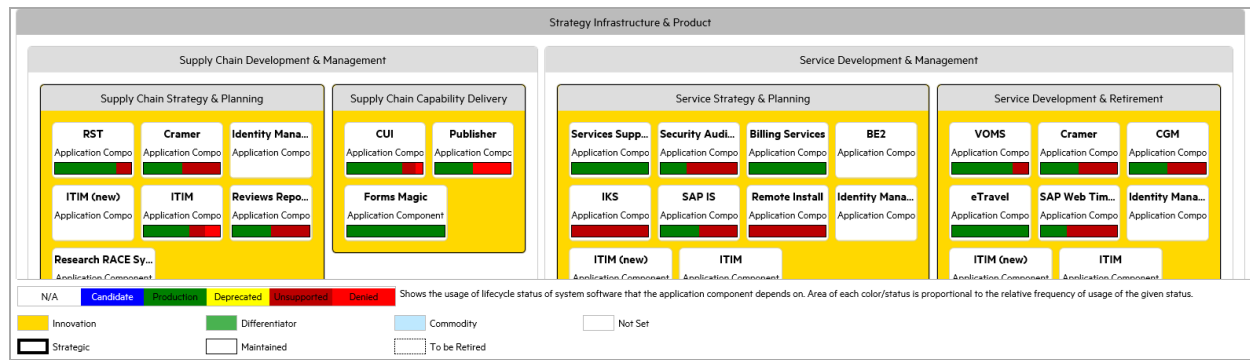
Diagrammatic View of Capability Investment Analysis



Business Capability Risk Map

The capability risk map or structure map presents a summary of applications within individual capabilities that are being evaluated for further support, any exception, dependency or architectural risks. Red shades show the measure of risk for a given capability. Strategic capabilities are highlighted in different colors and you can generate background data for deeper analysis. You can then provide drill-down to a list of concrete projects by a given capability.

Capability Risk/Structure Map



Chapter 4: Architecture Transformation

Architecture transformation is designed to offer cohesive business solution to stakeholders for their business needs. The objective is to provide a structure which is transparent, encourages wider involvement from those concerned with architecture changes, enable better control, and facilitate interoperability. Enterprise Maps (HPE EM) enables the enterprise architect to provision future states of an enterprise architecture in order to evaluate new solution architecture designs. This enables the Enterprise Architect to maintain a view of shared IT assets and to make decisions regarding asset sharing through the approved solution design of a new project. The ability to create consolidated future views in selected time slices is made possible through the export of a new solution design layout to the HPE EM repository during the Solution Architecture Design phase.

HPE EM is capable of managing not only the current architecture (as-is) but also the future architecture (to-be) provisioned for the enterprise. HPE EM uses the same artifacts as in Archimate2® Implementation, and Migration and Motivation layers to model the transformation process.

The structure acts as a catalyst in bringing together the enterprise resources and reorganize them to present a less complicated, more logical structure. One that leads the organization towards a more efficient and systematic approach in realizing the business goals.

- The HPE architecture management provides a robust architecture keeping the entire business in focus. It integrates business strategies, architecture and projects by covering and managing the requirements, successfully negating the effects of a weak project planning present in other models.
- IT related project issues are minimized with the help of proper standards of governance, smoother cross project inter-dependencies and a clear cut road-map. These measures result in saving time and money, thereby improving the overall organizational efficiency.

Chapter 5: Cloud Transformation

Enterprise Maps provides the capability to manage the Cloud transformation process for applications. This process involves surveys from different perspectives, cost analysis, reports visualization and Cloud Service Automation. Cloud transformation features can be accessed via Cloud Transformation Guide . For more details, see "Cloud Transformation Guide" in *User Guide*.

Through surveys you can gather inputs from respective stakeholders, relevant to Cloud transformation perspectives namely technical, business and financial. The results help the CIO/CTO in making strategic decisions related to the IT infrastructure of the organization. Through Cloud assessment, a survey manager can take surveys on behalf of the respondents or inform them to take assigned surveys. Once the survey results are gathered, the Cloud transformation manager can view the results in Cloud transformation reports and decide on the viability of migrating applications into Cloud. For more details, see "Surveys" and "Cloud Transformation Report" in *User Guide*.

Cost analysis helps compare real costs when deploying the applications into different Cloud data centers such as Amazon Web Service. Beside the already available data centers, others can be added for comparison to maximize cost savings. The estimation can be simply based on number of servers or can even be as detailed as per the deployment requirement. For more details, see "Estimating Cost of Deployment" and "Cloud Transformation Tab" in *User Guide*.

After completion of the assessment, integration with HPE Cloud Service Automation, helps automate creation of service designs, which is the first step towards Cloud automated provisioning. For more details, see "CSA Integration" in *Administration Guide* and HPE Cloud Service Automation documentation.

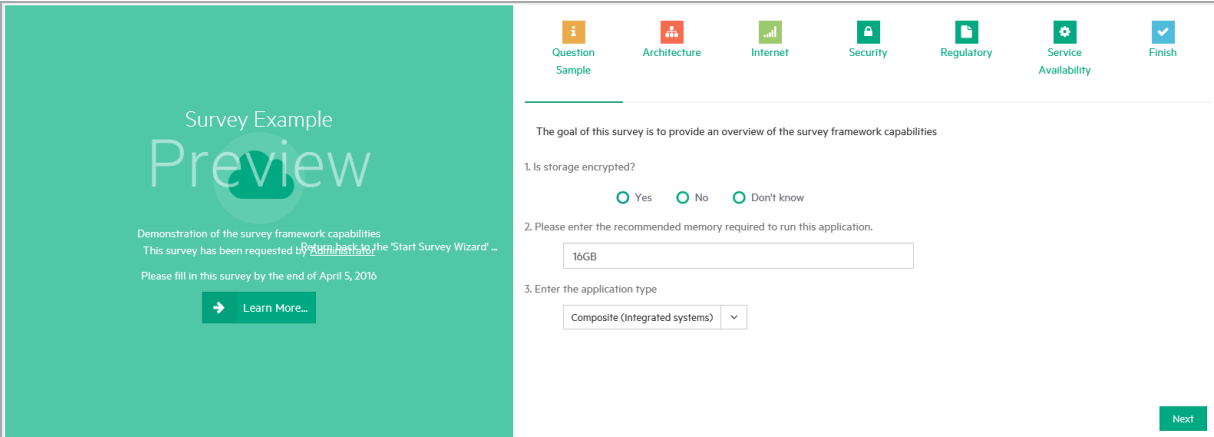
Chapter 6: Survey Overview

HPE EM provides Survey as a tool to assess the enterprise architecture changes to further enhance the usability and feasibility of the artifacts. The survey is designed to encourage valuable feedback from catalog users as per their user experience and expertise. The objective is to obtain a conclusive feedback so as to bring about improvements in the artifacts keeping in mind the organization goals.

The survey results enthuse the stakeholders to arrive at a unanimous decision on the changes required for the artifacts.

Workflow

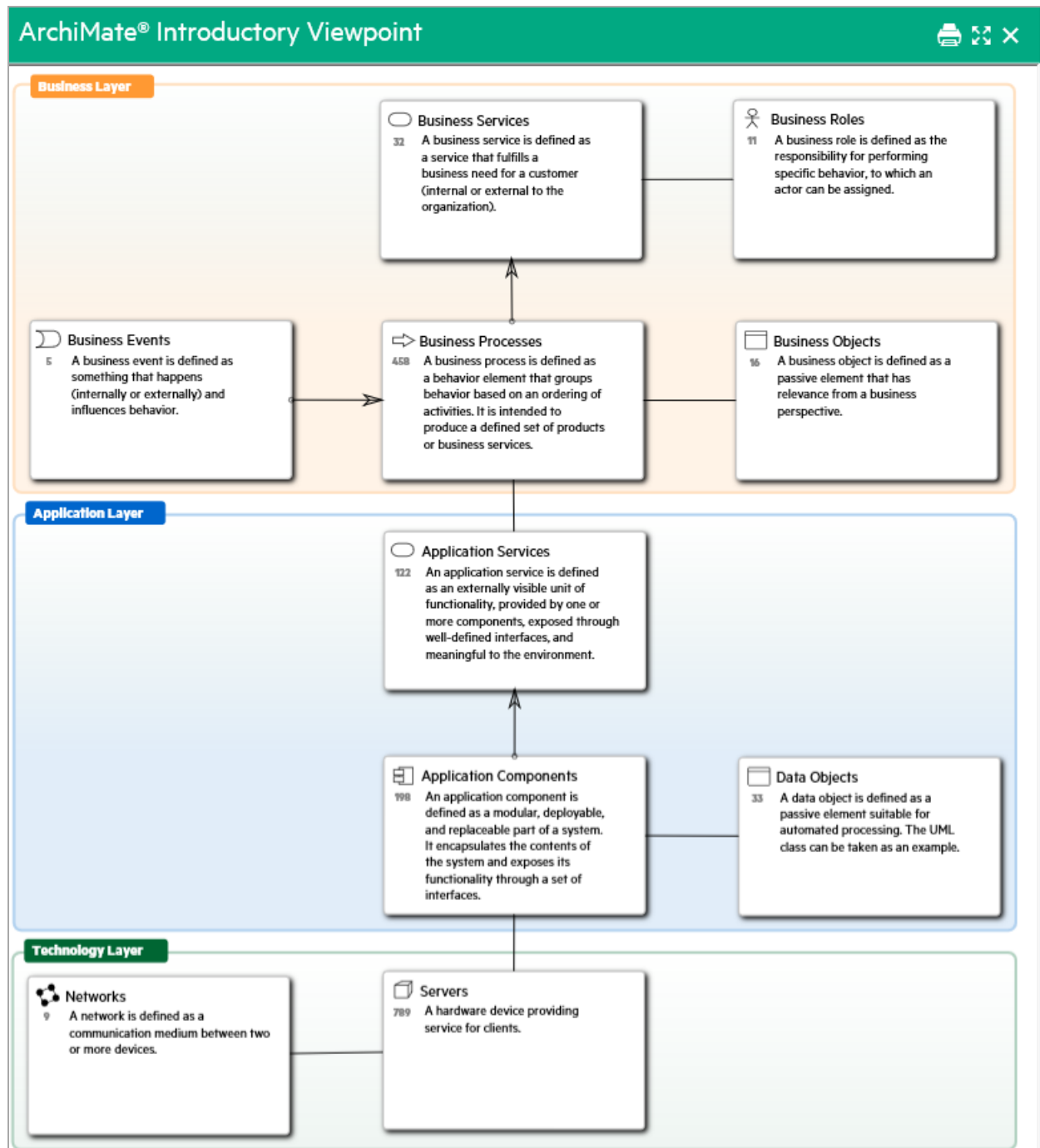
- The survey is designed through a survey definition which is a managed script on the Administrator UI. This definition is also available for the survey manager on the catalog page called the Survey Definition artifact.
- Once the definition is created and completed, the survey manager can initiate a survey and create survey artifacts from it. The artifacts to be surveyed can be selected from the list (by default all artifacts are selected). A survey definition may be associated with multiple survey artifacts.
- After starting the survey, notification emails will be sent out to all the stakeholders defined in the contact roles for each of the artifacts being surveyed. Following the email request, the stakeholders can go through the survey wizard to complete the survey. Each survey is time bound and the respondents will not be able to access the survey once it has expired.
- A survey manager, besides having the rights to start the survey is also granted with the rights to manage and monitor the surveys. This allows for editing, marking the survey as complete or if required canceling or deleting the surveys.



Chapter 7: Model Viewpoint

Model viewpoints (or viewpoint portlets) are HPE EM implementation of Archimate® viewpoints. Viewpoint portlets are defined by HPE EM managed server-side scripts. The layout of the viewpoint is specified by using an SVG file that you can create in Inkscape (see www.inkscape.org).

HPE EM distribution contains the Extension for Inkscape, which allows administrators to create and deploy new viewpoints. For more information, see "HP EM Extension for Inkscape" [EM Extension for Inkscape](#) in *Customization Guide*.



Chapter 8: Lifecycle Overview

Artifacts in Enterprise Maps go through several stages from candidate through development, implementation, and eventually deprecation and reuse. Each stage has its own specific features, and the organizations have specific requirements for the various stages. These stages can be split into development and run-time stages. Before an artifact is allowed to move from one stage to another, all necessary policy requirements and approvals must be in place.

In Enterprise Maps lifecycle processes are defined and the administrator provides the policy, task, and approval requirements. These processes are then automatically or manually applied to artifacts. Manual lifecycle tasks can be assigned to different users and can have policies that must be validated before a task is completed. Policies as well as permissions can be associated with the lifecycle process stage.

Once all the requirements and tasks are complete, the artifact owner makes a request to move the process to the next stage. If the administrator has assigned approvers, they are notified and are required to vote for approval. Depending on the transition type, the governed artifacts move to the next stage and lifecycle automatic actions defined for these stages are triggered.

Chapter 9: Artifact Validation

HPE Enterprise Maps enables you to validate your Catalog content against published policies to ensure its consistency and conformance to your business policy.

Policy management and validation uses the following artifact types:

- **Technical Policy**

A technical policy consists of a set of assertions and references to other technical policies, and serves as the central point of reference for validation. References to other technical policies enable you to collect a set of technical policies together into a larger policy enabling you to validate them collectively.

- **Assertion**

An assertion is a validation check for a single piece of data which can either pass or fail. For example, an assertion can check the following attributes of an artifact:

- **Property Values**

An assertion can check that a particular property has a value and what the value is. Typical examples include verifying that keywords are set when an artifact is created and verifying that an artifact is consumable before it enters the production lifecycle stage.

- **Related Artifacts**

An assertion can check whether a particular artifact type is associated with the artifact being verified and check property values of the related artifacts. A typical example is to verify that a service has an attached document which is categorized as a business specification document before the service is approved at the candidate lifecycle stage.

- **Data Content**

Some artifact types are expected to contain attached content. An assertion can verify that the attachment exists.

- **Artifact State**

An assertion can check various status attributes of an artifact, For example, its lifecycle status or its compliance status.

Chapter 10: Shortcut Relationship

Shortcut relationships (or shortcuts) are HPE EM implementation of Archimate® derived relationships. For more details, read *Derived Relationship* in Archimate® documentation.

Shortcuts are introduced in HPE EM for these purposes:

- Speed up Reporting

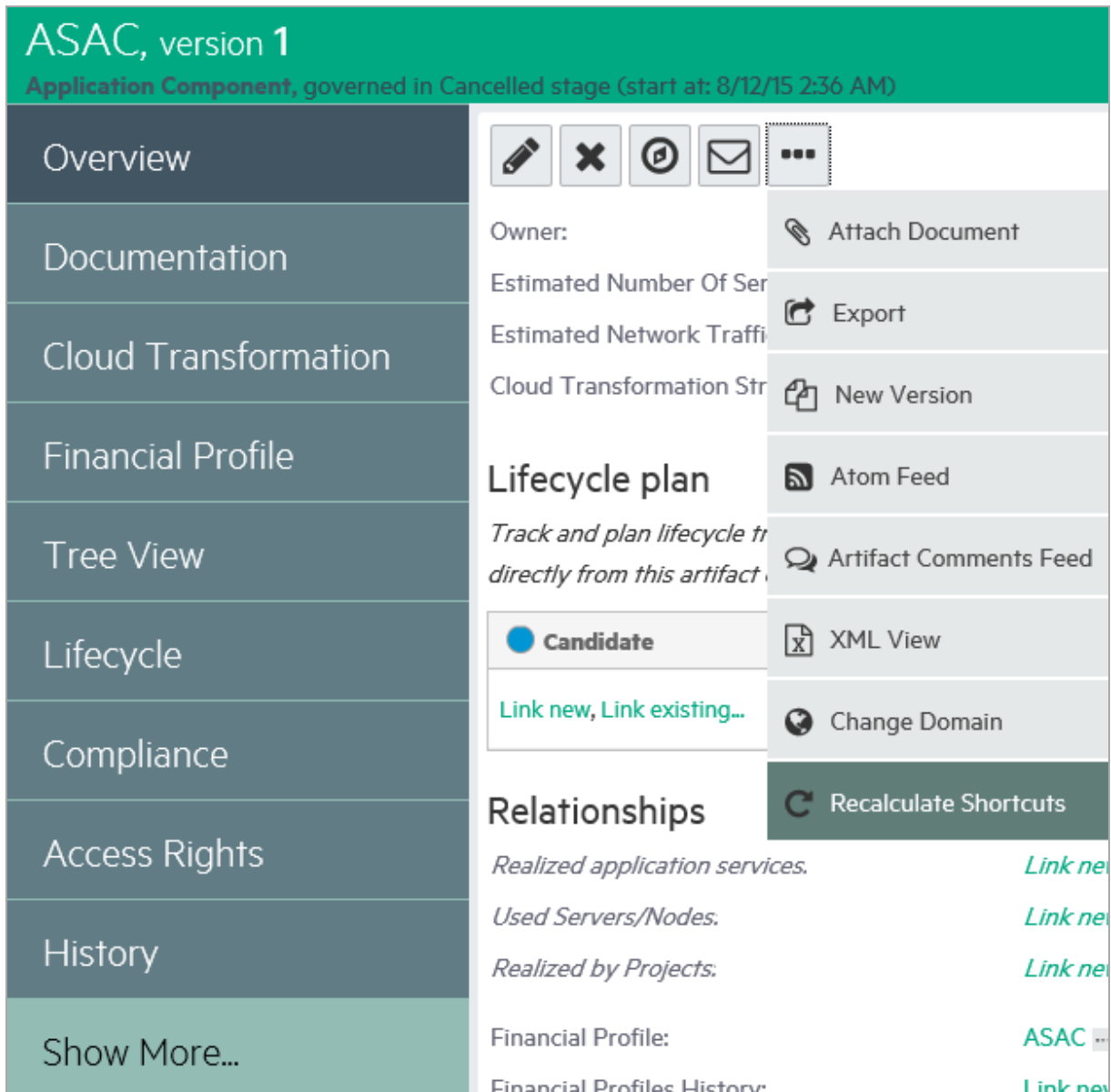
The performance of reports is improved by analyzing shortcuts instead of traversing the whole chain of direct relationships.

- Simplify the Architecture

Unimportant artifacts can be skipped when modeling the enterprise architecture while keeping it compliant with Archimate® language specification. Foreexample: modeling an application component and its providing services without modeling its detailed functions. In another example, 'Server realizes Infrastructure Service' shortcut represents the required servers/VMs of a deployment model (infrastructure service).

Shortcuts are defined as managed scripts by administrators. Due to performance reason, shortcuts may not be updated immediately to reflect the latest changes of artifacts. To avoid this inconsistency, the Shortcut Consolidation Task can be scheduled by administrators to update shortcuts frequently. In addition, Catalog users can resolve shortcuts of an artifact immediately by clicking **Recalculate**

Shortcuts from its context menu.



Shortcuts are displayed in Overview tab of an artifact in *italic* font so that they are distinguished with direct relationships. If a shortcut is defined as editable, it can be created using the UI.

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Application Component, governed in Cancelled stage (start at: 8/12/15 2:36 AM)

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Documentation	<p>Owner: 👤 Joseph Banks</p> <p>Estimated Number Of Servers: 15</p> <p>Estimated Network Traffic (GB/month): 500</p> <p>Cloud Transformation Strategy: Automated</p>								
Cloud Transformation									
Financial Profile									
Tree View									
Lifecycle	<h3>Lifecycle plan</h3> <p><i>Track and plan lifecycle transitions of this artifact. The current lifecycle status and when it was reached directly from this artifact or by linking this artifact from a plateau or deliverable. The date for the transition is shown in the table below.</i></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 25%;">● Candidate</th> <th style="width: 25%;">● Development</th> <th style="width: 25%;">● Production</th> <th style="width: 25%;">● Deprecated</th> </tr> </thead> <tbody> <tr> <td>Link new, Link existing...</td> <td>Link new, Link existing...</td> <td>Link new, Link existing...</td> <td>Link new, Link existing...</td> </tr> </tbody> </table>	● Candidate	● Development	● Production	● Deprecated	Link new, Link existing...	Link new, Link existing...	Link new, Link existing...	Link new, Link existing...
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Chapter 11: Product Integration

HPE EM includes integrations with many data sources that you can access directly from the Catalog tab catalog panel. These include modeling tools, other HPE solutions such as HP PPM and HP uCMDB, as well as CSV and XML file importing, and direct imports from other HPE EM instances. Out of the box you can integrate with these tools, provided other systems are supported as well. For more details, see "Product Integration Management" in the *Administration Guide*.

- **Enterprise Architect Modeling Tools:** You can edit the whole repository in an external diagramming tool where the data will be bidirectionally synchronized between HPE EM and the tool project space. For more information, see "Extensions for Sparx Systems EA" in the *User Guide*.
- **Project & Portfolio Management:** You can connect HPE EM to project and portfolio management solutions to import project and financial information, which enables you to analyze data in a broader IT perspective, including the application and technology layers of the enterprise architecture.
- **Configuration Management Database:** To analyze the costs, impacts, and dependencies of IT infrastructure on your business, you can integrate HPE EM with a configuration management database (CMDB). This allows the system to get information about servers and software that are part of application and business architecture. This also enables you to control the lifecycle of these entities.
- **Database:** It is possible to import data from other systems into HPE EM by integration with those system relational databases. A mapping between columns of database tables with HPE EM artifact types and properties must be created, and database connection must be configured as a data source in HPE EM application server.
- **Cloud Service:** To fulfill Cloud transformation, you need to subscribe to cloud infrastructure and make appropriate provisions to host the applications. The inputs come from HPE EM for these services.

Note: Contact your HPE sales representative to request an extra integration connector license.

Chapter 12: Data Import and Export

HPE EM provides several methods for data import and export. These include Excel/CSV files, XML file importing, and direct imports from other HPE EM instances. For more information see the information given below:

- **Excel/CSV Files:** You can import Excel/CSV files into HPE EM directly using HPE EM UI or if you have installed HPE EM on your local machine you can find a command line tool for CSV file import in the following location: `INSTALL_DIR\client\bin\csvImport.bat[sh]`. You can also download the dedicated CSV importer distribution, which enables you to use the `csvImport` command line tool. The export option is available too. Use context action directly from HPE EM tables to export CSV files.
- **XML Files:** You can publish XML files into HPE EM by using the File Import function. The XML file is analyzed and decomposed into artifacts based on a configuration file stored within script artifacts. This configuration is customizable and you can define your own for your custom XML schemas.
- **HPE EM Archives:** You can selectively export some artifacts (a whole plateau for example) from another HPE EM instance by selecting the desired artifacts in the catalog browser and clicking the Export context action. An archive file is produced. You can import the archive by using the Import Repository Archive feature. This enables you to transfer data between multiple, even disconnected instances of HPE EM. In a similar way, you may export whole HPE EM domains.
- **WebDAV:** HPE EM supports standard WebDAV protocol for importing and exporting documents. You can copy documents attached to artifacts in a HPE EM instance, then simply paste them into another HPE EM instance. The artifacts corresponding to document names are reproduced in the target instance automatically.

Chapter 13: FinPlanner - Case Study

The content of the Case Study section is a project called FinPlanner. FinPlanner is a banking application, which, through the means of an internet application, will empower clients to contract out their financial or investment aims.

This case study will show one approach, which matches the principles of building an agile enterprise architecture (Architecture Transformation), while simultaneously markedly reducing project risk connected with the definitions of scope, delivery strategy, delivery deadlines and costs.

Case Study Objectives:

- Demonstrate the approach to building an agile enterprise architecture
- Show the role of the Enterprise Architect in this process
- Show the means of working out high-level design solutions.
- Show the support of the EA application in working out a design solution
- Recapitulate the benefits for the project
- Recapitulate the benefits for the whole Enterprise Architecture.

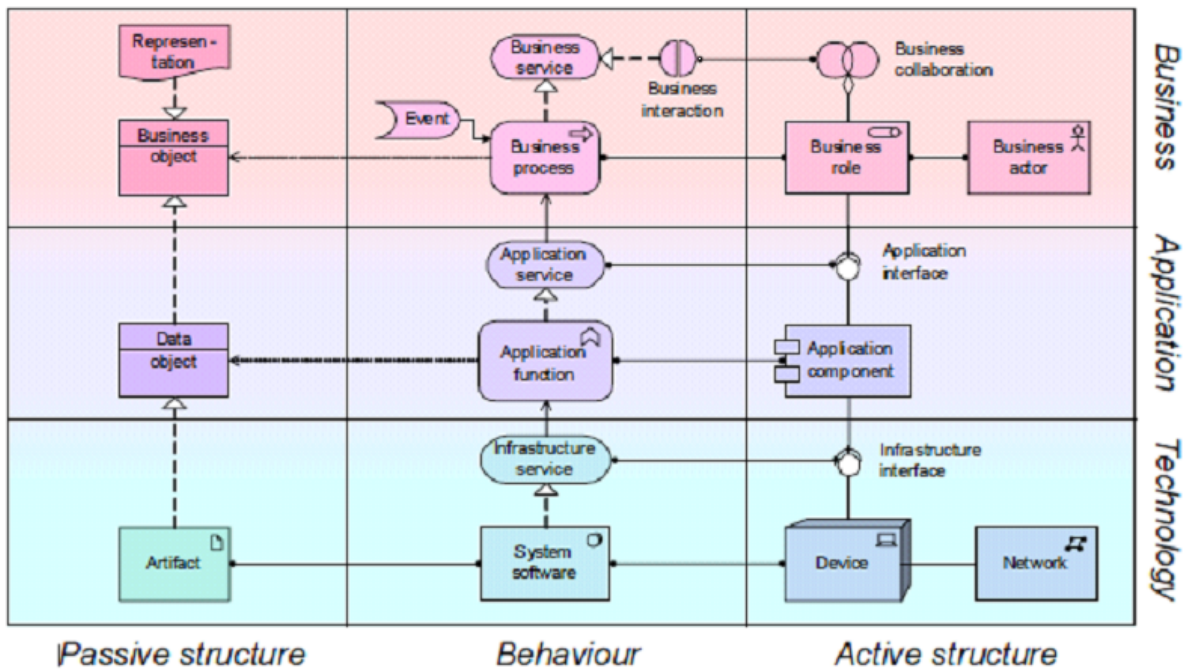
The Case Study covers the following topics:

- ["FinPlanner Solution Design " below](#)
- ["Modeling Business Architecture " on the next page](#)
- ["Modeling Application Architecture " on page 31](#)
- ["Modeling Technology Architecture " on page 31](#)
- ["FinPlanner Initial Installation and Setup " on page 31](#)
- ["FinPlanner Sparx EA Project " on page 32](#)
- ["FinPlanner Summary" on page 33](#)

FinPlanner Solution Design

High-level design layers that are descriptive of the future solution design enable the enterprise architect and solution architect to create a list of component solutions as well as descriptions of their mutual relations and interfaces. For the FinPlanner case study, high-level design is created in layers using ArchiMate 2 notation, through the use of a strictly defined set of elements and relations that are also precisely defined. You can find more details about the ArchiMate meta-model in the ArchiMate® 2.0 Specification. The enterprise architecture has three layers: Business, Application, and Technology. The concept of services, when they

are being furnished on individual layers and that are consumed through various interfaces forms the basis.



Basic List of Elements on All Layers and Relations

Modeling Business Architecture

The goal of modeling the business architecture is to create a comprehensive list of the following:

- Roles and Actors
- Business Services and Processes
- Business Objects
- A list of application services, which will be needed by business processes
- Create relationships between these elements

A list of business objects and their relations as an information model is created incrementally. In the high-level design layer only a core list of business objects and their relations is created. It is only in the phase of detailed modeling of business processes that the attributes are filled in with the help of BPMN. This approach also applies for the detailed specification of service integrations.

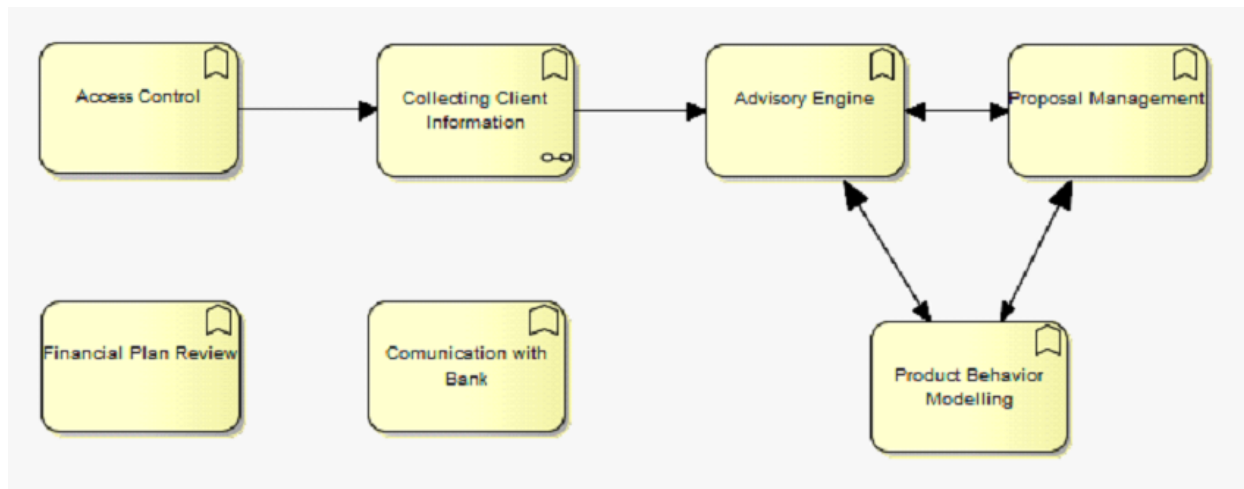
The business architecture in the FinPlanner case study was designed based on the client's documentation. Workshops with user groups followed. The users participated directly in creating the business architecture model.

Defining Core Business Functions

To create the high-level design, begin with defining your core business functions, and then continue with a specification of business services. This must respond to the customer's vision and include the definitions of

services by role that will be used to create the business capability list. In this phase, you can go into more detailed or revised specification of deliverables.

In the FinPlanner case study, in the area of collecting client information and facilitating web services for the business service definition, questions are developed and a dialog with the customer conducted to collect the required information. For example, the customer responded that the application must be able to manage the client's investment portfolio and update personal data. Information collected on roles and related services also helps to define the core business functions.



High-level Design of Business Functions

Once the core business functions are created in the high-level design, you will see the described functional areas in the design model.

Defining Application Services Integration

Apart from the business architecture components there is also the creation of the integration requirements of a new solution with the existing application architecture. These requirements emerge gradually and become more precise over time, eventually creating a detailed specification of the IN and OUT parameters of the service integration. On a high-level design, only the service names are detected. These are then filled in with parameters on the detailed process description level (BPMN). At the end of the specification process, you will have a detailed service integration specification that corresponds to all application processes and all business contexts in which they are called.

The high-level design of application services and integration must constantly be updated so that it can serve as an actual view of the target solution. The high-level design diagram provides a consolidation space for all parts of the business architecture, including the integration layers and the information model.

In the FinPlanner case study, a single application service can be called in the context of a number of business processes. For example, the "Get Finbank products owned by client" application service is called within multiple business process contexts, including the Collecting Client Information business process (shown) and two additional business process modules (partially shown). The model shows the relationships between application services and business processes and conforms to Governance in the area of service design, concretely displaying definitions at a level of meaningful granularity.

Modeling Application Architecture

After approving the high-level design model of the business layer, the next step is to create the application architecture model. The order of operations and required content at each step is designed according to the principles and recommendations of the TOGAF and other enterprise architecture frameworks. The goals for the design of the application layer architecture model are:

1. Transform the requirements into integration services
2. Create instructions for the realization of the required integration services
3. Fill in the existing application components, which will supply services to the business processes and the functioning new application, in the high-level design diagram.
4. Fill in the application component(s) in the high-level design diagram.
5. Inside of the application component, create the basic decomposition on the level of application functions.
6. Create relations between the application components and the application services.
7. In cooperation with the business architect create the relations between the application services and business process and functions.

Just as for the business layer, on the application layer, the requirement to provide constant updating through a gradual process of specifying an architecture solution leads to a stronger enterprise architecture model.

Modeling Technology Architecture

The goal of the technology layer is to describe the runtime environment of the application represented by the elements of the ArchiMate 2.0 technology layer. The main building block is the node. It is a combination of a hardware device and system software. This represents an environment for execution artifacts, which are installed on a component node. The artifact represents a concrete physical software product element (application source code, source files, scripts, databases, etc). The task of a senior programmer is to gradually specify the technology layer model, with the key component being a detailed list of all artifacts that will be installed on a single node.

In the FinPlanner case study, you can see the first increment of the FinPlanner application's technology layer. Since the FinPlanner case study includes a classic three-tier architecture, the technology layer contains three nodes: database server, application server, and presentation layer.

The design of the technology layer must correspond to all the nonfunctioning requirements of the FinPlanner application and must be in accord with the enterprise architecture governance rules and policies.

FinPlanner Initial Installation and Setup

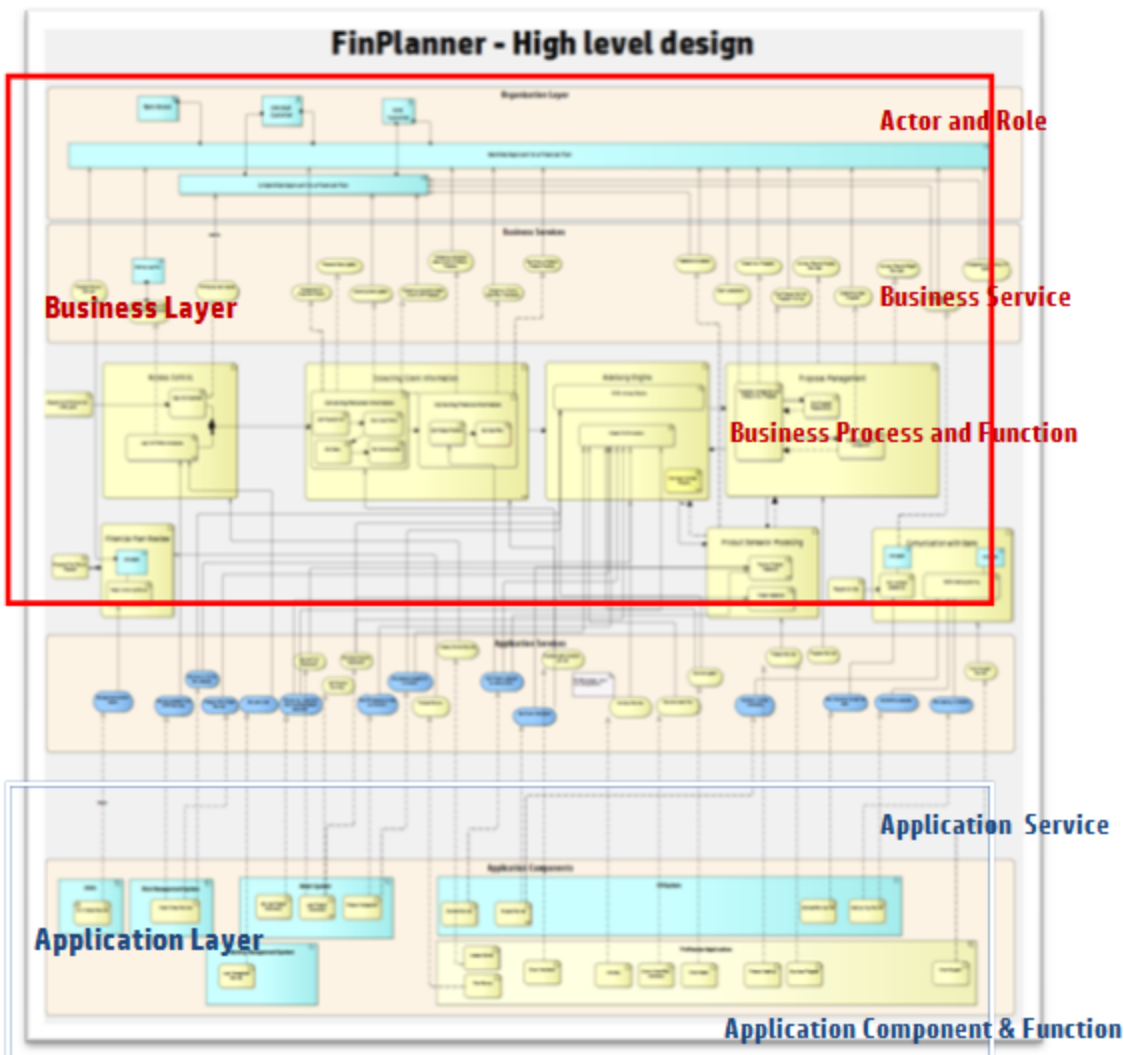
To set up the FinPlanner case study, first a local installation of the Sparx Systems Enterprise Architect version 12 modeling environment was made, and then an HPE EM instance in an organization's private cloud was set up. To access the HPE EM application all that is needed is a standard web browser. Follow the instructions given in *User Guide* under section *Extension for Sparx Systems EA*.

A high-level view includes the following steps:

1. Install Sparx Systems EA, and then install the HPE EM Sparx Systems EA. After you finish the installation, the import and export functions are available in Sparx Systems EA.
2. Import the current architecture from HPE EM into Sparx Systems EA. After you finish the import, all elements from your current architecture are available for modeling high-level design and relationships. The elements are shown in layers corresponding to the ArchiMate 2.0 language. This availability accelerates the possibility of reusing existing IT artifacts.

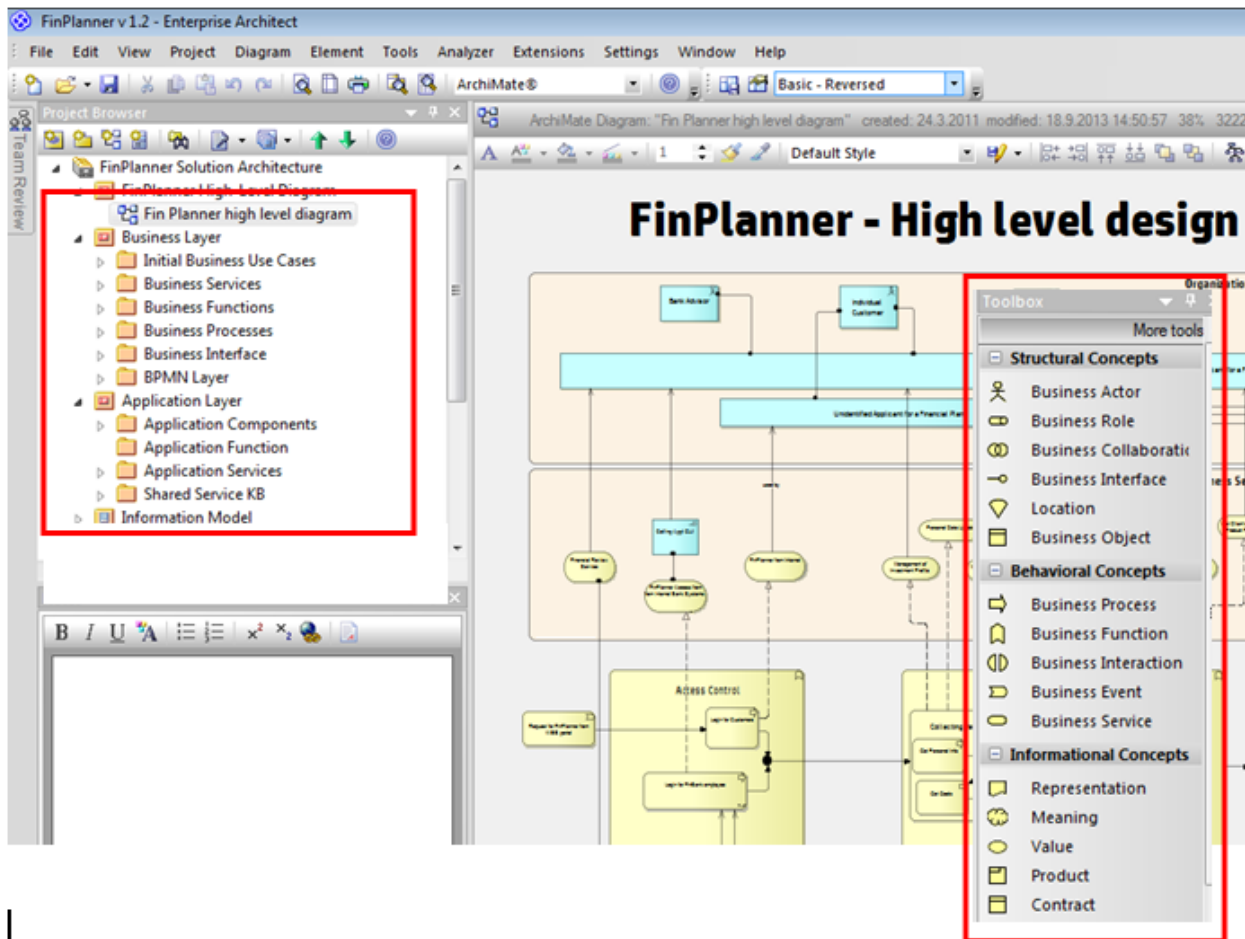
FinPlanner Sparx EA Project

The FinPlanner high-level design is shown without a technological layer because it simplifies the diagrammatic view. Sparx Systems Enterprise Architecture version 12 is used as a modeling tool and incorporates the ArchiMate 2 toolbox. The diagram serves as an end-to-end view of the architecture of the future solution. The business architect creates the business layer and the integration architect the application layer. The solution architect works on the solution design as a whole and the enterprise architect works on the architectural design aspects. The technological layer (not shown) falls under the competence of a senior programmer.



Although the FinPlanner case study high-level design is created in Sparx Systems Enterprise Architect version 12, you can also create high-level designs using other modeling Archimate2-compliant tools. For more information about tools for modeling in ArchiMate, see the publication Mastering ArchiMate in the ArchiMate 2 documentation set.

The FinPlanner high-level design model organization corresponds to the ArchiMate layers and element groups. This simplified view aids in synchronization with the enterprise architecture repository. For customizing the model, the ArchiMate2 toolbox is used. In the view area, elements of the business layer are shown. The toolbox also contains relational concepts for you to use in creating relationships between layout elements. Extension for Sparx Systems Enterprise Architect does not contain any control of language rules, which means that a strong practical understanding of the modeling language is key. As a good starting point, it is recommended that you study existing modeling patterns and that you and your team work through the high-level design model.



FinPlanner Summary

Shared Application Services

An important part of the solution design of a new application is its integration into the current application and information architecture of the organization. Underestimation in this area is frequently a reason for the failure of an entire project. Shared integration services (in the Service Oriented Architecture framework) are a subset

of all application services and are likewise a part of the import from the HPE EM repository to the modeling environment. The business architect user of the FinPlanner application can use the instant view of integration services, including their input and output parameters and their data types.

The business architect user can also immediately evaluate the FinPlanner application needs within the existing integration services, insert a concrete integration service into the application services layer, or create relations between the service and a given business process or business function. If a need arises, the business architect can create a request to modify an existing service or to create a design for a new service. HPE EM will dynamically update in response to these requests, thereby providing guaranteed integration of services. This simplifies and improves the quality of the draft application design and automatically increases shared IT assets.

FinPlanner Shared Application Components

Similar to shared application services, after importing from HPE EM repository, the architect has immediate access to all existing enterprise architecture application components. These elements can then be used directly in the design layer of the application architecture.

Components of the shared application layer can even include future components, which arise as a part of other projects. This makes it possible to evolve and plan shared IT assets even when they are not part of the current architecture.

FinPlanner Standards Compliance

Maintaining defined architectural principles and standards largely impacts the effectiveness of enterprise architecture management. You can use HPE EM to define the principles that govern compliance and to automatically enforce adherence to related rules and policies.

In the case of FinPlanner; in synchronization with the HPE EM repository, the case study arrived at a control for maintaining principles and standards, which is also a part of the control of the ArchiMate language rules. In cases where language rules are not adhered to, elements that are not in compliance are flagged in red in the high-level diagram.