

# Enterprise-Wide Planning, Engineering & Management for Stage3 Users

## Executive Summary

Users of the Planner can combine different individual services into enterprise-wide services (“initiatives”) that are managed by one organization. These services can be used to model departments, government agencies, firms or business units, This capability of the Planner to combine several individual services from different sectors to form new services is a very powerful feature that can be and has been used to model firms, business units, government agencies and a very wide range of public and private sector scenarios.

The objective of this document is to show how strategic plans for enterprise wide services can be developed by using the Strategic Planner (Planner). Specifically, the Planner automatically invokes specialized modules of system called PISA (Planning, Integration, Security and Administration) to develop a strategic plan for large initiatives by using the best practices and standards. The document shows how PISA is invoked and how it guides the Planner users through development of an overall architecture and a plan for launching large initiatives.

**Prerequisite:** Stage 2 Documents (posted on the SPACELab Learning Corner)

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## SPACE QUICKSTART EXPERIMENTS FOR STAGE3 USERS

The SPACE Stage3 user can conduct the following suggested experiments to develop a better technical understanding of the entire SPACE Environment.

### **Suggested Experiment1: Patterns.**

Use the Samples Patterns Repository to understand the Service Bundles by browsing through the Composite Services patterns.

### **Suggested Experiment 2: Games.**

- Signon to SPACE by using your ID-PW.
- Use the Architecture and Integration Games to develop an understanding of Enterprise-Wide Integration and Legacy System Migration issues.

### **Suggested Experiment3: Simple Planner**

- Sign In to SPACE by using your ID-PW.
- Create a scenario for a small company, say a hospital, by using the PISA Simple Planner
- Assume that patient care services need to be integrated with patient admission services.
- Use PISA to invoke AIM to automatically invoke the needed integration steps, games and patterns to produce the needed results.

### **Suggested Experiment4: Develop an IT Plan of a Small Company by using ePlanner**

Signon to SPACE by using your ID-PW and create a scenario for a Service Bundle, i.e., a collection of services that need to be integrated with each other. An example is a digital community center for a given country (e.g., Nepal).

The ePlanner will invoke different sets of services to handle the Service Bundles. Let us briefly review the process by using Figure 1 which shows a detailed view of the ePlanner.

As previously stated, the ePlanner is a set of intelligent apps (“advisors”) that are integrated around common resources. These advisors collaborate with each other to cover five phases (P0 to P4), shown in Figure 1. These advisors invoke the games, patterns, and other resources to generate the outputs shown in Figure 1. The following processes should be noted:

- Specialized modules such as Large Initiative Planner (LIP) are invoked to handle Service Bundles (also known as Composite Services)
- The ePlanner proceeds, as shown in Figure1, through P0, P1,P2, P3 and P4 to generate the outputs to support project management and governance.
- For specialized processing needed for Service Bundles, the Planner calls LIP when it detects that a user has selected a large initiative (e.g., an enterprise wide service bundle)
- LIP does some initial processing and develops a model that can be handled by PISA if needed
- PISA goes through several steps and invokes PARIS and other components needed to develop the needed plans

Figure 1 show an overview of LIP processing. Basically, LIP is invoked in the service specification phase (P1) when a user chooses Bundles. This document describes the LIP module of SPACE. As shown, LIP may invoke PISA, also described in detail in this document.

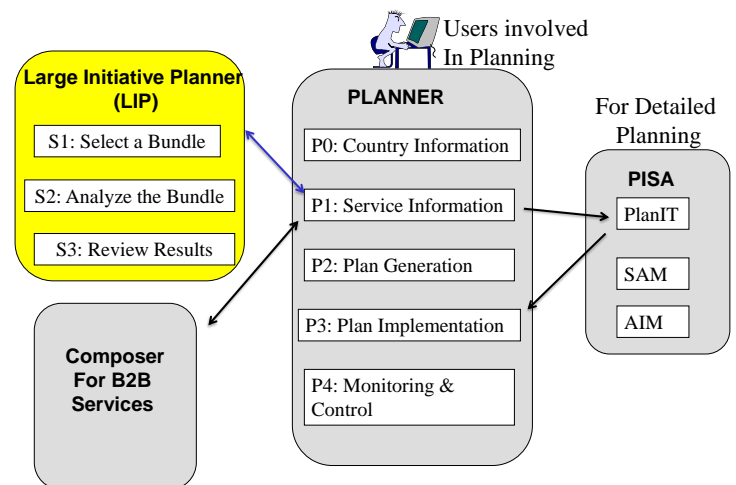


Figure 1: Enterprise-Wide Services (Large Initiative) Planning – Conceptual View

## 1. STRATEGIC PLANNING FOR ENTERPRISE-WIDE SERVICES AND INITIATIVES

### 1.1. Introduction to Service Bundles

The Computer Aided Strategic ePlanner (commonly referred to as the Planner) is a key component of the SPACE Environment. The Planner guides the user through a quick but systematic and intuitive process of producing detailed and highly customized strategic plans. It has the capability to produce plans and other documentation for 1) individual services and 2) combine individual services into “*service bundles*” that can represent enterprise wide as well as inter-enterprise services. The focus of this document is on the service bundles.

Users of the Planner can combine different individual services into *enterprise-wide service bundles* (sometimes also referred to as “initiatives”) that are managed by *one* organization. These services can be used to model departments, government agencies, firms or business units. This capability of the Planner to combine several individual services from different sectors to form service bundles is a very powerful feature that can be and has been used to represent the following real-life situations:

- A small to medium business in any part of the world
- A division or office of a large company (e.g., a marketing and sales office in China of large company based in Chicago)
- An Agricultural Center to help the farmers in any part of the world
- A B2B Marketplace for buying and selling on the Internet (such as eBay or Ali Baba)
- A Business/Strategic Intelligence Center for a small country/island to promote economic development
- A Customer Support Center (or Specialized Division) of a large organization
- A Digital Community Center for rural areas that offers adult education, health and agriculture services to remote populations (e.g., small islands, small villages and communities)
- A “Smart Town Center” that supports a smart town (population between 5,000 to 20,000) located anywhere in the world. The main objective is to provide smart services in health, education, public safety, public welfare, and utilities for the town population.
- A Disaster Management Center in a developing country and a rural area
- An eCommerce Center (e.g., a small retail store) to support cottage industries in rural areas
- An Education Center for students with special needs
- An Entrepreneurship Center to help young entrepreneurs by connecting them to VCs and other resources
- A Financial Services Center for banking, insurances and other financial services
- A G2G (Government to Government) Center that exchanges information between agencies (e.g., Pennsylvania County Commission to serve counties in Pennsylvania)
- A Tele-Health (Tele-Medicine) Center that provides medical services to remotely located populations

- An HIE (Health Information Exchange) for exchange of information between different healthcare enterprises (e.g., hospitals, insurance companies, physicians, and government agencies)
- A Tourism Center for small islands, remote areas and other tourist spots

The Planner treats each enterprise service as a single organizational unit (enterprise unit) that is managed by a central authority that can introduce and enforce common policies and procedures. This simplifies several inter-system communication problems. The interagency problems that require collaboration and coordination between multiple independent agencies are beyond the scope of this document and are discussed in a separate document on Inter-Enterprise Services (G2G, B2B).

## 1.2. A Closer Look at Service Bundles

SPACE can be used to plan and architect very simple to very large and complex situations. Specifically, the ability to select different types of services for different types of service providers is a very powerful capability of SPACE. Specifically, the users of SPACE can do the following:

- Select a single service (e.g., mobile health clinic) within a sector (e.g., healthcare)
- Combine different services from one or more sectors to construct “*service bundles*” that may represent large initiatives (e.g., eCities) or interagency and B2B services (e.g., supply chains).

A user may select an individual service or construct a service bundle. Based on the choices made, the Planner automatically walks the user through the most appropriate steps and then generates very powerful outputs. Thus the Planner adjusts its behavior based on the type of service selections. Figure 4 shows four possible categories of scenarios (S1, S2, S3, S4) in terms of services and service providers. These scenarios are described briefly.

Providers	Many	<b>S3: One service between many organizations (B2B)</b>  <b>Examples</b> <ul style="list-style-type: none"> <li>- HIE (Health Information Exchange) in Ohio</li> <li>- B2B Services</li> </ul>	<b>S4: Many service sbetween many organizations</b>  <b>Examples</b> <ul style="list-style-type: none"> <li>- HIE between Providers in Europe</li> <li>- B2B Services in Africa</li> </ul>
	One	<b>S1: planning for an eservice for an organization</b>  <b>Example: eLearning for a high school in Libya</b>	<b>S2: Planning for enterprise wide service bundles</b>  <b>\Example: Planning for ICT Villages, Communities and Cities in Rwanda</b>
		One	Many (Bundles)
		<b>Services</b>	

**Figure 1: Service Scenarios in SPACE**

- **S1: Individual Services and Sectors:** The overall SPACE environment is organized into sectors such as economic development, healthcare, education, and e-government. Each sector provides many individual services. For example, healthcare sector provides patient care and administrative services. This scenario type allows users to offer any service by a single service provider (typically within one sector).
- **S2: Enterprise-Wide Service Bundles** (e.g., Firms, Cities and Ministries): A user can combine different individual services into enterprise-wide service “bundles” that are managed by one organization. These service bundles can be used to model departments, government agencies, firms or business units, This capability of the Planner to combine several individual services from different sectors to form new service bundles is a very powerful feature that can be and has been used to represent the following real-life situations.
- **S3 and S4: Inter-Enterprise and Inter-Agency (B2B, G2G) Service Bundles:** In addition to individual services and centrally managed initiatives in domains such as healthcare and economic development, the Planner can be used to represent large and more complex service bundles that include multiple independent agencies and organizations. The Planner provides a “Composer” that takes different services and composes them into larger and more complex service bundles such as a document exchange network between different government agencies, a B2B marketplace with numerous buyers and sellers, a supply chain system consisting of several consumers and suppliers, and a government/business network such as a health information network (HIN).

The Planner treats each enterprise service as a single organizational unit (enterprise unit) that is managed by a central authority that can introduce and enforce common policies and procedures. This simplifies several inter-system communication problems. The interagency problems that require collaboration and coordination between multiple independent agencies are discussed later.

### **1.3. Example of Service Bundles -- Planning of City and Intercity Services**

This project, inspired by our work with a United Nations Partnership on Small Islands and Least Developed Countries, is being used for management training and graduate courses in Strategic ICT Planning, Architectures and Management. The class is divided into several teams, 3 to 4 persons per team, and each team was asked to choose one city (population from 10,000 to 30,000 people) from any part of the world. Their first assignment is to do the following by hand:

- Each team member develops ICT plan for one service of the chosen city in the area of public health, education, welfare, and safety.
- Combine the chosen city services into a city-wide architecture that works smoothly
- Each city (team) is then asked to partner with another city (team) and to exchange information about their services for a set of scenarios (e.g., food shortage)

The second assignment is to do Self-Assessment of the results from Assignment 1 by using SPACE. This allows the students to redo their work by using the SPACE tool and then improve their results based on the hands-on experiments. Exhibit 1 displays a sample service bundle that represents a community center in a small island. In the next section, we will show the actual steps, with screenshots, of the planning process used by SPACE (see Exhibit2 in Section2).

## Exhibit 1: Sample Service Bundle for an Island

The following screenshot displays a sample service bundle created by SPACE that represents a community center in a small island. Community centers in rural areas offer adult education, health, agriculture, public safety and public welfare services to remote populations (e.g., small islands, small villages and communities). In addition, the community centers in small islands support fishery services for economic development.

Please note that the following community center bundle is a pattern that includes services from multiple sectors and includes tourism and fisheries. As can be seen, this pattern can be further customized by including more services and excluding others by pointing and clicking. In Section (Exhibit2) we will show the actual steps, with screenshots, of the planning process used by SPACE to develop this and other service bundles.

### Community Center for Small Islands and Developing States (SIDS)\*

Please choose services from following and click the next button.

If you want to see and choose more services of other sectors, [Click here](#)

If you want to include completed services (within the same country), [Click here](#)

Sectors	Services	Relationships	Status
Administrative Services	<input checked="" type="checkbox"/> Business Intelligence (BI) Service*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Agriculture	<input checked="" type="checkbox"/> Eservices for Food Safety*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Agriculture	<input checked="" type="checkbox"/> e-agriculture 2.0	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Agriculture	<input checked="" type="checkbox"/> M-Agriculture	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Economic Development	<input checked="" type="checkbox"/> Fishery Distribution (Supply Chain)*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Economic Development	<input checked="" type="checkbox"/> eTourism Services*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Education	<input checked="" type="checkbox"/> e-learning for the physically-Handicapped	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Education	<input checked="" type="checkbox"/> Educating School Teachers in ICT	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Healthcare Provider	<input checked="" type="checkbox"/> Emergency Medical Services*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Healthcare Provider	<input checked="" type="checkbox"/> Electronic Health Records*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Healthcare Provider	<input checked="" type="checkbox"/> Decision Support System (DSS) for Health*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Healthcare Provider	<input checked="" type="checkbox"/> Telemedicine*	<a href="#">Interactions</a>	<a href="#">[Completed]</a>
Healthcare Provider	<input checked="" type="checkbox"/> mHealth*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Public Safety Services	<input checked="" type="checkbox"/> Disaster Management Service (Basic)*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Public Safety Services	<input checked="" type="checkbox"/> Weather Alert and Travel Warning*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>

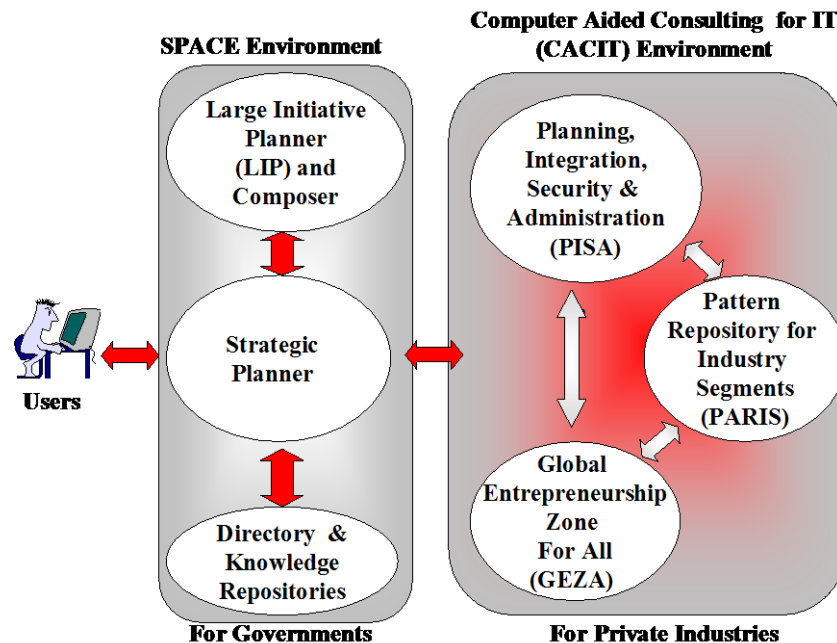


## 2. PLANNING FOR ENTERPRISE-WIDE SERVICES

### 2.1. How are Plans for Enterprise-Wide Services Developed

We have developed a specialized capability, called *Large Initiative Planner (LIP)*, for enterprise-wide initiatives that involve multiple services, possibly from multiple sectors. Figure 1 shows an overall architectural view of the SPACE Environment that will help us to understand how LIP works. As shown in Figure 2, the users (government agencies, NGOs, or other organizations) develop strategic plans, RFPs and project management plans by interacting with the SPACE Environment, a new system primarily intended to support government services. SPACE provides these services by using the SPACE Planner that guides the users through various decisions as discussed previously. The Planner uses the following capabilities to handle user requests:

- SPACE resources (Directory and Knowledge Repositories) as described in this document.
- Specialized modules such as Large Initiative Planner (LIP) to handle initiatives such as MDGs and digital cities, and Composer for developing composites and interagency services. *The focus of this document is on LIP.*
- Integration and aggregation of the external information already available in portals such as the United Nations Public Administration Network ([www.unpan.org](http://www.unpan.org)) and the UN-GAID website ([www.un-gaid.org](http://www.un-gaid.org)). In addition, we will provide access to useful educational and training materials.



**Figure 2: SPACE Environment – The Big Picture**

SPACE also supports the private sector by leveraging an existing Computer Aided Consulting Environment that primarily concentrates on the private sector. Specifically, SPACE has been successfully integrated with a comprehensive environment that supports private sectors. This environment is based on research in using computer aided planning for best practices [16-21] and consists of detailed planning tools, displayed in Figure 21. Currently these tools consist of:

- **A detailed planning system for private sectors called PISA** that can be used to quickly build real life business scenarios and then guides the user through IT planning, integration, security and administration tasks by using best practices. PISA supports 18 industry segments that include many within the scope of public administration (e.g., education, energy, health, and transportation) and provides basic capabilities for composing larger and more complex scenarios that include multi-region offices, supply chains, mergers, acquisitions and business networks. This comprehensive tool also provides extensive capabilities for integrating different systems by using SOA (service oriented architecture) and supports open interfaces so that gaming and simulation tools can be easily plugged in.
- **A knowledge portal for entrepreneurship, called GEZA** that provides a set of knowledge services ranging from starting a business to international partnership and outsourcing opportunities. GEZA capabilities include business solutions for developing and implementing business strategies, a comprehensive yellow book directory of SMB portals, an outsourcing center for service providers and consumers, an international center for doing business internationally, an education center for entrepreneurs, and links to PISA for IT solutions and to PARIS for industry patterns.
- **An industry pattern repository called PARIS** that houses business patterns for more than 20 industry segments including education, healthcare, transportation, telecom, and manufacturing. PARIS provides overviews, examples, specializations and sources of information for each industry segment; examples and best practices of how ICT is being used effectively in different industry segments; business process patterns, requirement patterns and information model patterns in UML; and interfaces to support PISA advisors and GEZA services.

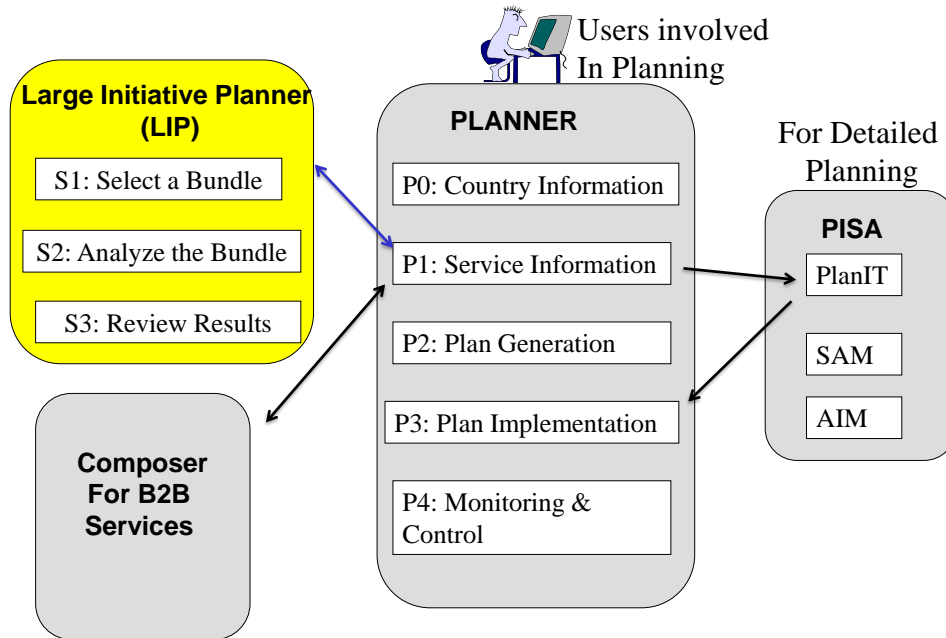
To develop plans for initiatives that may span public as well as private sectors, the following processing takes place (see next section for additional details):

- The Planner calls LIP when it detects that a user has selected a large initiative (enterprise wide service bundle)
- LIP does some initial processing and develops a model that can be handled by PISA if needed
- PISA goes through several steps and invokes PARIS and other components needed to develop the needed plans

## 2.2. LIP (Large Initiative Planning) Processing Overview

Figure 3 shows an overview of LIP processing. Basically, LIP is invoked in the service specification phase (P1) when a user chooses large initiatives. This section primarily describes the LIP module of SPACE. As shown, LIP may invoke PISA, described in detail in the next section.





**Figure 3: Enterprise-Wide Services (Large Initiative) Planning – Conceptual View**

In the first step (S1) of LIP, the user selects an enterprise-wide bundle (initiative). LIP, at the time of this writing, supports the following service bundles:

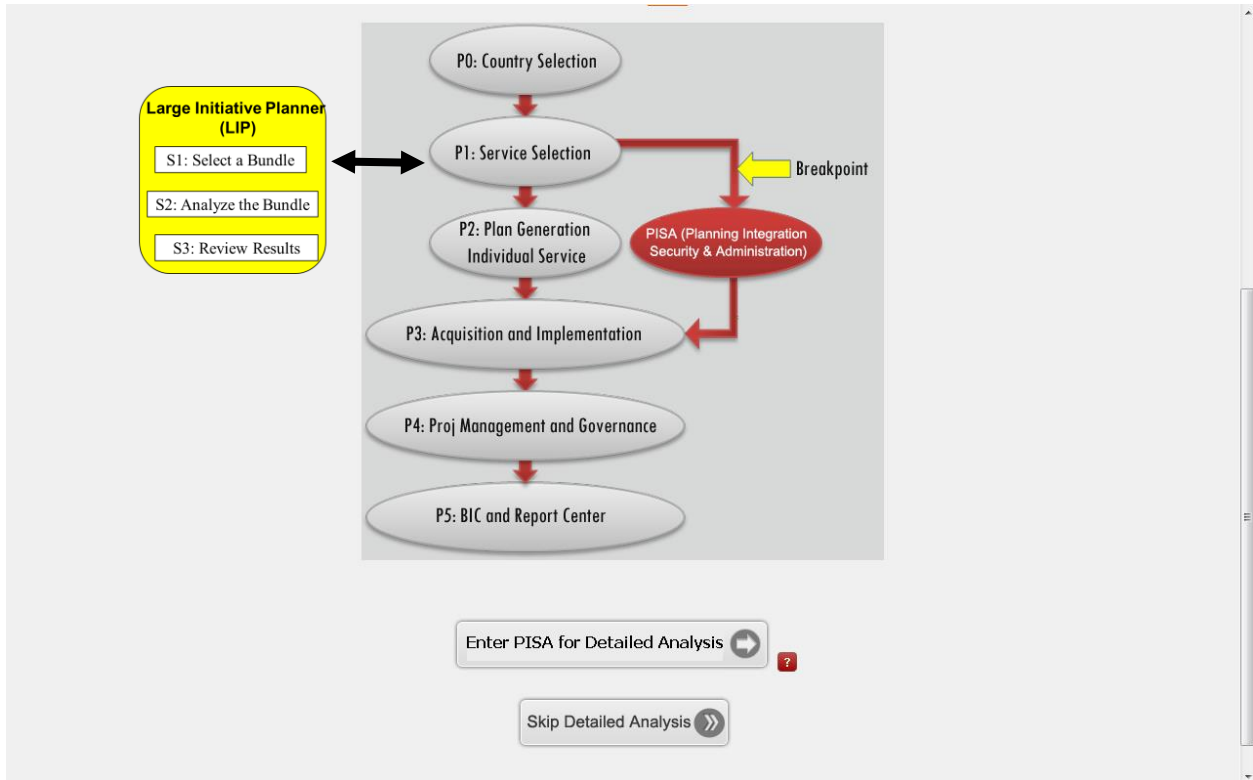
- Digital/Smart Cities that involve development of ICT services and infrastructure needed to support modern cities, villages, or communities
- Millennium Development Goals (MDGs) that involve improvements in health, education and poverty reduction by using ICT
- Mobility Initiatives to support mobile applications and wireless communications for government and public sectors
- Government Specific Initiatives such as five year plans and private industry revitalization plans.

In step S2, the user is presented with a pattern for the selected initiatives. The user reviews and modifies the pattern by selecting the services needed for the initiative. The user may invoke cost/benefit analysis to determine if a particular service should be included or not. At the end of this selection, a customized pattern is created that represents the services of value to the user. An overall cost/benefit analysis is then performed to understand if the overall initiative is worth doing or not. Step S2 of LIP is quite extensive and may require the user to review and evaluate several alternatives for the given initiatives.

In step S3, the user creates simple reports that display the cost/benefit analysis and evaluations of the various choices. The user may choose at this point to conclude the analysis and conduct an offline examination. The user may choose to continue with PISA module for additional modeling and recommendations of application plans, platform plans and network plans needed to support the selected initiatives. The PISA environment and its components that may be invoked for detailed planning are described in the next section.

Figure 4 shows a more detailed view of LIP processing. Lets assume that the bundle is a small city. As stated previously, the Planner calls LIP in P1 when it detects that a user has selected a city (an enterprise wide service bundle). LIP executes steps S1, S2 and S3 to handle the city specific

processing (e.g., assemble the city with the right type of services, conducts strategic analysis of the services that will be needed by the city, and review the results of the analysis). As shown in Figure 4, after completion of LIP processing, the Planner offers the following options:



**Figure 4: Screenshot of LIP Processing Logic**

- Create a high level view of the city by bypassing the detailed planning offered by PISA. This option, offered by the “Skip Detailed Analysis” button at the bottom of the screen, is very useful for creating a high level sketch of the city services first before detailed planning and analysis. If PISA is skipped, the Planner continues processing through P3, P4, and P5.
- Create a detailed plan by using PISA as described in the next section. After completing PISA, the Planner continues processing through P3, P4, and P5.

As explained in the next section, PISA is a very detailed system that goes through enterprise modeling, application planning, platform planning, network planning and security planning. A complete PISA session may take between 30 to 50 minutes. This is why, the user is offered an opportunity to take a break before invoking PISA (see Figure 4).

### 2.3. Outputs Generated (Working Portal) and a Sample

The Computer Aided Strategic ePlanner generates extensive documents that are discussed and illustrated in Exhibit 2. These outputs cover the entire Learn-Plan-Do-Check cycle and are produced *in less than an hour by the ePlanner -- it takes between 6 months to a year to produce similar outputs manually.*

Beside the reports, the Planner also generates a powerful working portal with built-in collaboration capabilities. The generated portal shows all the services included in the Bundle and also provides capabilities for searching for and collaborating with other partners. It can also be easily customized by users. The search and collaboration capabilities allow the users to search for partners based on country, bundle type, etc. (see Exhibit 3).

### **Exhibit 2: The Outputs Produced by the Planner**

A user of the SPACE Environment selects a service (e.g., mobile health clinic) for a given country (e.g., Nepal) and generates the following outputs:

- Strategic Planning Report that shows the overall vision and architecture with business/technical justification
- Requirements documents for system development
- Business plans that can be used to obtaining funding
- Standardized RFPs (Requests for Proposals) that can be used to attract vendors for bidding
- Project management, policies and procedures, disaster recovery and needed governance guidelines
- Education, training and public awareness campaigns needed for success
- Enterprise architecture (EA) views for overall governance
- Suggested standards and best practices
- A working portal with built-in collaboration capabilities

These outputs, displayed graphically below, cover the entire Learn-Plan-Do-Check cycle, are produced *in less than an hour (it takes between 6 months to a year to produce similar outputs manually)*.

As indicated by Gawande [28] in his best-selling book “The Checklist Manifesto: How to Get Things Right”, a checklist is a very powerful tool for successful execution of projects. The information contained in these reports can serve as a massive checklist that can help the users to succeed.

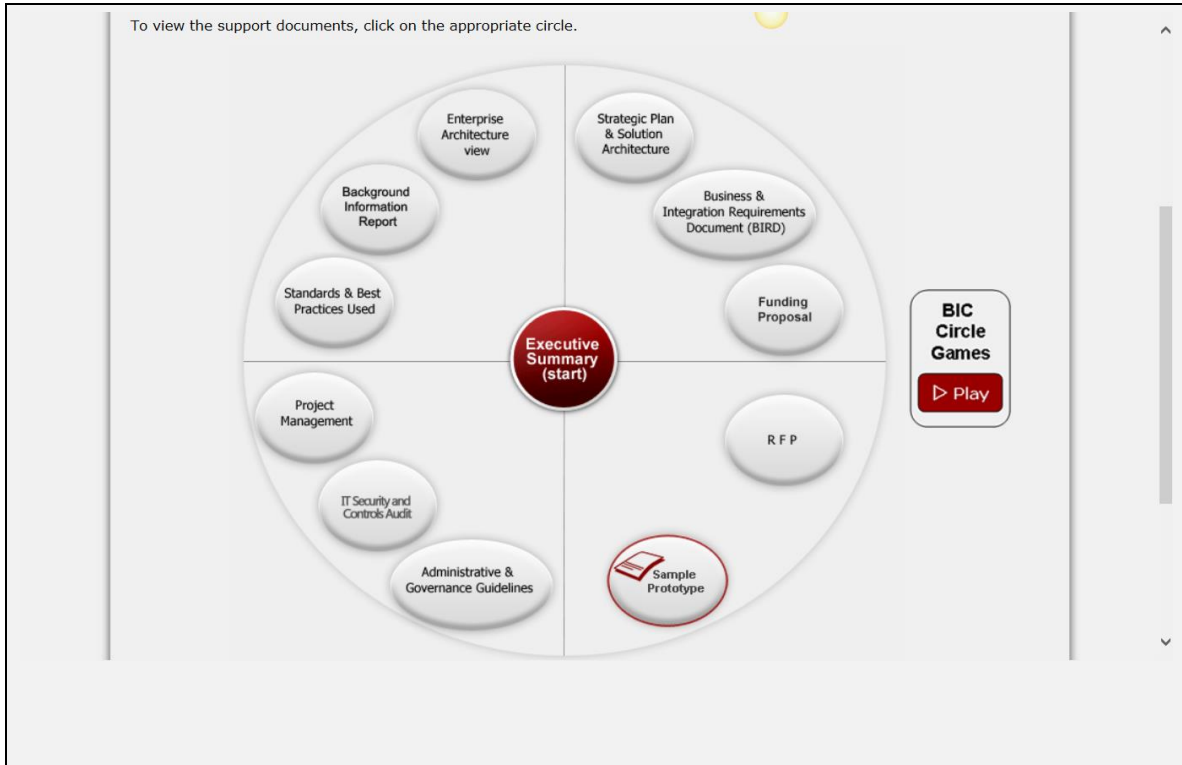


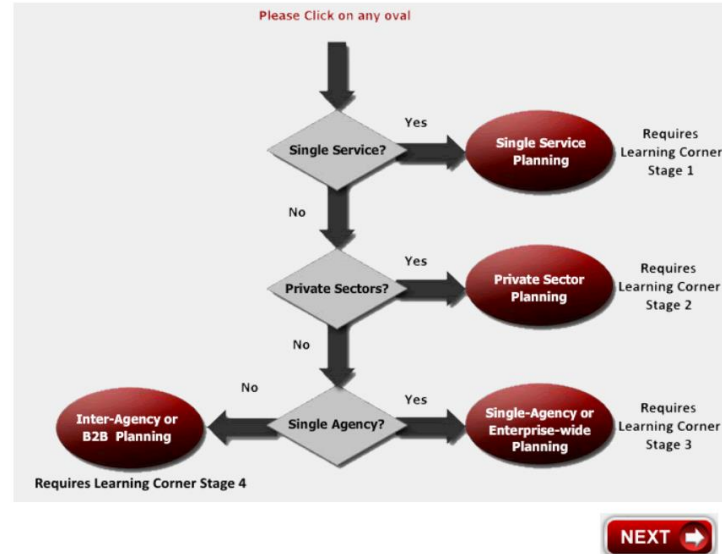
Exhibit 3 shows how a Service Bundle representing a Digital Community Center in the Island of Samoa was developed. Digital Community Centers (DCCs) in rural areas offer adult education, health, agriculture, public safety and public welfare services to remote populations (e.g., small islands, small villages and communities). The snapshots display the main results obtained in the phases (P0-P4) of the Planner.

### **Exhibit 3: Example of Developing a Service Bundle (Community Center) for an Island (Samoa)**

- Phase P0: The user selects the country Samoa
- Phase P1: First, the user selects an Enterprise Wide Service (see Snapshot1) and then selects a Service Bundle for Community Center for Small Islands (see Screenshot2). The selected Bundle is a pattern that selects all the services typically needed by a Community Center.
- Phase P2 (LIP): Shows the Community Center Bundle to the user so that the user can customize the pattern for Samoa (see Screenshot3).
- Phase P4: The Planner generates extensive reports and a working portal for the selected Bundle within half an hour (see Screenshot 4 and 5). The generated portal shows all the services included and also provides capabilities for searching for and collaborating with other partners. It can also be customized by users.
- Phase P5: The generated portal has search and collaboration capabilities that allow the users

to search for partners based on country, bundle type, etc (see Screenshot6).

Please click on one of the following buttons to proceed. More advanced capabilities require better understanding. If a button doesn't work then you need to learn more from learning corner and upgrade your level, Please go to [Planner Learning Corner](#)



Screenshot1: Choosing an Enterprise Wide Service (a Service Bundle in P1)

<input type="radio"/> Economic Development	<input type="radio"/> Education	<input type="radio"/> Healthcare	<input type="radio"/> Public Safety	<input type="radio"/> Internal Affairs	<input type="radio"/> Public Welfare Services	<input type="radio"/> Administrative Services
<input type="radio"/> Finance and E-commerce	<input type="radio"/> Retail Services	<input type="radio"/> Agriculture	<input type="radio"/> Environmental Services	<input type="radio"/> Transportation and Logistics		
<input type="radio"/> ICT Infrastructure Services						
<input type="radio"/> MDGs(Millennium Development Goals) Services						
<input type="radio"/> Service Bundles within an Enterprise						
<input type="radio"/> Service Bundles between Enterprises						



Services ?

14 Services Listed under Service Bundles within an EnterpriseSector

1	2				
	#	Service Title	Service Description	Taxonomy ?	MDG Goals Support
Select	1	Community Center	..Click Here	C2C	-
Select	2	Community Center for Small Islands and Developing States (SIDS)*	..Click Here	C2C	-
Select	3	Company	..Click Here	B2C	-
Select	4	Department	..Click Here	B2E	-
Select	5	eCities or eCommunities	..Click Here	B2C	-
Select	6	Government (City, State,Federal)	..Click Here	G2C	-
Select	7	Government Agency	..Click Here	G2C	-
Select	8	Health and Human Services*	..Click Here	B2B	-
Select	9	Health Information Exchange*	..Click Here	B2B	-

Screenshot2: Selecting a Community Center Bundle in P1

## Community Center for Small Islands and Developing States (SIDS)\*

Please choose services from following and click the next button.

If you want to see and choose more services of other sectors, [Click here](#)

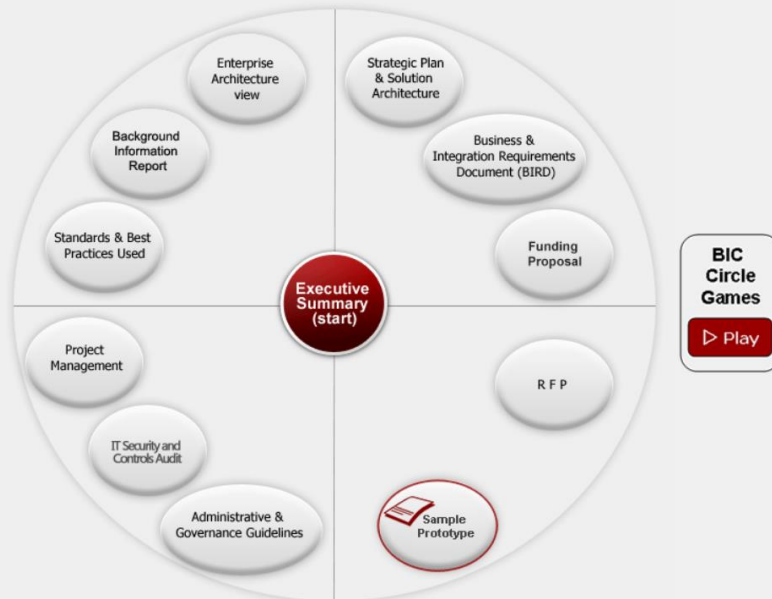
If you want to include completed services (within the same country), [Click here](#)

Sectors	Services	Relationships	Status
Administrative Services	<input checked="" type="checkbox"/> Business Intelligence (BI) Service*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Agriculture	<input checked="" type="checkbox"/> Eservices for Food Safety*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Agriculture	<input checked="" type="checkbox"/> e-agriculture 2.0	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Agriculture	<input checked="" type="checkbox"/> M-Agriculture	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Economic Development	<input checked="" type="checkbox"/> Fishery Distribution (Supply Chain)*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Economic Development	<input checked="" type="checkbox"/> eTourism Services*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Education	<input checked="" type="checkbox"/> e-learning for the physically-Handicapped	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Education	<input checked="" type="checkbox"/> Educating School Teachers in ICT	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Healthcare Provider	<input checked="" type="checkbox"/> Emergency Medical Services*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Healthcare Provider	<input checked="" type="checkbox"/> Electronic Health Records*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Healthcare Provider	<input checked="" type="checkbox"/> Decision Support System (DSS) for Health*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Healthcare Provider	<input checked="" type="checkbox"/> Telemedicine*	<a href="#">Interactions</a>	<a href="#">[Completed]</a>
Healthcare Provider	<input checked="" type="checkbox"/> mHealth*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Public Safety Services	<input checked="" type="checkbox"/> Disaster Management Service (Basic)*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>
Public Safety Services	<input checked="" type="checkbox"/> Weather Alert and Travel Warning*	<a href="#">Interactions</a>	<a href="#">[Overview]</a>

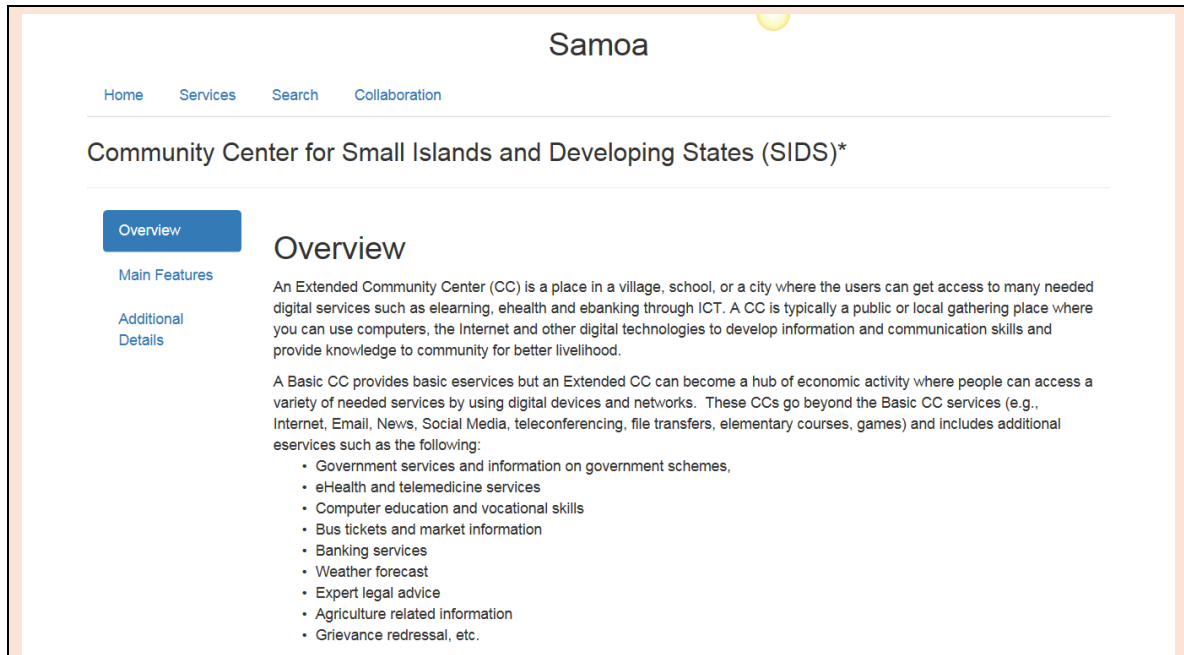
**NEXT** ➔

Screenshot3: Customizing the Service Bundle in LIP

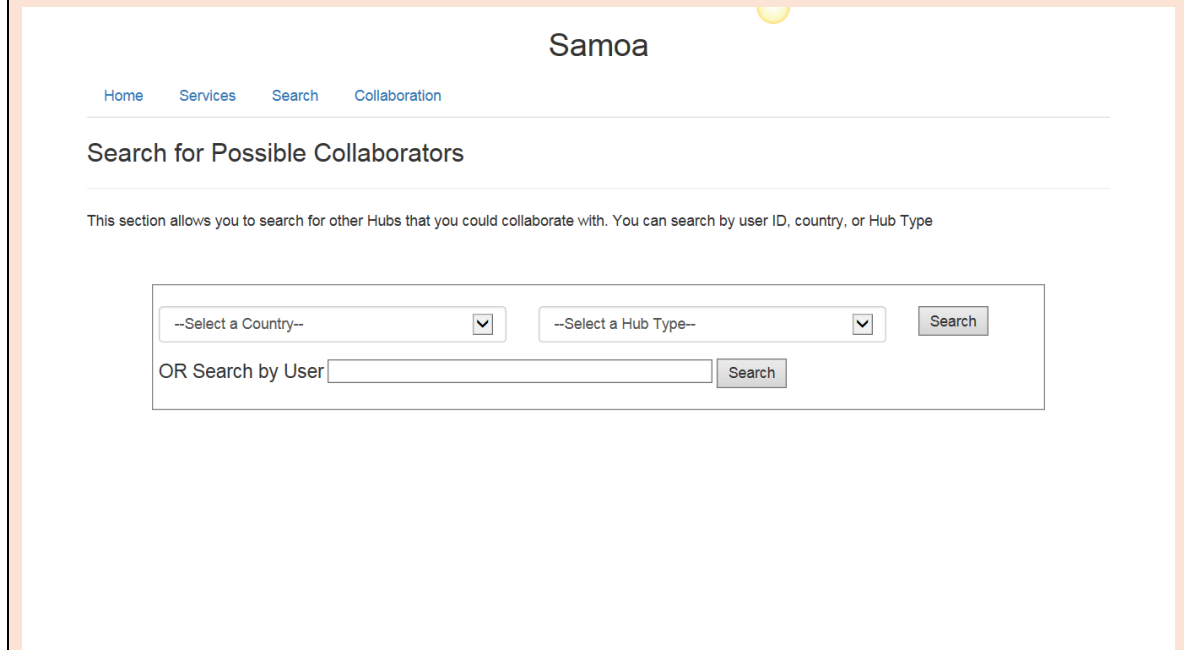
To view the support documents, click on the appropriate circle.



Screenshot4: Generated reports and the sample Portal view (Phase P4). The circle shows all the artifacts produced by the Planner.



Screenshot5: Generated Portal view (Phase P4). The portal shows all the services included and also provides capabilities for searching for and collaborating with othe partners

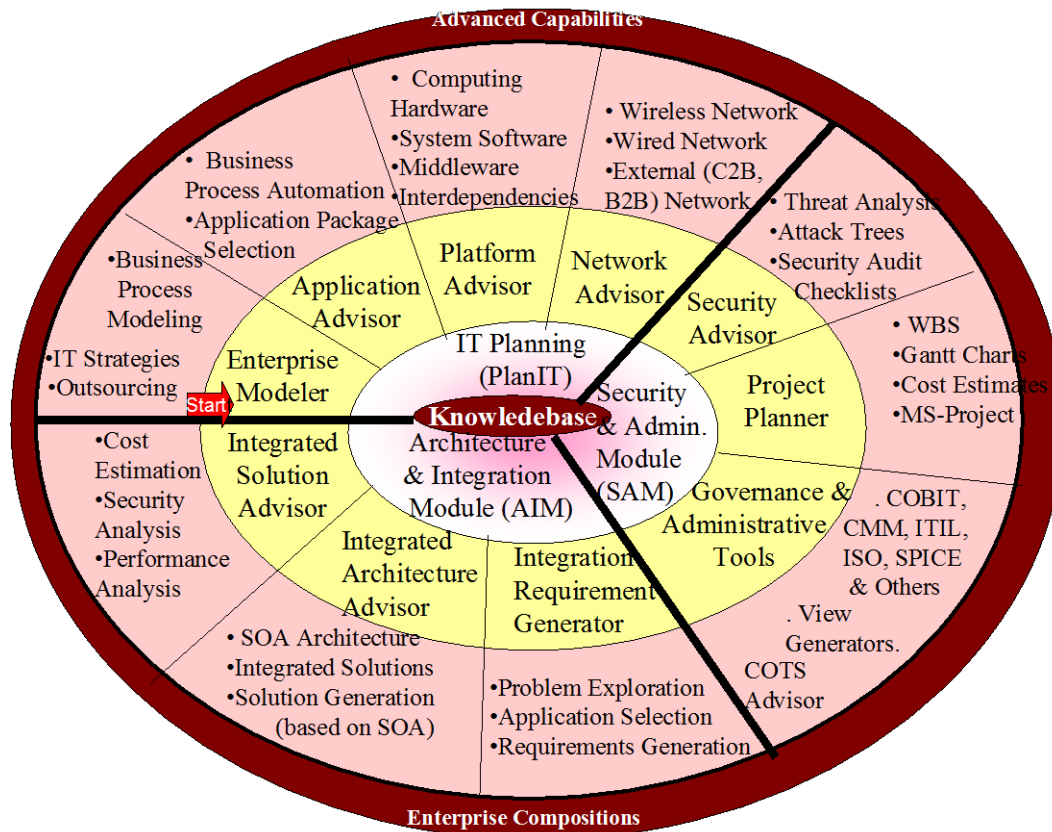


Screenshot6: Generated Portal allows the users to search for possible collaborators based on country, hub type, or by user type

### 3. PISA ENVIRONMENT

#### 3.1. Overview

PISA (Planning, Integration, Security and Administration) is an intelligent decision support environment that helps businesses plan, integrate and secure their IT (information technology) systems. At present, PISA is intended for small to medium businesses (SMBs) but can also be used for offices and divisions of larger businesses.



**Figure 5: Conceptual Model of PISA**

The PISA environment, conceptually shown in Figure 5, provides a family of automated consultants (“advisors”) that support all stages of IT planning, integration and security projects (e.g., enterprise modeling, application planning, network planning, security planning, project planning, architecture analysis and solution evaluation). At the heart of PISA, as shown in Figure 5, is the knowledgebase (KB) that contains an extensive patterns repository. The KB is used by the PISA advisors which are segmented into three modules (see Figure 5):

- **PlanIT (Planner for IT)** concentrates on IT planning projects and develops a plan at the enterprise level
- **SAM (Security and Administration Module)** provides guidance for security, project management and governance issues



- **Architecture and Integration Module (AIM)** focuses on how SOA (Service Oriented Architecture) can be used to architect and integrate the various components to form a functioning system

Each PISA advisor, as shown in the outer circle of supports a specific stage and collaborates with other advisors to produce plans. For example, the Network Advisor supports the network planning stage and collaborates with the Security Advisor to develop a security plan that secures a network. The outermost circle (“the PISA crust”) represents the **Advanced Capabilities Module (ACM)** that accepts the outputs produced by the PISA advisors and then helps the users to invoke detailed simulation and analysis tools.

To understand the sequence in which these advisors are invoked, start from the Enterprise Modeler (“Start” arrow in Figure 3) and follow the circle clockwise. Specifically, the PlanIT advisors do the following: the Enterprise Modeler develops a model of an enterprise, the Application Advisor develops an Application plan, the Platform Advisor develops a computing platform plan, and the Network Advisor builds a network plan. The SAM advisors develop a security plan, a project plan, and provide other administrative services. The AIM advisors develop an integrated architecture plan based on SOA. The advisors are not strictly sequential – different advisors can be invoked in different sequences to fit the type of project you are working on. However, some things have to be done in sequence. For example, you cannot secure a network before developing a network plan (naturally!). The PISA Control Panel, discussed later, guides the user through what can be invoked when.

### 3.2. How to Use PISA?

The PISA website ([www.ngepisa.com](http://www.ngepisa.com)) provides a great deal of information about this system. The user session, after signing in, is guided through a control panel shown in Figure 4. The system automatically determines which advisor you can invoke and this is indicated by a red arrow. In a normal session, advisors are automatically invoked in the pre-defined sequence suggested by Figure 6 (i.e., Enterprise Modeler -> Application Advisor -> Platform Advisor, etc.). However, a user may invoke other advisors as they become available (indicated by a yellow arrow). ACM can be invoked anytime for more detailed analysis. Each advisor, when invoked, produces a model and then returns control to the control panel. As shown in Figure 6, the links to the results produced by advisors used previously (“generated models”), if any, are also shown. The top toolbar provides buttons for help and the bottom toolbar provides access to a glossary, online guides and tutorials, PISA documentation, business scenario templates, and the PISA pie (Figure 5).



**Figure 6: Sample PISA Control Panel**

### 3.3. PlanIT Module To Develop a Plan for IT Infrastructure

Businesses face numerous challenges in using IT. The main challenge is that these businesses increasingly rely on sophisticated information technologies such as the Internet, wireless networks, Web technologies, numerous application software packages, different types of security solutions, and a multitude of system software packages such as database managers, utilities, .Net framework, and the like. Many businesses, especially SMBs, lack in-house expertise to properly plan the IT infrastructure needed to support the business. The PlanIT module of PISA helps with IT planning decision through the following advisors:

- Enterprise Modeler helps the user to create an enterprise model that captures the important aspects of a company such as company type, company size, company sites, outsourcing decisions, etc.
- Application Advisor helps the user develop automation strategies and suggests the business applications that will support different automation strategies.
- Platform Advisor suggests computing platforms (“hosts”) on which the applications will reside.
- Network Advisor suggests a network configuration that includes wireless as well as wired networks.

### 3.4. SAM (Security and Administration Module) to Support PlanIT

SAM provides the following security and governance/administrative advisors that help you to secure and administer the enterprise resources.

- Security Advisor secures the applications and the hosts on the network. It also produces a list that can be used in security audits.

- Governance Information Extractor examines the information from a diverse array of governance standards (e.g., CMM, CobIT, ITIL, SPICE, ISO200x, and SOX) and presents it to different advisors of the PISA platform as customized checklists.
- Business Continuity Planner generates a comprehensive plan that heavily utilizes different patterns for business continuity.
- Project Planner develops a project plan based on the decisions made in the previous advisors.

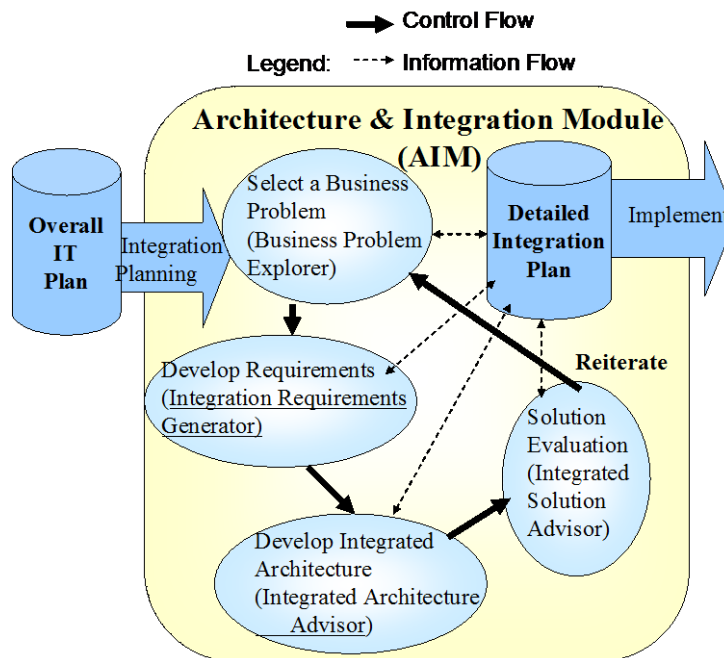
These advisors make inferences based on the information gathered by the previous advisors and further enrich and enhance the PISA knowledgebase. You can, of course, further refine and customize the plans generated by SAM.

SAM also supports the following administrative tools to support PlanIT:

- COTS (Commercial-off-the-Shelf) Advisor populates a Techbase that serves as a repository of commercially available solutions.
- Diagram Generator creates visual representations of the various solutions.
- Intelligent Document Generator produces reports at the end of the interview.

### 3.5. AIM (Architecture and Integration Module) for SOA

PlanIT produces an enterprise-wide IT plan that shows the main elements of the IT infrastructure. However, it does not answer the important question: how will all these elements fit together to form a working solution? This is where AIM fits in. A user would typically develop an enterprise-wide plan by using PlanIT and then use AIM to investigate in more detail how different aspects of this plan can be integrated into an overall architecture. AIM helps its users to develop an integration plan based on Service Oriented Architecture (SOA) principles.



**Figure 7: Conceptual View of AIM**

Development of an integration plan is a complicated task with many challenges. Instead of a ‘big bang’ approach where all enterprise systems are converted to SOA in an afternoon, AIM supports a gradual approach where the enterprise achieves an integrated architecture one business (application) area at a time. The AIM methodology, shown in Figure , guides the user through the iterative process of choosing a business problem and then developing and evaluating integrated architectures for the chosen problem

The AIM advisors (Business Problem Explorer, Integration Requirements Generator, Integrated Architecture Advisors, and Integrated Solution Advisor) support different stages of this methodology and generate extensive documentation (an integration requirements document, an integrated architecture document, and an evaluation report) that can be used to understand, explain and communicate the major decisions. The starting point for AIM is the overall IT plan generated by PlanIT.

#### **4. CONCLUDING COMMENTS AND ADDITIONAL INFORMATION**

PISA is a comprehensive environment that supports the IT planning, integration, security and administration activities through a family of automated consultants (“advisors”). These advisors are integrated around an extensive knowledgebase and collaborate with each other like a team of consultants in real life situations. PISA demonstrates the technical and business feasibility of computer aided consulting. The focus on SMBs is deliberate to allow development of complete solutions. Future research and development directions include a wide range of activities to make the existing platform into a valuable tool for SMBs.

A great deal of additional information and documentation about PISA can be found at the website [www.ngepisa.com](http://www.ngepisa.com). Exhibit 4 displays the main documents that are available at the PISA Website. If you are going to actually use the system, then we suggest that you access and read the ‘PISA User Guide’ before using the system.

**Exhibit 4: PISA Documents on [www.ngepisa.com](http://www.ngepisa.com) site - (Follow the “Learn More” link)**

**Or the SPACE Lab Learning Corner**

**PISA Quick Start:**

- [PISA Executive Summary](#), a three slide executive summary.
- [PISA at a Glance](#), a one page flier on PISA.
- [PISA Overview](#) gives a quick overview of the system (this document)

**PISA Details:**

- [PISA User Guide](#) gives details about how to use the system, illustrated through an example
- [SOA Planning Through PISA-AIM](#) shows how PISA can be used to develop an SOA-based architecture.
- [CASE STUDY: IT Infrastructure Planning Through PISA-PlanIT](#) describes how PISA-PlanIT was used to develop a complete IT plan for a manufacturing-retail company.
- [CASE STUDY: SOA Planning Through PISA-AIM](#) describes how PISA-AIM was used to develop a complete SOA plan for a retail company.
- [PISA Demo Example](#) illustrates a demo of using PISA through extensive screenshots.
- [PISA Patterns Repository](#) gives an overview of the patterns that are contained in the pattern repository.

**PISA in Classroom:**

- [PISA Instructor’s Guide](#) shows how to use PISA in online or on-site courses

- [Course “Architectures for Globally Integrated Enterprises”](#) describes a course that is heavily supported through PISA.

**Sample Reports Generated by PISA:**

- [Complete IT Plan](#), generated by PISA-PlanIT
- [Security Audit Report](#) generated by PISA Security Advisor
- [Application Requirement Document](#), generated by PISA-AIM
- [Application Architecture Document](#), generated by PISA-AIM

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