



Building the Next Generation Enterprises

PISA

(Planning, Integration, Security and Administration)

**An Intelligent Decision Support Environment for
IT Managers and Planners**

Demo Example

May 11, 2007

NGE Solutions, Inc. (www.ngesolutions.com)

Contents

1. QUICK OVERVIEW	3
1.1. PURPOSE OF THIS DOCUMENT.....	3
1.2. WHAT IS PISA?.....	3
1.3. HINTS AND SUGGESTIONS	4
1.4. BEFORE GETTING STARTED	4
2. USING PLANIT TO DEVELOP AN IT PLAN.....	5
2.1. EXAMPLE OVERVIEW	5
2.2. THE CONTROL PANEL	6
2.3. ENTERPRISE MODELER	7
2.4. APPLICATION ADVISOR.....	11
2.5. COMPUTING PLATFORM ADVISOR.....	15
2.6. NETWORK ADVISOR.....	17
2.7. SECURITY ADVISOR	21
2.9. PRODUCING A CONSOLIDATED IT PLAN.....	27
3. USING AIM TO INVESTIGATE AN ARCHITECTURE AND INTEGRATION PROBLEM.....	29
3.1. EXAMPLE OVERVIEW	29
3.2. BUSINESS PROBLEM EXPLORER	30
3.3. INTELLIGENT REQUIREMENTS GENERATOR (IRG).....	32
3.4. INTEGRATED ARCHITECTURE ADVISOR	33
3.5. INTEGRATED SOLUTION ADVISOR.....	36
4. CONCLUDING COMMENTS AND NEXT STEPS	37

1. QUICK OVERVIEW

1.1. Purpose of This Document

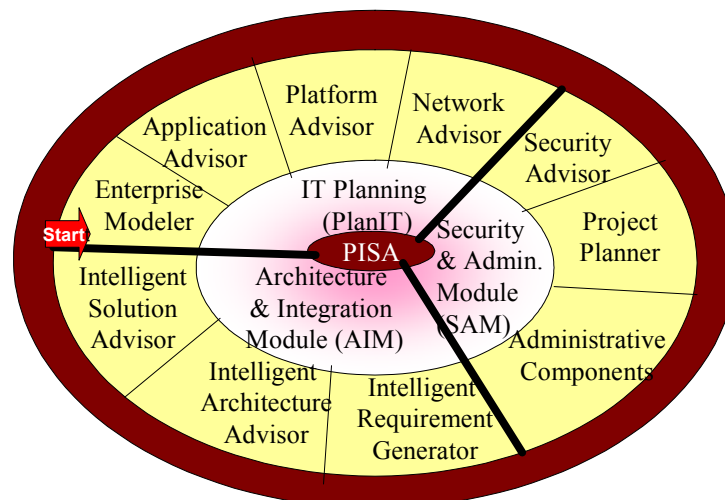
This document shows how PISA can be used to develop an IT plan and then investigate an integration problem for a small (less than 100 employees) manufacturing company (XYZCorp) with 2 sites. This document shows the overall procedure, with numerous screen-shots, to develop this model and then produce an IT plan for this company by using various PISA advisors.

1.2. What is PISA?

PISA (Planning, Integration, Security & Administration) is an intelligent decision support environment for IT managers and planners. It allows the users to quickly build models (scenarios) of an enterprise and then develop completely documented IT plans. PISA consists of a family of automated consultants (*Advisors*) that are organized in the following modules:

- **PLANIT (Planner for IT):** develops an IT plan at enterprise level, with rough estimates and documentation.
- **AIM (Architecture and Integration Module):** concentrates on more detailed issues of how specific components of the plan will fit together to form a functioning system.
- **SAM (Security and Administrative Module)** provides the security and administrative services to produce a complete and secure IT solution with project plans, extensive documentation and graphic support.

The following diagram shows the three modules of the PISA environment and the advisors in each module.



1.3. Hints and Suggestions

- The tool is self-contained. It includes an extensive 'Explain' capability that serves as an online tutorial. The Explain is accessed by clicking on the '?' button on any screen.
- It is best first to create a rough model and then create a more detailed model.
- In case you get stuck, hit logout (top bar), log back in, and access the scenario you were working on. You should be able to proceed without any problems (famous last words!).
- Rarely you may get an error 'Application Error'. In case of this error, click on 'home' (this will take you to the Control Panel from where you can proceed). In case, nothing else works, logout and restart the session with the profile you are working with.

1.4. Before Getting Started


Please browse through the PISA Overview document (available at www.ngesolutions.com/pisa) before proceeding.

2. USING PLANIT TO DEVELOP AN IT PLAN

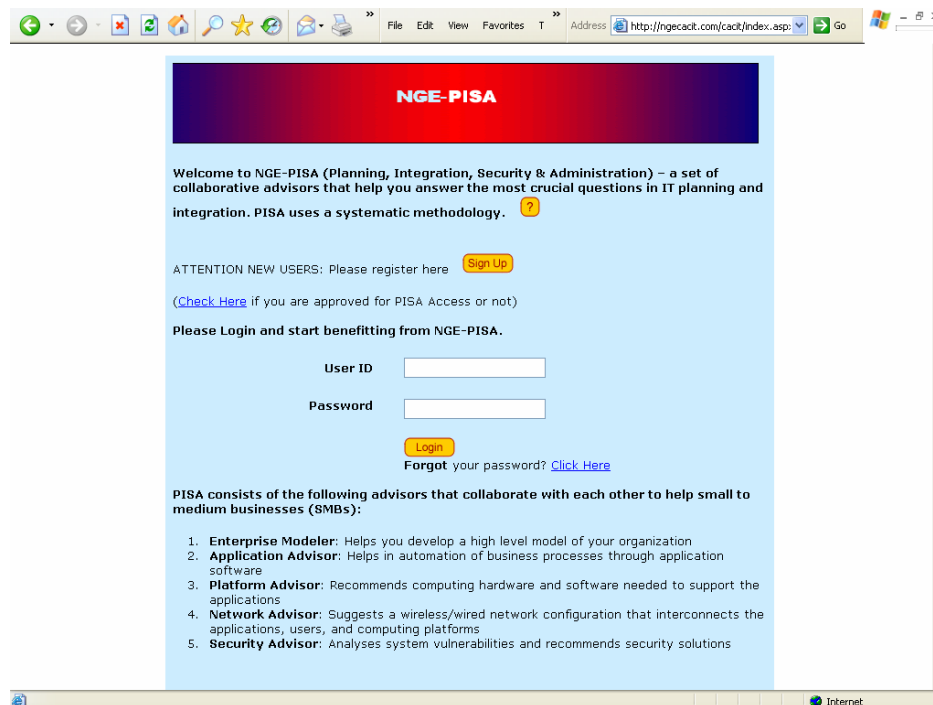
2.1. Example Overview

PLANIT (Planner for IT), as stated previously, is a module of PISA that helps a user to quickly develop an IT plan. In this example, PlanIT is used to develop an IT plan for a small manufacturing company (XYZCorp). The company wants to outsource some business functions, plans to buy and rent most of its applications, but also wants to build and re-use some. This document shows the overall procedure, with numerous screen-shots, to develop this model and then produce an IT plan for this company by using PISA. Specifically, the document illustrates how:

- **Enterprise Modeler** helps in developing a high level model of this organization
- **Application Advisor** aids in automation of business processes through application software
- **Platform Advisor** recommends computing hardware and software needed to support the applications
- **Network Advisor** suggests a wireless/wired network configuration that interconnects the applications, users, and computing platforms
- **Security Advisor** analyses system vulnerabilities and recommends security solutions

PISA uses a very simple user interface. User instructions appear on each screen at every step of the process. Additional information is available on help screens which are accessed by clicking on the  button.

The first screen that appears is the Registration/Login screen (see below). If you are a first-time user and you do not have an ID and password, you must click on the **Sign Up** button and create your own ID and password before logging in.



2.2. The Control Panel

The Control Panel, shown below, is the main home page of CACIT. It controls the flow of a user interview and is shown several times as an interview progresses. The Panel shows a list of all PISA advisors and guides the user to systematically navigate through various steps of the IR planning process. For the first-time users, the advisors that can be invoked follow the methodology sequence (Enterprise Modeler, Application Advisor, Platform Advisor, etc.) through a red arrow. .

In the following screenshot, a user has gone through the first 3 advisors and is now invoking the Network Advisor.

Hints:
This is the main home page of PISA. It serves as a control panel and is shown several times as the interview progresses.
The Red Arrow suggests a sequence in which the advisors should be invoked.
The Yellow Arrow, if shown, indicates that AIM may be invoked at this point to investigate application integration issues and come back to the Red Arrow later. Although doable, it may get a little complicated to go back and forth between PlanIT and AIM. The suggested approach is to finish PlanIT first to develop an enterprise plan and then proceed with AIM to investigate architecture and integration issues.

Additional Hints:
PISA consists of a set of advisors that are subdivided into the following two modules:

- **PlanIT (Planning for IT) Module:** These advisors are used to build a model of an enterprise and then develop the application, platform, network and security plans of the enterprise. PlanIT is the starting point.
- **AIM (Architecture and Integration Module):** These advisors are used to explore enterprise applications, develop requirements for them and build/evaluate integrated architectures

PlanIT Advisors	Generated Models
Enterprise Modeler	Enterprise Model
Applications Advisor	Application Plan
Platform Advisor	Platform Plan
Network Advisor	Network Plan
Security Advisor	Security Plan
Project Planner	
Consolidated Report	
AIM (Architecture & Integration Module)	

2.3. Enterprise Modeler

The Enterprise Modeler is the first advisor and it allows a user to build an enterprise model for a given business scenario. The first step is to define a business scenario by choosing a scenario name, size of company, type of industry segment (pull down menu shown), etc. We used the following screen to define a business scenario ('manuf1') of a small (less than 100 employees) manufacturing company with 2 sites.

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Home Glossary Tutorials Help Contact Us Logoff

STEP 1: Company Profile Basic Data ?

Please enter scenario of your organization. The information entered here will be extremely important since the recommendations and decisions made by the 'Advisors' will be based on this data.

For help with business issues, click here for a concise [Guide to Small and Medium sized Businesses \(SMBs\)](#)

Name of Scenario

Size of Business (number of employees)

Type of industry Segment

Number of Sites

Site Locations

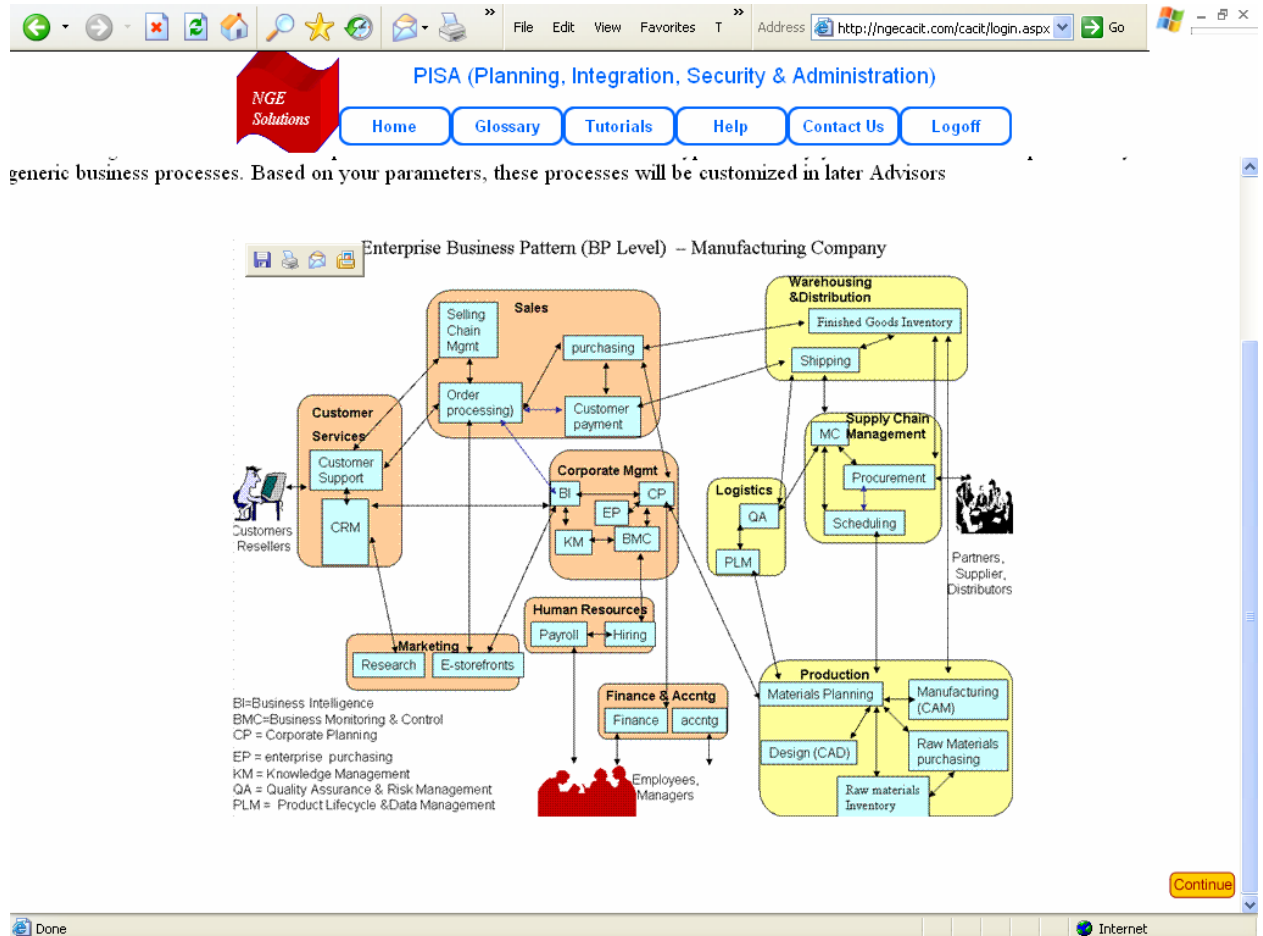
Web Reliance ?

Mobile Computing and Wireless Reliance ?

On-demand Services ? ☒ None ☐ Few ☐ Many

[Continue](#)

After defining a business scenario, this advisor shows a business process pattern (BPP) for a manufacturing company (see the screenshot). This BPP is fetched from the Pattern Repository. The repository has this image plus an XML representation of this BPP.



The Enterprise Modeler now produces a list of business functions (BFs) for the type of industry chosen based on the BPP shown previously. The following screenshot shows the list of BFs for a manufacturing company. Notice that the user can outsource some BFs, delete some by selecting 'None' and add some (yellow button at the bottom of screen).

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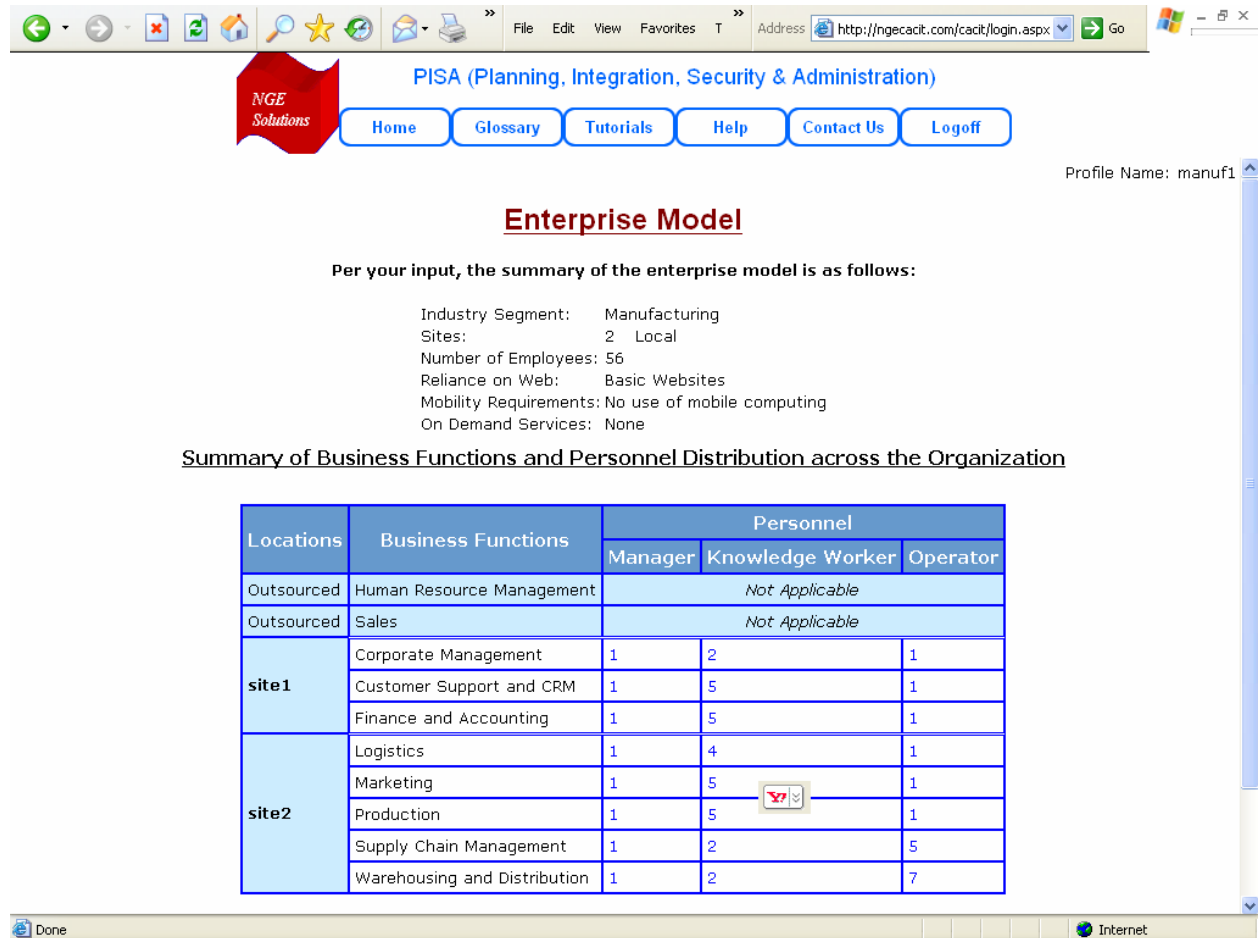
Business Function	Mode of Functioning
Corporate Management	<input checked="" type="radio"/> Inhouse <input type="radio"/> OutSource <input type="radio"/> None
Customer Support and CRM	<input checked="" type="radio"/> Inhouse <input type="radio"/> OutSource <input type="radio"/> None
Finance and Accounting	<input checked="" type="radio"/> Inhouse <input type="radio"/> OutSource <input type="radio"/> None
Human Resource Management	<input type="radio"/> Inhouse <input checked="" type="radio"/> OutSource <input type="radio"/> None
Logistics	<input checked="" type="radio"/> Inhouse <input type="radio"/> OutSource <input type="radio"/> None
Marketing	<input checked="" type="radio"/> Inhouse <input type="radio"/> OutSource <input type="radio"/> None
Production	<input checked="" type="radio"/> Inhouse <input type="radio"/> OutSource <input type="radio"/> None
Supply Chain Management	<input checked="" type="radio"/> Inhouse <input type="radio"/> OutSource <input type="radio"/> None
Sales	<input type="radio"/> Inhouse <input checked="" type="radio"/> OutSource <input type="radio"/> None
Warehousing and Distribution	<input checked="" type="radio"/> Inhouse <input type="radio"/> OutSource <input type="radio"/> None
e-Advertising	<input type="radio"/> Inhouse <input type="radio"/> OutSource <input checked="" type="radio"/> None

color code:

- Predefined BFs for the pertinent industry segment -- blue/white
- Other Predefined BFs -- Green
- User Defined BFs -- Yellow

Add Predefined Business Functions

The Enterprise Modeler produces a summary of the enterprise options chosen by the user at the end of Enterprise Modeler. This shows the BF's that have been outsourced and the ones that are assigned to the 2 sites with staff assignments. We have not shown all steps of the Enterprise Modeler.



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Profile Name: manuf1

Enterprise Model

Per your input, the summary of the enterprise model is as follows:

Industry Segment: Manufacturing
 Sites: 2 Local
 Number of Employees: 56
 Reliance on Web: Basic Websites
 Mobility Requirements: No use of mobile computing
 On Demand Services: None

Summary of Business Functions and Personnel Distribution across the Organization

Locations	Business Functions	Personnel		
		Manager	Knowledge Worker	Operator
Outsourced	Human Resource Management	Not Applicable		
Outsourced	Sales	Not Applicable		
site1	Corporate Management	1	2	1
	Customer Support and CRM	1	5	1
	Finance and Accounting	1	5	1
site2	Logistics	1	4	1
	Marketing	1	5	1
	Production	1	5	1
	Supply Chain Management	1	2	5
	Warehousing and Distribution	1	2	7

2.4. Application Advisor

The Application Advisor of PISA allows the user to select how the various BF's (business functions) and BP's (business processes) within the BF will be automated (buy, rent, outsource, etc). This step can be used to create different IS planning scenarios within a given business scenario. For example, a company may decide to automate all BF's/BP's, outsource all, or a mixture. Very small organizations (e.g., SOHOs) may not even need to go to the BP level. This screen leads to other screens (not shown) that allow users to make more detailed decisions.

STEP 2(b): Select Automation Strategy (Detailed Issues) ?

Please select suitable solution strategy for each Business Process.
There are six options including: [Manual \(no automation needed\)](#), [Buy Pkgs \(Buy Commercial Packages\)](#), [Rent from ASP](#), [Inhouse Development](#), [Outsource Development](#) and [Re-Engineer](#) existing application software. 'Buy Commercial Packages' will be the default option.

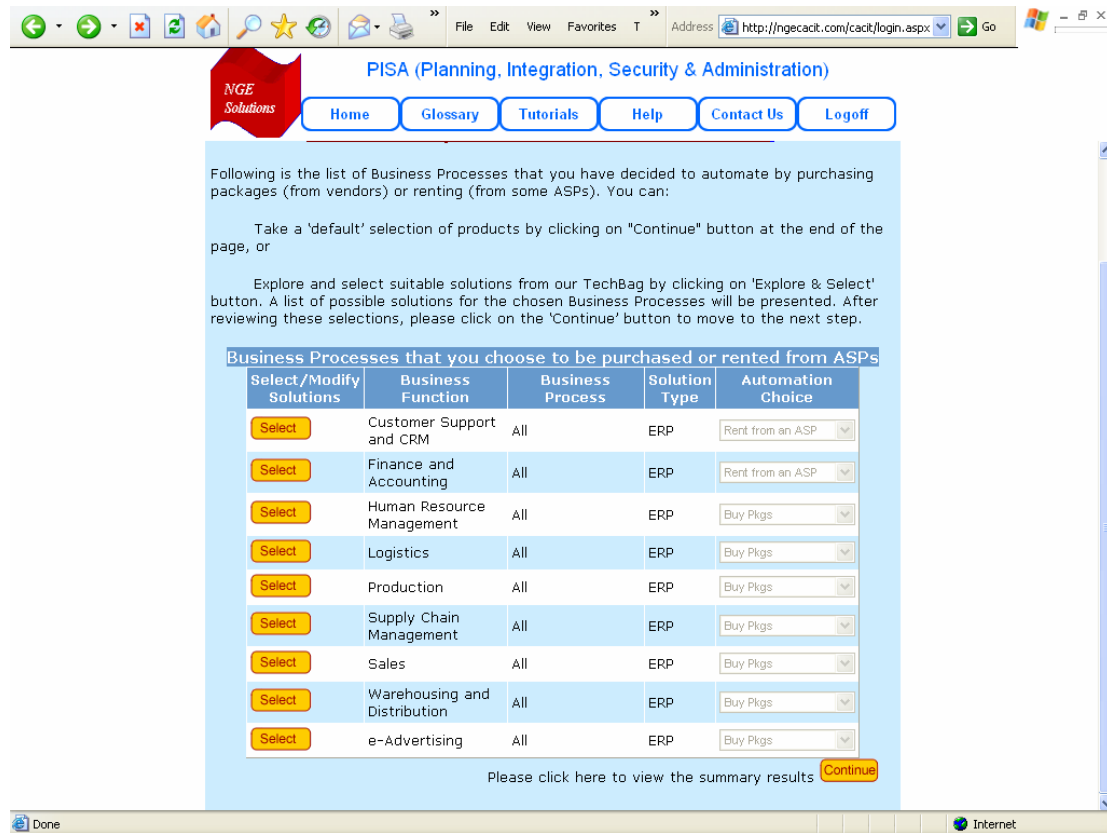
If you cannot choose an option, click on 'Get Recommendation'.

Please select desired automation strategy for each Business Process

Business Function	Business Process	Solution Type	Automation Choices	
Corporate Management	All	ERP	Manual	Get Recommendation
Customer Support and CRM	All	ERP	Rent from an ASP	Get Recommendation
Finance and Accounting	All	ERP	Rent from an ASP	Get Recommendation
Logistics	All	ERP	Buy Pkgs	Get Recommendation
Marketing	All	ERP	Manual	Get Recommendation
Production	All	ERP	Buy Pkgs	Get Recommendation
Supply Chain Management	All	ERP	Buy Pkgs	Get Recommendation
Warehousing and Distribution	All	ERP	Buy Pkgs	Get Recommendation

[Continue](#)

The following screen displays how the user can explore and select application packages and ERP Solutions.



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[Home](#) [Glossary](#) [Tutorials](#) [Help](#) [Contact Us](#) [Logoff](#)

Following is the list of Business Processes that you have decided to automate by purchasing packages (from vendors) or renting (from some ASPs). You can:

Take a 'default' selection of products by clicking on "Continue" button at the end of the page, or

Explore and select suitable solutions from our TechBag by clicking on "Explore & Select" button. A list of possible solutions for the chosen Business Processes will be presented. After reviewing these selections, please click on the 'Continue' button to move to the next step.

Business Processes that you choose to be purchased or rented from ASPs

Select/Modify Solutions	Business Function	Business Process	Solution Type	Automation Choice
Select	Customer Support and CRM	All	ERP	Rent from an ASP
Select	Finance and Accounting	All	ERP	Rent from an ASP
Select	Human Resource Management	All	ERP	Buy Pkgs
Select	Logistics	All	ERP	Buy Pkgs
Select	Production	All	ERP	Buy Pkgs
Select	Supply Chain Management	All	ERP	Buy Pkgs
Select	Sales	All	ERP	Buy Pkgs
Select	Warehousing and Distribution	All	ERP	Buy Pkgs
Select	e-Advertising	All	ERP	Buy Pkgs

Please click here to view the summary results [Continue](#)

The following screenshot shows the recommended application packages. The user can receive the explanations (justifications) of the recommendations and also can explore their alternative actions.

The screenshot displays the NGE Solutions PISA (Planning, Integration, Security & Administration) web application. The interface includes a navigation bar with links for Home, Glossary, Tutorials, Help, Contact Us, and Logoff. The main content area lists selected solutions for different business functions, each with an 'Explain' and 'Explore' button.

Following is the list of Solutions that are Selected.

- Click the 'Explain' button to know why
- Click the 'Explore' button to explore other option or even add you on solutions

Business Function: [Corporate Management](#)

Not Chosen

[Explain](#) [Explore](#)

Business Function: [Customer Support and CRM](#)

#	Product	Vendor
1	Microsoft Business Solutions for Field Service Management	Microsoft

[Explain](#) [Explore](#)

Business Function: [Finance and Accounting](#)

#	Product	Vendor
1	Microsoft Business Solutions for Financial Management- Axapta	Microsoft

[Explain](#) [Explore](#)

Business Function: [Human Resource Management](#)

#	Product	Vendor
1	Microsoft Business Solutions for HR Management - Axapta	Microsoft

[Explain](#) [Explore](#)

Business Function: [Logistics](#)

The following screenshot shows the summary of Application Plan produced by the Application Advisor. Note that the application packages have been chosen from the COTS database.

The screenshot displays the NGE Solutions PISA (Planning, Integration, Security & Administration) web application. The browser address bar shows the URL <http://ngecact.com/cact/login.aspx>. The application features a navigation menu with links: Home, Glossary, Tutorials, Help, Contact Us, and Logoff. The main content area is divided into sections for different business functions:

- Corporate Management**: None Chosen
- Customer Support and CRM**:
 - Product Name: Microsoft Business Solutions for Field Service Management
 - Vendor: Microsoft
 - Product URL: <http://www.microsoft.com/BusinessSolutions/fieldservice.aspx>
- Finance and Accounting**:
 - Product Name: Microsoft Business Solutions for Financial Management- Axapta
 - Vendor: Microsoft
 - Product URL: <http://www.microsoft.com/BusinessSolutions/Axapta/financialmanagement.aspx>
- Human Resource Management**:
 - Product Name: Microsoft Business Solutions for HR Management - Axapta
 - Vendor: Microsoft
 - Product URL: <http://www.microsoft.com/BusinessSolutions/Axapta/hrmanagement.aspx>
- Logistics**

2.5. Computing Platform Advisor

The Platform Advisor infers and recommends the computing platforms needed to support the business processes by using the knowledge gathered in the previous interviews and a few questions that are asked in the steps of this advisor. .

The Platform Advisor uses the workgroups (WGs) and the various activities (business processes, support activities) performed in each WG to recommend computing platforms. It also recommends different types of servers based on allocations of corporate applications and databases.

The following screen shows the recommendations generated by the Platform Advisor for the various Workgroups at the 2 different sites. The **View/Change Recommendation** button allows a user to view and modify the recommendations. You can modify the requirements and recommendations to add, for example, wireless users.

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Home Glossary Tutorials Help Contact Us Logoff

Site # 1: **site1**

Show Servers

#	Workgroup	User Type	Actions
1	Corporate Management	Fixed only	View/Change Recommendation
2	Customer Support and CRM	Fixed only	View/Change Recommendation
3	Logistics	Fixed only	View/Change Recommendation
4	Marketing	Fixed only	View/Change Recommendation
5	Production	Fixed only	View/Change Recommendation
6	Supply Chain Management	Fixed only	View/Change Recommendation

Site # 2: **site2**

Show Servers

#	Workgroup	User Type	Actions
1	Finance and Accounting	Fixed only	View/Change Recommendation
2	Human Resource Management	Fixed only	View/Change Recommendation
3	Sales	Fixed only	View/Change Recommendation
4	Warehousing and Distribution	Fixed only	View/Change Recommendation
5	e-Advertising	Fixed only	View/Change Recommendation

Show Diagram Continue

After you have received all recommendations, the platform recommendation summary is displayed. It shows the servers, the desktops, and mobile/wireless computing platforms suggested by the Platform Advisor. The following screenshot shows a small portion of the recommendations.

The screenshot displays the NGE Solutions PISA (Planning, Integration, Security & Administration) web application. The interface includes a navigation bar with links for Home, Glossary, Tutorials, Help, Contact Us, and Logoff. The main content area is divided into three sections:

Server Configuration

Type	Configuration	Business Software
Email Server	OS: Microsoft Windows Server 2003 Hardware: IBM xSeries 206 Server	✓ MS Exchange Server (by MicroSoft)

Server Configuration

Type	Configuration	Business Software
Application Server	OS: Microsoft Windows Server 2003 Hardware: IBM xSeries 206 (84824su) Server (Pentium 4 3.2 GHz, 512 MB (DDR SDRAM), 80 GB HDD)	<ul style="list-style-type: none"> ✓ Microsoft Business Solutions for Field Service Management (by Microsoft) ✓ Oracle E-Business Suite Logistics (by Oracle) ✓ Microsoft Business Solutions for Supply Chain Management-Navision (by Microsoft)

Business Function: Corporate Management

Title	qty	Configuration	Software (Applications + Middleware)
Manager	1	Type: wired Hardware: Dell Dimension 4400 OS: Microsoft Windows 2000	<ul style="list-style-type: none"> ▶ MS Office XP ▶ MS Outlook Express ▶ MS Internet Explorer 6.0
Knowledge Worker	2	Type: wired Hardware: Dell Dimension 4400 OS: Microsoft Windows 2000	<ul style="list-style-type: none"> ▶ MS Office XP ▶ MS Outlook Express ▶ MS Internet Explorer 6.0
Operator	1	Type: wired Hardware: Dell Dimension 4400 OS: Microsoft Windows 2000	<ul style="list-style-type: none"> ▶ MS Office XP ▶ MS Outlook Express ▶ MS Internet Explorer 6.0

2.6. Network Advisor

The Network Advisor is an “intelligent” system that recommends a network solution by inferring a great deal of information based on the past interviews with the other advisors. Thus a user does not have to sit for hours providing all the information. It gathers additional information from a quick interview and uses the information it has gathered to recommend a solution.

The Network Advisor first infers a workload model based on the interviews conducted by other advisors. It uses some formal methods to develop a network design based on the estimated workload and network topology. You can keep the "default" workload model intact or modify it. The following screen shows the estimated workload model for different workers in different workgroups. You can modify the estimated workload.

You can keep the “default” workload model intact and click submit if you do not want to modify it. You can always come back and change the workload to see different results.

Location	Role	Intranet BW	Internet BW
site1/FA	Manager	200 kbps	20 kbps
site1/FA	Knowledge Worker	200 kbps	20 kbps
site1/FA	Operator	200 kbps	20 kbps
site1/HcG	Manager	200 kbps	20 kbps
site1/HcG	Knowledge Worker	200 kbps	20 kbps
site1/HcG	Operator	200 kbps	20 kbps
site2/HcG	Manager	200 kbps	20 kbps
site2/HcG	Knowledge Worker	200 kbps	20 kbps
site2/HcG	Operator	200 kbps	20 kbps
site3/HcG	Manager	200 kbps	20 kbps
site3/HcG	Knowledge Worker	200 kbps	20 kbps
site3/HcG	Operator	200 kbps	20 kbps
site3/HR	Manager	200 kbps	20 kbps
site3/HR	Knowledge Worker	200 kbps	20 kbps
site3/HR	Operator	200 kbps	20 kbps

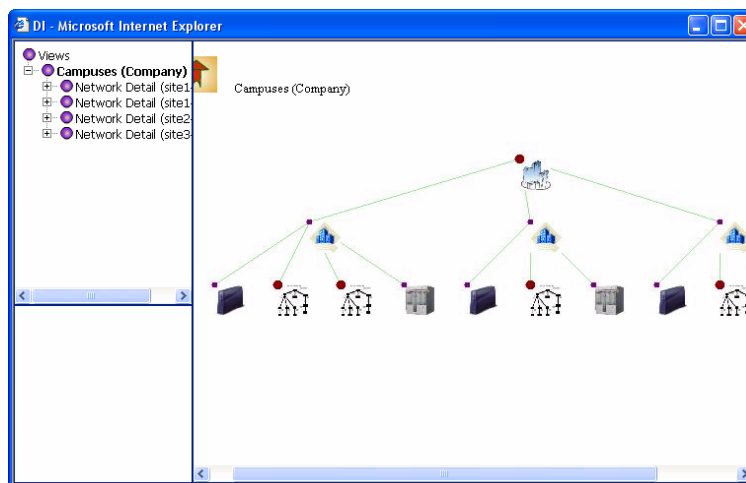
Utilization: 0.5 (Effectively Interactive)

The Network Advisor shows recommendations based on user input. The following screen shows a table with the following entries:

- # shows the network number
- Campus shows the name of the site (e.g., HQ, site 1, site 2, etc.).
- BPs shows the business processes (BPs) to be served by the network.
- Users shows the total number of users (Wired + Wireless) on the network. For example, (38 + 7) shows that 38 wired plus 7 wireless users will be on this network.
- Bandwidth shows the total bandwidth, in Kbps, needed by the network to support the number of users on the network. This helps you to choose a fast enough network.

#	Campus	Workgroups	Users (Wired+Wireless=) Total	Bandwidth
1	site1	► Invoicing	(38+7=)45	9000 kbps
2	site2		(23+3=)26	5200 kbps
3	site3	► Payroll	(30+4=)34	6800 kbps

Click on the **Show Diagram** button for views of the network (shown below). You can see different aspects of your network by clicking on different icons. Please close this window when you are done.



You can also use this Advisor to determine the commercial products to support the network design. The Network Advisor suggests the commercially available network products, shown below, based on user requirements.

Network Advisor

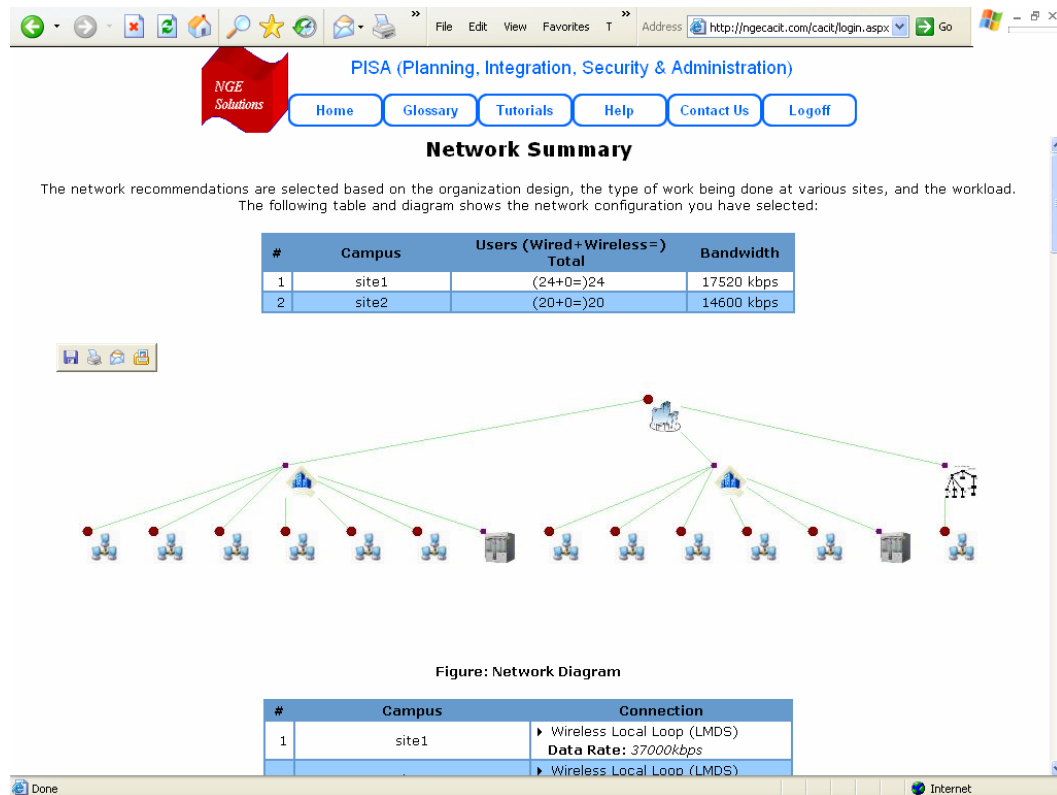
Previous Advisor → **Step 1** **Step 2** **Step 3** → Next Advisor

STEP 3: Displaying selected Commercial Products ?

The Network Advisor has Selected the following commercially available network products per your requirements. You can see the details in the following table.

#	COTS Selected	Features	Usage
1	Linksys Cable/DSL Modem	N/A	Path: site 1
2	Wireless-B Access Point	Type: Wireless Access Point Topology: 802.11b Bandwidth: 11Mbps Vendor: Linksys	Path: site 1/ FA Devices Attached: 2 Load: 0.8Mbps
3	EtherFast® 10/100 16-port Auto-Sensing Hub	Type: Hub Ports: 16 Bandwidth: 10Mbps Vendor: Linksys	Path: site 1/ FA Devices Attached: 8 Load: 3.2Mbps
4	5-Port 10/100 Switch	Type: Group level switch Ports: 5 Bandwidth: 100Mbps Vendor: Linksys	Path: site 1/ FA Devices Attached: 3
5	Wireless-B Access Point	Type: Wireless Access Point Topology: 802.11b Bandwidth: 11Mbps Vendor: Linksys	Path: site 1/ HcG Devices Attached: 5 Load: 2Mbps
6	EtherFast® 10/100 24-port Auto-Sensing Hub	Type: Hub Ports: 24 Bandwidth: 10Mbps Vendor: Linksys	Path: site 1/ HcG Devices Attached: 24 Load: 9.6Mbps

The following screenshot shows the summary of network plan produced by the Network Advisor.



2.7. Security Advisor

The Security Advisor analyzes the security features of the models developed so far and suggests a security plan that can be used to secure networks, databases, applications, platforms, and other objects. This Advisor starts with setting the security requirements for the different “objects” (resources to be protected) in the network. The following screen shows the objects to be protected in the system (this list is produced automatically) and the user can set security requirements to be high, medium or low.

Previous Advisor → **Security Advisor** → Next Advisor

Step 1: Secure individual objects ?

Here you set the security requirements for different “objects” (devices, computers, databases, software packages) in the network.

Following are the vulnerable device/object types. Please specify your security requirements and click the “Continue” button to proceed.

#	Object Type	Security Level
1	Cable/DSL Modem	<input checked="" type="radio"/> Low <input type="radio"/> Medium <input type="radio"/> High <input type="radio"/> None
2	Access Point	<input type="radio"/> Low <input type="radio"/> Medium <input checked="" type="radio"/> High <input type="radio"/> None
3	Hub	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High <input type="radio"/> None
4	Switch	<input type="radio"/> Low <input type="radio"/> Medium <input type="radio"/> High <input checked="" type="radio"/> None
5	Router	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High <input type="radio"/> None
6	Wireless Host	<input type="radio"/> Low <input type="radio"/> Medium <input checked="" type="radio"/> High <input type="radio"/> None
7	Wired Host	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High <input type="radio"/> None
8	Application Server	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High <input type="radio"/> None

Continue

This Advisor next suggests solutions for the main objects in the system based on the security requirements chosen previously. For example, it shows what should be done to protect databases, applications, network devices, and other vulnerable objects.

The solutions show the type of encryption (e.g., symmetric key, asymmetric key, PKI, digital certificates), authentication (e.g., ID, PW, secure ID cards), authorization (e.g., authorization control lists), and other techniques. Note that if you chose higher security requirements, more solutions are suggested (naturally!).

Step 2: Display Vulnerabilities/Solutions ?

The Security Advisor has examined your network configuration and found the following objects with vulnerabilities were found in the network.

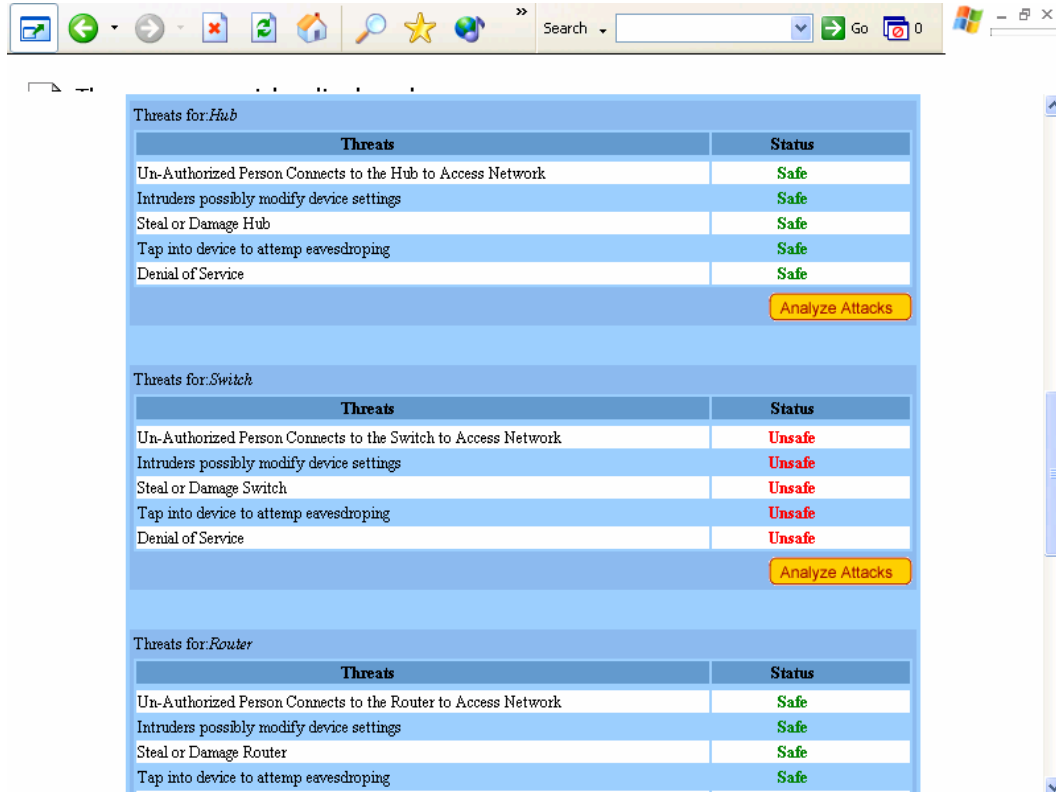
Based on the security requirements (none, low, medium, high) you chose in the previous step, the following solutions have been proposed by the Advisor. The number of solutions suggested depends on the security requirements: For example, if you specified 'None', then no solutions are suggested; for 'Low', very few are suggested, for 'High' many are suggested.

Click on 'Select Solutions' to select the suggested solutions (you do not have to select everything suggested).

Object type	Weakness	Solutions
Cable/DSL Modem	<ul style="list-style-type: none"> ▶ Device is not placed in a secure Location ▶ No Authorization Required for access ▶ Too much workload to allow jamming 	<ul style="list-style-type: none"> ▶ Protect the network device by placing in a controlled area ▶ Turn id/pw on for Device access ▶ Replicate to avoid jamming <p>Select Solutions</p>
Access Point	<ul style="list-style-type: none"> ▶ Device is not placed in a secure Location ▶ Too much workload to allow jamming ▶ No Encryption ▶ Weak or no Authentication/Authorization ▶ Accessible to outside users (RandomConnectivity) ▶ No Audit trails 	<ul style="list-style-type: none"> ▶ Protect the network device by placing in a controlled area ▶ Put network device in highly protected or difficult to reach areas so that the intruders cannot tamper with them easily ▶ Replicate to avoid jamming ▶ Move to a more jamming resistant network such as IPV6 ▶ Extensive duplication ▶ Use maximum WEP security features such as encryption ▶ SSL, VPN (IPSec), Firewalls, WAP/WS

Attack trees are a convenient way to explore potential attacks and thoroughly examine the impact of weaknesses in the system. An attack tree is simply a tree that is similar to a logical decision tree that pinpoints what could be attacked, where the attack could happen, when the attack could take place and what could be the results. Attack trees can illustrate how a single weakness, such as sending passwords on clear links, can result in multiple threats to your system.

The Security Advisor automatically runs attacks on the objects in your network. The following screen partially shows the result of running the attacks. Safe and unsafe shows which attacks you are safe or unsafe from.

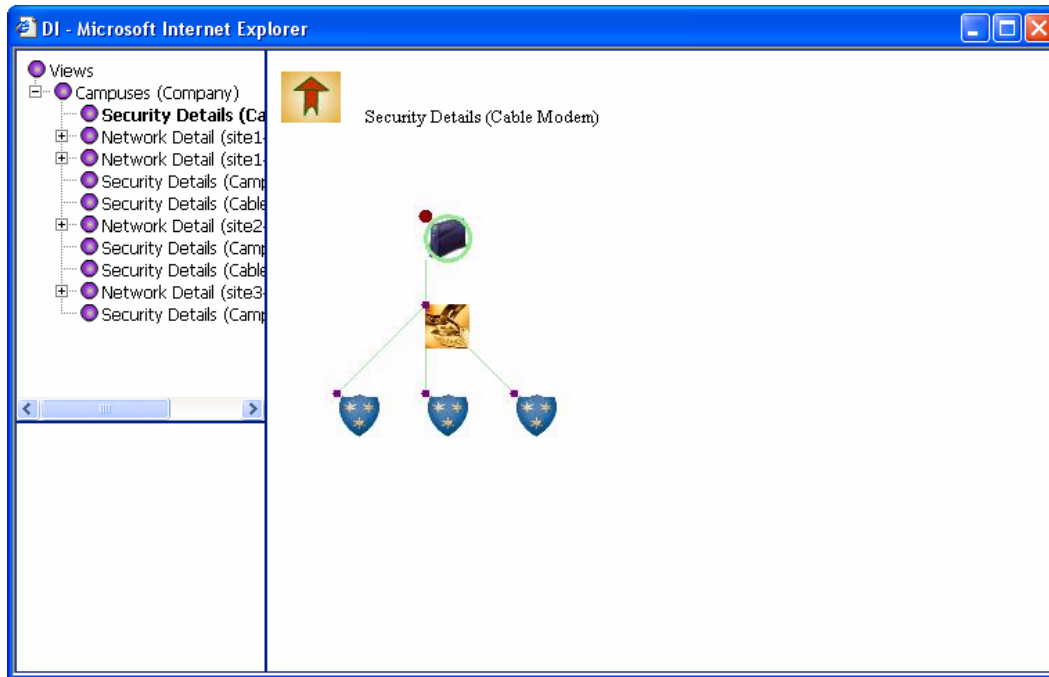


Threats for: <i>Hub</i>	
Threats	Status
Un-Authorized Person Connects to the Hub to Access Network	Safe
Intruders possibly modify device settings	Safe
Steal or Damage Hub	Safe
Tap into device to attempt eavesdropping	Safe
Denial of Service	Safe
Analyze Attacks	

Threats for: <i>Switch</i>	
Threats	Status
Un-Authorized Person Connects to the Switch to Access Network	Unsafe
Intruders possibly modify device settings	Unsafe
Steal or Damage Switch	Unsafe
Tap into device to attempt eavesdropping	Unsafe
Denial of Service	Unsafe
Analyze Attacks	

Threats for: <i>Router</i>	
Threats	Status
Un-Authorized Person Connects to the Router to Access Network	Safe
Intruders possibly modify device settings	Safe
Steal or Damage Router	Safe
Tap into device to attempt eavesdropping	Safe

The following screen shows the network diagram with security features added. The security features are displayed by moving the mouse over certain icons.



The security Advisor also displays an audit and control checklist customized for the scenario at hand. Part of this checklist is shown below.

AUDIT AND CONTROL CHECKLIST

Color coding

The segments in Customized Checklist are color coded to represent the following:

- If the segment is **"Black"**, no change needed to this segment
- If the segment is **"Blue"**, you can reduce this segment or even remove it according to your requirement
- If the segment is **"Red"**, you may need to expand this segment according to your requirements

2.8. Organizational Controls and Security Administration

These controls are intended for the entire firm and address the organizational structures, policies and procedures.

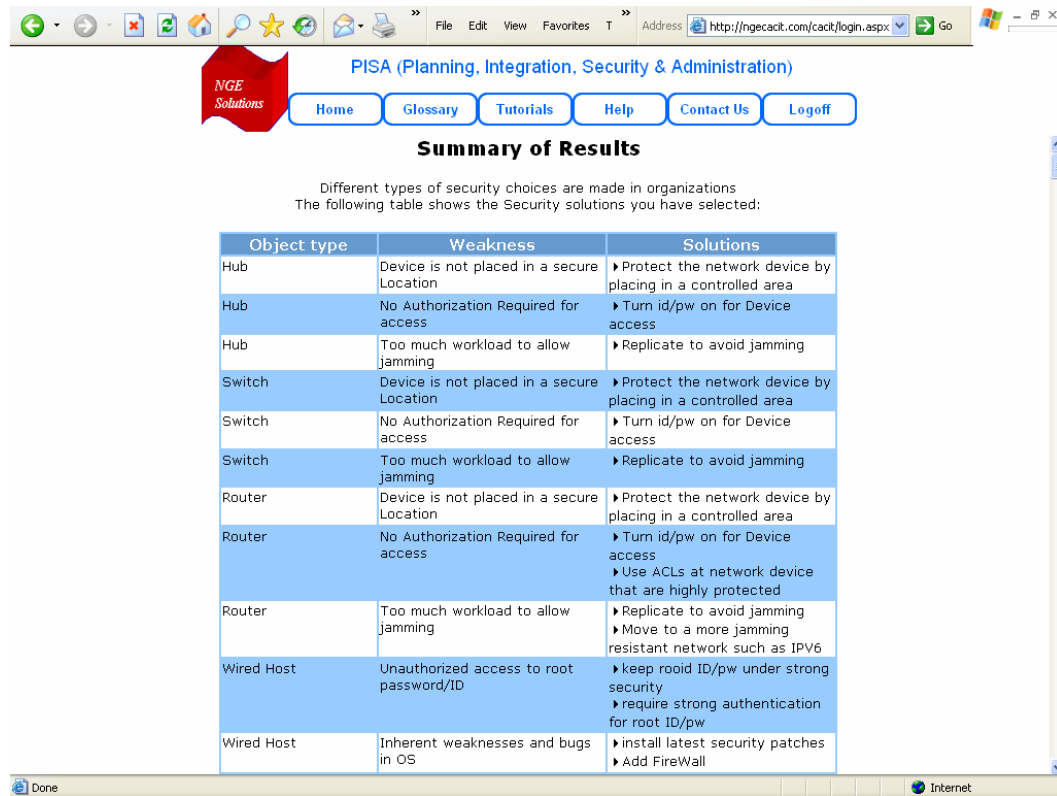
2.8.1. Documentation of the Information Systems Strategic Plan

- Management has developed and implemented long and short term plans that identify and fulfill the organizations strategies _____
- Information systems security is adequately addressed in the organizations long- and short-term plans _____
- The management of the information systems security was established and applied using a structured approach _____

2.8.2. Information Security Policies and Procedures

- Information security policies exist _____
- These policies are adequate to address Privacy, Integrity, Authorization, Authentication, and Availability (PIA4) in the following areas (circle the ones that are NOT adequately covered by the policies):
 - Web pages
 - Firewalls
 - Employee Surveillance
 - Electronic Banking
 -

A summary report is shown at the end of the Security advisor.



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Home Glossary Tutorials Help Contact Us Logoff

Summary of Results

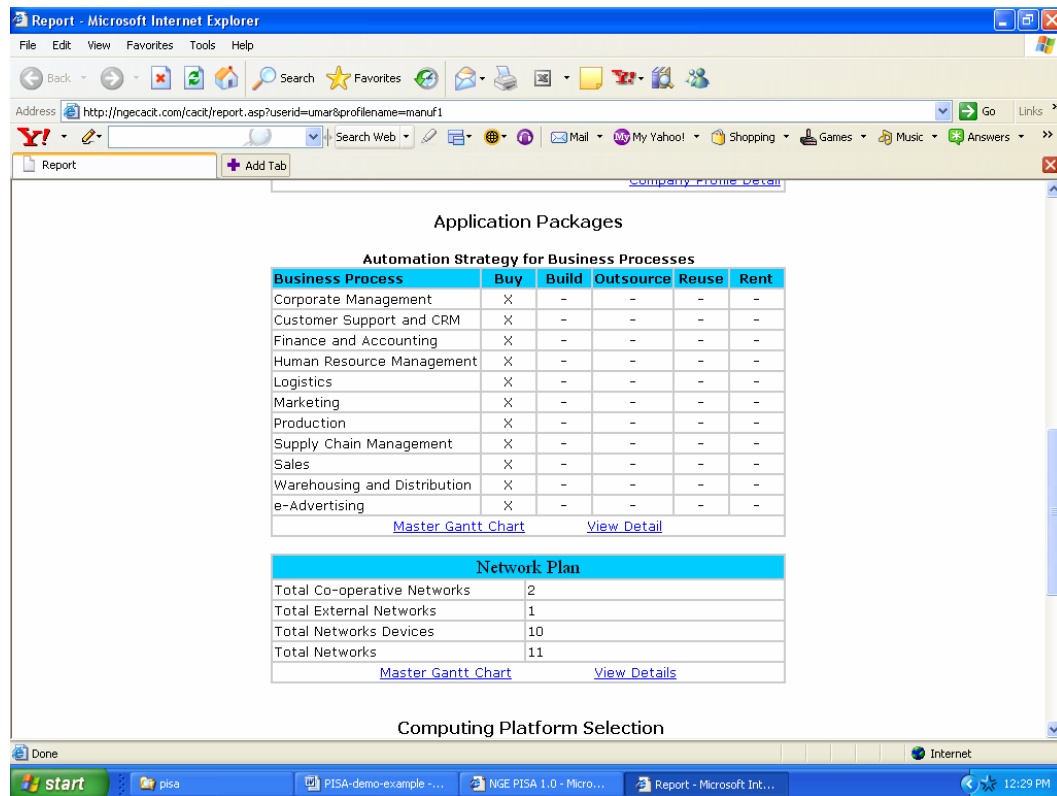
Different types of security choices are made in organizations
The following table shows the Security solutions you have selected:

Object type	Weakness	Solutions
Hub	Device is not placed in a secure Location	▶ Protect the network device by placing in a controlled area
Hub	No Authorization Required for access	▶ Turn id/pw on for Device access
Hub	Too much workload to allow jamming	▶ Replicate to avoid jamming
Switch	Device is not placed in a secure Location	▶ Protect the network device by placing in a controlled area
Switch	No Authorization Required for access	▶ Turn id/pw on for Device access
Switch	Too much workload to allow jamming	▶ Replicate to avoid jamming
Router	Device is not placed in a secure Location	▶ Protect the network device by placing in a controlled area
Router	No Authorization Required for access	▶ Turn id/pw on for Device access ▶ Use ACLs at network device that are highly protected
Router	Too much workload to allow jamming	▶ Replicate to avoid jamming ▶ Move to a more jamming resistant network such as IPV6
Wired Host	Unauthorized access to root password/ID	▶ keep rooid ID/pw under strong security ▶ require strong authentication for root ID/pw
Wired Host	Inherent weaknesses and bugs in OS	▶ install latest security patches ▶ Add FireWall

2.9. Producing a Consolidated IT Plan

PlanIT produces a **Consolidated Report** that reflects the IT Plan developed by different advisors.

The report is shown at two levels: a high level summary (snapshot of this summary report is given below). A detailed summary report is also generated (shown on the next page).



Application Packages

Automation Strategy for Business Processes

Business Process	Buy	Build	Outsource	Reuse	Rent
Corporate Management	X	-	-	-	-
Customer Support and CRM	X	-	-	-	-
Finance and Accounting	X	-	-	-	-
Human Resource Management	X	-	-	-	-
Logistics	X	-	-	-	-
Marketing	X	-	-	-	-
Production	X	-	-	-	-
Supply Chain Management	X	-	-	-	-
Sales	X	-	-	-	-
Warehousing and Distribution	X	-	-	-	-
e-Advertising	X	-	-	-	-

[Master Gantt Chart](#) [View Detail](#)

Network Plan

Total Co-operative Networks	2
Total External Networks	1
Total Networks Devices	10
Total Networks	11

[Master Gantt Chart](#) [View Details](#)

Computing Platform Selection

A snapshot of the detailed report is shown below for illustrative purposes (the report can be quite long). This report can be used for several purposes such as the following:

- Treat the IT plan generated by PISA as a sketch and extend/modify this plan to take into account the situations not handled by PISA
- Buy products to support the organization
- Issue bids and RFPs/RFQs (requests for quotations, requests for prices)
- Develop a more detailed plan based on this plan.

This report summarizes the results recommended by different components of the system based on the information provided in the interview.

1. Enterprise Model

Profile Name: manuf1

Enterprise Model

Per your input, the summary of the enterprise model is as follows:

Industry Segment: Manufacturing
 Sites: 2 Local
 Number of Employees: 44
 Reliance on Web: Basic Websites
 Mobility Requirements: No use of mobile computing
 On Demand Services: None

Summary of Business Functions and Personnel Distribution across the Organization

Locations	Business Functions	Personnel		
		Manager	Knowledge Worker	Operator
	Corporate Management	1	2	1
	Customer Support and CRM	1	2	1

3. USING AIM TO INVESTIGATE AN ARCHITECTURE AND INTEGRATION PROBLEM

3.1. Example Overview

In this section, we will show how to use AIM (Architecture and Integration Module) to develop a better understanding of how one application (e.g., order processing) can be architected and integrated with other applications.

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 working solutions? 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. Developing integrated architectures that work in the digital age is an important and complex decision. AIM, in its early prototype stage at the time of this writing, attempts to address this issue. Specifically, AIM can be used to:

- Analyze, architect, and integrate specific applications
- Quickly develop application requirements that can be used to make buy, rent, outsource, re-use, and build-yourself decisions
- Examine various architecture and integration configurations
- Evaluate the impact of selected strategies on computing platforms, network architectures, and security solutions.

The starting point of AIM is the IT plan that is generated by working with the planning advisors. The main steps of AIM are:

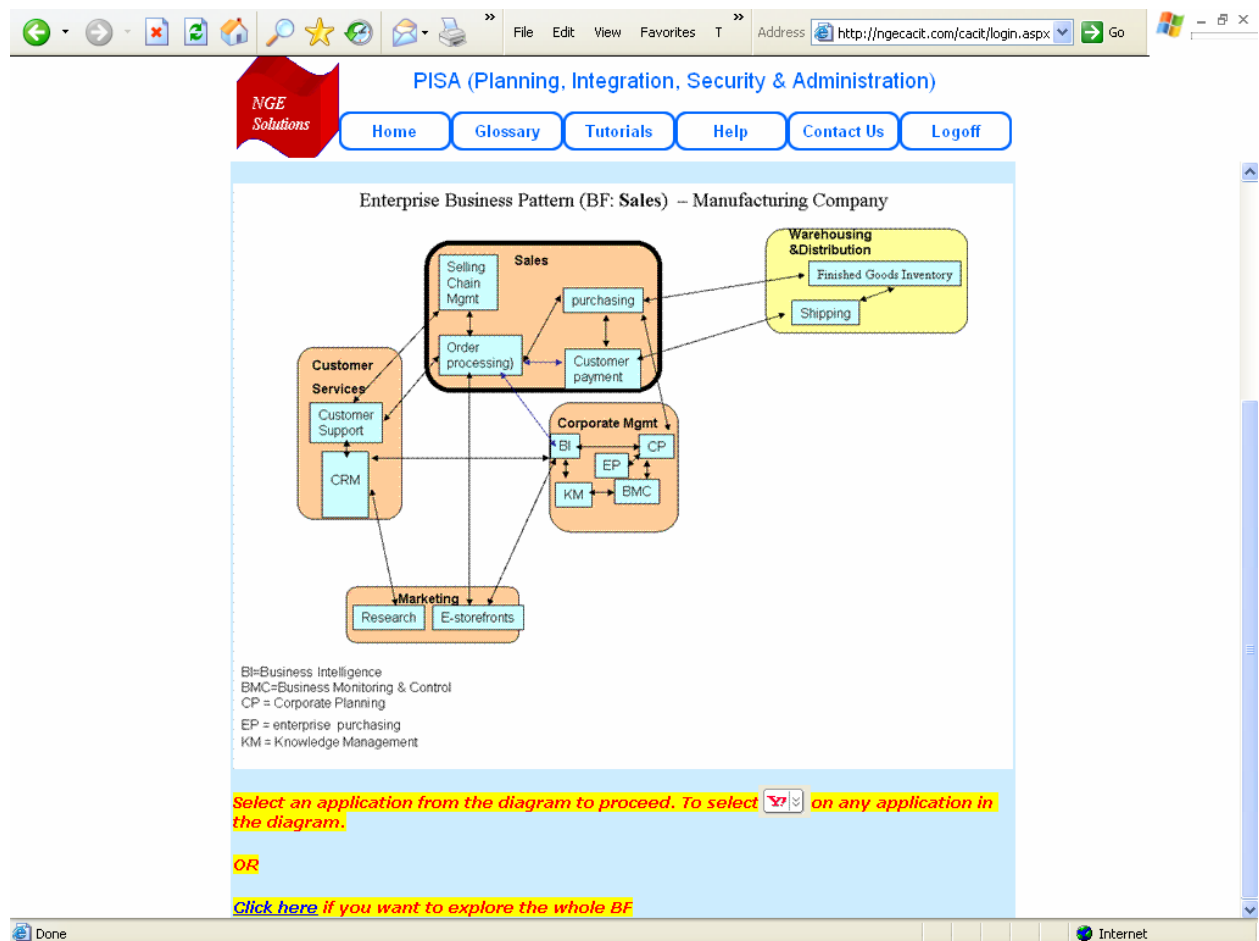
- **Invoke AIM** from the Control Panel (Yellow Arrow)
- Business Problem Explorer helps a user to investigate and pick an application you want to integrate. Choose something like online purchasing system to look at some interesting situations.
- **Intelligent Requirements Generator** helps a user to develop a requirements document for online purchasing. Use different options in the interviews to develop an understanding of the system (interfacing applications, etc).
- **Intelligent Architecture Advisor** guides a user to develop an architecture document for online purchasing. Run through various options in the interview. For example, first assume that the purchasing app is hosted internally (bypass remote hosting) and then explore remote hosting and outsourcing options.
- **Integrated Solution Advisor** helps a user to evaluate the selected architecture in terms of performance, cost, and security.

The following pages illustrate how we used AIM to develop integration plan for order processing system of the manufacturing company (XYZCorp).

3.2. Business Problem Explorer

After invoking AIM from the Control Panel (Yellow Arrow), a user invokes the Business Problem Explorer to select a business process (BP) for detailed integration analysis. The user is shown a diagram of the selected BF (in this case, sales) and is asked to select a BP by clicking on a 'green' box. Note that this is a small segment of the BPP that was shown in Section 2.3. We selected order processing for the purpose of illustration.

The enterprise application pattern shown below allows the user to understand external interfaces of the application and conduct sensitivity analysis. For example, the order processing (OP) application of a company can be analyzed to determine which systems interface with OP. This is the basis for developing an integration strategy.



Now the **user** creates an integration scenario (called integration plan in the tool) for Order Processing for more detailed analysis. This scenario, shown below, is used in all later interactions. Please notice that this screen allows users to create additional integration scenarios within the 'manuf1' business scenario. The diagram shows the steps that the user can follow after creation of an integration scenario.

The screenshot shows the NGE PISA 1.0 web application running in Microsoft Internet Explorer. The browser address bar shows <http://ngecacit.com/cacit/login.aspx>. The page title is "PISA (Planning, Integration, Security & Administration)".

Navigation links include: Home, Glossary, Tutorials, Help, Contact Us, and Logoff. A red banner on the left says "NGE Solutions". A note states: "Note: AIM and all of its advisors are a prototype."

The main content area displays the list of Applications in the **manuf1** IT Plan. It includes a table with the following data:

Application Name	Actions
Order Processing	Open Application Plan New Integration Plan

Below the table is a flow diagram illustrating the process within the **Architecture & Integration Module (AIM)**. The diagram shows the flow from **PlanIT Advisors** to **Overall IT Plan**, then to **Integrate**, leading into the AIM. Inside the AIM, the flow goes through **Integration Problem Explorer**, **Integration Requirements Generator**, **Integrated Architecture Advisor**, and **Integrated Solution Advisor**, finally leading to **Detailed Integration Plan** and **Implement**. A legend indicates that dashed arrows represent "Information Flow".

3.3. Intelligent Requirements Generator (IRG)

IRG gathers additional information about the order processing application through an interview that considers factors such as user access, back-end apps, B2B apps, transaction value, volume, number of partners, mobility, personalization, etc.

The following screen shows the interview. The outputs of this interview are used to populate the requirements document. In short, to develop a requirements document for integration of online purchasing application, the user will basically fill out an interview form shown below. As a result of this interview, this advisor generates a requirements document (a very long document, not shown here).

The screenshot shows a web browser window with a title bar containing standard navigation icons and a menu bar with 'File', 'Edit', 'View', 'Favorites', 'Tools', and 'Help'. The main content area is titled 'Interview' and contains a form with the following fields and values:

Application chosen	
User Access	Web Access;
Number of back-end Applications Interfaced	Few (1 to 3)
Coupling with back-end Applications	Loose (Asynchronous)
Type of back-end Applications	Well defined APIs
Services needed from back-end Applications	Data
Data Translation for Back-end Application	No translation
Number of External Applications Interfaced for B2B	Few (1 to 3)
Interaction with External Applications	Direct
Coupling with external Applications	Loose (Asynchronous)
Type of external Applications	Well defined APIs
Services needed from External Application	Data
Data Translation for External Application	No translation
Value of Transactions Handled by Application	Medium (around \$1000)
Volume of Transactions Handled by Application	Medium (around 100 per day)
Boundaries crossed in trade	National
<input type="button" value="SHOW RESULTS"/>	

Below the form, the 'Results' section displays the text: 'Web browser interface, with SSL security due to transaction value'.

3.4. Integrated Architecture Advisor

This Advisor takes the requirements produced by IRG and generates an interview for the order processing application that asks the user some questions to develop an integrated architecture pattern.

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Please fill out the following form to develop sketch of an application architecture pattrer. Click the "Proceed" button when done.

Interview

Application chosen	Order Processing
User Access	<input checked="" type="radio"/> Web Access; <input type="radio"/> Wireless Handheld-Device Access; <input type="radio"/> Voice Access; <input type="radio"/> Application Access;
Number of back-end Applications Interfaced	None
Coupling with back-end Applications	Loose (Asynchronous)
Type of back-end Applications	Monolithic (legacy)
Services needed from back-end Applications	<input checked="" type="radio"/> Data <input type="radio"/> Function <input type="radio"/> Both
Data Translation for Back-end Application	No translation
Number of External Applications Interfaced for B2B	None
Interaction with External Applications	<input checked="" type="radio"/> Direct <input type="radio"/> Indirect (Intermediary)
Coupling with external Applications	Loose (Asynchronous)
Type of external Applications	Monolithic (legacy)
Services needed from External Application	<input checked="" type="radio"/> Data <input type="radio"/> Function <input type="radio"/> Both
Data Translation for External Application	No translation
Value of Transactions Handled by Application	None (\$0)
Volume of Transactions Handled by Application	Small (less than 10 per day)
Boundaries crossed in trade	<input checked="" type="radio"/> Local <input type="radio"/> National <input type="radio"/> International

[Show Recommendations](#)

The Architecture Advisor asks a few more questions to develop an integration strategy based on the information gathered so far. It makes some suggestions about the type of integration strategy to be used. In this case, it is suggesting 'access in place', i.e., do not change the system, just use adapters to integrate.

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Home Glossary Tutorials Help Contact Us Logoff

To use this form, use the pull-down menus in the 'CHOICES' Column and then click on "SHOW RECOMMENDATIONS" button to see the few (mostly two) application patterns that appear to be most appropriate for your situation.

Application/BC Name:	Order Processing
FACTORS TO BE CONSIDERED	CHOICES
Type of target application	Updates only (Data Load)
Type of resources needed from the back-end applications	<input checked="" type="radio"/> Data <input type="radio"/> Process <input type="radio"/> Both
Business value of back-end applications	<input checked="" type="radio"/> Low and Medium <input type="radio"/> High
Data currency requirements	Strict (most recent)
Flexibility needed in back-end systems	<input checked="" type="radio"/> Low <input type="radio"/> High
Number of back-end applications	<input checked="" type="radio"/> Few (less than 5) <input type="radio"/> Many (more than 5)
Type of back-end applications	Well structured (well defined interfaces)
Show Recommendations	

Results

Suggested Strategy	ACCESS IN PLACE because you require access to mixture of resources with varying capabilities
---------------------------	--

Done Internet

Based on the information gathered, this Advisor generates an integrated architecture document (about 20 pages) of the order processing system. This document has an overview, a conceptual architecture diagrams and details of front-end, back-end integration. A small portion of this document is shown below. This document is generated by a PISA advisor by fetching appropriate information from the Patterns Repository, Project Models Repository, and the underlying ontology.

1. OVERVIEW -- ORDER PROCESSING

This architecture document is based on an interview with AIM. It uses a service oriented architecture (SOA) based on components that provide these services. The components consist of the following (see the diagram)

- **BCs** (Business Components) that imbed the business logic of the application and provide business services. At present, we are assuming one BC per application (you can modify it, if you wish)
- **FICs** (Front-end Integration Components), also known as user integration components, that allow different types of user devices (e.g., mobile, handheld) to invoke the BCs.
- **BICs** (Back-end Integration Components) that BCs to interact with different back-end and external applications.

Overall Integration Strategy

The Suggested Strategy is:
ACCESS IN PLACE because you require access to mixture of resources with varying capabilities

Advantages:

- Does not modify the existing applications thus reducing the risk of failures
- Leverages the current investment in applications
- The new applications can access the most recent data that is created/stewarded by the existing apps.

Disadvantages:

- Tends to overload the existing applications and could thus cause performance problems
- Only surrounds the old systems, does not replace them. Thus does not change the target applications that are too inflexible and expensive to maintain

2. FRONT-END INTEGRATION

Different type of user devices require different level of front-end integration

3.5. Integrated Solution Advisor

This Advisor helps the users to evaluate the various integration choices based on cost, performance and security issues.

At the end of a session, PISA produces a final summary that captures the highlights of the interview. The following shows a segment that displays the estimated costs, security issues and performance issues for the integration of the order processing system.

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Estimated Integration Costs

Total estimated cost in person-days	21
Cost for additional integration software	0
Average expenses per person-day	\$500
Total estimated cost in USD	\$10,500.00

Security Recommendations

Frontend Domain	Integration Adaptor	Suggested Security Measures
Backend Applications	Integration Adaptor	Suggested Security Measures
a	ODBC/JDBC	Protect database server with IDs/PWs so that others cannot tamper with it
b	MOM/SOAP	Protect MOM server with IDs/PWs so that others cannot tamper with it
c	screen scraper	Not Available

Performance Analysis for Order Processing Application

Important Parameters and assumptions

LAN DataRate	10Mbps	WAN DataRate	1.5Mbps
Number of Local Users	10	Number of Users at other sites	10
Assumed Incoming message size	100bytes	Assumed outgoing message size	500bytes

Estimated Performance Indicators

Application Server	Processing Rate (Queries per sec)	Response Time (secs per message)	Utilization Factor
--------------------	-----------------------------------	----------------------------------	--------------------

4. CONCLUDING COMMENTS AND NEXT STEPS

This document has attempted to illustrate a demo example of the PISA environment. Through selected screenshots. For additional information:

- Please review the sample reports generated by the PISA environment at www.ngesolutions.com/pisa/documents
- Register for a demo of PISA at the pisa site www.ngesolutions.com/pisa