Module (Networks)

Network Services and Architectures in the Internet Age

e-Business Applications, Architectures, Integration

MODULE (APPLICATIONS): e-Business Strategies and Applications:
Chapter 1: e-Business - From Strategies to Applications
Chapter 2: e-Business Applications (CRMs, ERPs, eMarkets, SCM, ASPs, Portals)
Chapter 3: From Strategies to Solutions -- A Planning Methodology
Chapter 4: IT Infrastructure -- Overview of Enabling Technologies
Chapter 5: Applications State of the Practice, Market, and Art

MODULE (ARCHITECTURES): Solution Architectures Through Components
Chapter 1: Solution Architecture Overview
Chapter 2: Enterprise Application Architectures -- Component-based Approach
Chapter 3 Enterprise Data Architectures in Web-XML Environments
Chapter 4: Implementing Architectures -- Concepts and Examples
Chapter 5: Architectures State of the Practice, Market, and Art

MODULE (INTEGRATION):Enterprise Application Integration and Migration
Chapter 1: Integration with Existing (Including Legacy) Applications -- An Overview
Chapter 2: Enterprise and Inter-Enterprise Application Integration (EAI/eAI)
Chapter 3: Data Warehouses and Data Mining for Integration
Chapter 4: Migration Strategies and Technologies
Chapter 5: Integration State of the Practice, Market, and Art

The Enabling IT Infrastructure

MODULE (PLATFORMS): Platforms for Mobile and EC/EB Applications
Chapter 1: Mobile Computing Platforms -- Mobile Application Servers
Chapter 2: e-Commerce Platforms for C2B Trade-- The Commerce Servers
Chapter 3: B2B Platforms and Standards -- The B2B Servers
Chapter 4: Platforms for Multimedia and Collaboration
Chapter 5: Platforms State of the Practice, Market, and Art

MODULE (MIDDLEWARE) : Application Connectivity Through Middleware
Chapter 1: Middleware Principles and Basic Middleware Services
Chapter 2: Web, XML, Semantic Web, and Web Services
Chapter 3: Distributed Objects: CORBA, J2EE, .NET, SOAP, and EJBs
Chapter 4: Enterprise Data and Transaction Management
Chapter 5: Middleware State of the Practice, Market, and Art

MODULE (NETWORKS): Network Services and Network Architectures
Chapter 1: Principles of Communication Networks
Chapter 2: Network Architectures and Interconnectivity
Chapter 3: Wireless and Broadband Networks -- Next Generation Networks:
Chapter 4: IP-based Networks and the Next Generation Internet
Chapter 5: Networks State of the Practice, Market, and Art

Background and Management

MODULE (OVERVIEW); The Big Picture
Chapter 1: e-Business and 3G Distributed Systems
--From Strategies to Working Solutions

MODULE (EXAMPLES); Case Studies & Examples
Chapter 2: Case Studies and Examples

MODULE (MANAGEMENT): Management and Security
Chapter 1 e-Business Management in Practice
Chapter 2: Management Platforms for Network and Systems Management
Chapter 3: Security Management - Approaches and Technologies
Chapter 4: Security Solutions -- Using Technologies to Secure Systems
Chapter 5: Management State of the Practice, Market, and Art

MODULE (TUTORIALS): Tutorials and Detailed Discussions on Special Topics

Chapter 1: Network Technologies -- A Tutorial
Chapter 2: Object-Orientation, Java, and UML -- A Tutorial
Chapter 3: Database Technologies and SQL -- A Tutorial
Chapter 4: Web Engineering and XML Processing – A Closer Look
Chapter 5: CORBA -- A Closer Look

A Technology Briefing Module from

" e-Business and Distributed Systems Handbook"

Amjad Umar, Ph.D.
(www.amjadumar.com)
January 2003

MODULE (Networks): Network Services and Architectures in the Internet Age

Module Overview

Simply stated, the Internet is a large collection of physical networks that operate under the IP (internet Protocol) -- a protocol developed by the ARPANET (Advanced Research Projects Agency Network) project around 1969. The adoption of World Wide Web (WWW), commonly referred to as the Web, in the early 1990s turned the Internet -- once an obscure tool -- into a household word. At present, we are living in a world where many of our business, educational, entertainment, and social activities are being conducted over the Internet.

This module presents network services that transport the traffic between consumers, businesses, suppliers, government agencies, and various other players in an Internet environment. The focus is on the networking concepts and architectures that are of key importance to e-business with particular emphasis on networks needed to support the next generation of real-time enterprises. Figure 1 guides the discussion in this module and illustrates the following aspects of networks in an Internet environment:

- Many physical networks that operate at local and wide area levels to interconnect users, applications, and databases. These networks include new high performance networks as well as old (legacy) networks commonly in use. Chapter 1 discusses these networks.
- Network architectures and interconnectivity devices that combine the physical networks into a large global network (the Internet) that can deliver messages from your office in Chicago to recipients in Detroit, London, Tokyo, and Singapore. Chapter 2 concentrates on the network architecture and interconnectivity concepts.
- Wireless and broadband (high data rate) networks that are being used increasingly to provide fast access from mobile devices. The wireless networks include cellular networks, wireless local area networks, and satellite communications. Broadband networks use fast packet switching systems between remote sites. In addition, Next Generation Networks (NGNs) are being developed to integrate broadband and wireless networks into a powerful delivery mechanism. Chapter 3 discusses the wireless and broadband networks.
- The Internet Protocol (IP) is at the core of the Internet and supports a wide range of applications over almost all types of physical networks. The most popular application of the Internet is Web because it is built on top of IP (Web browsers, servers and HTTP all work on top of IP). In addition to Web, the IP-based networks are being used for a wide range of applications such as Internet telephony, video conferencing, and corporate computing. Chapter 4 discusses IP in detail and describes evolution of the current Internet into Next Generation Internet.

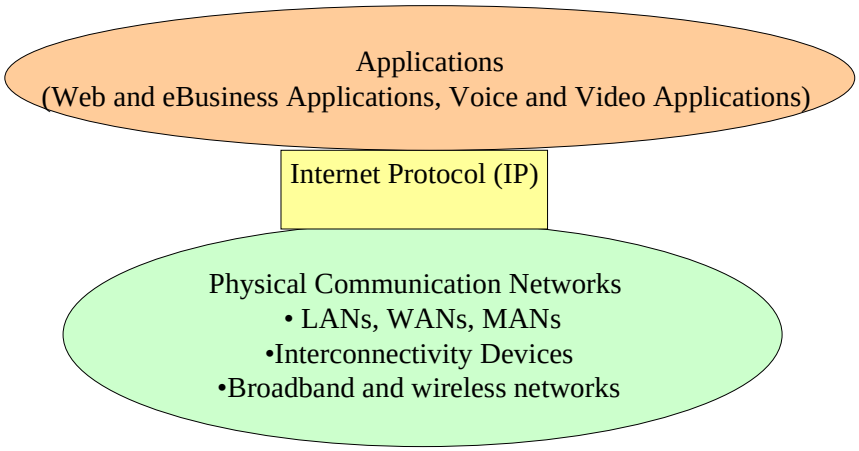

Figure 1: Conceptual View of the Internet

Module Case Studies

XYZCorp Case Study: Network Architecture in Internet Environments

The focus of the XYZCorp case study in this module is on building a network architecture for the corporation (see Figure 2). In particular, the company wants to evaluate the network hardware, software, and interconnectivity devices and develop a corporate "Intranet" that combines the wireless as well as wired networks in a seamless manner. We will develop this architecture by working through the following projects:

- A physical network design project that will develop an enterprise wide network configuration to support its EB applications and also for its future multimedia services. See Chapter 1 of this module
- A network architecture project that will support the e-business applications on top of the physical network developed in Chapter 1. The management is really interested in exploring the use of new and innovative applications in voice, data and images for participating in the modern EC/EB initiatives See Chapter 2 of this module.
- A broadband and wireless network selection project that will support the new and innovative applications in voice, data and images for office automation, factory floors and engineering design work. See Chapter 3 of this module.
- A futuristic IP architecture project that will present a vision of Next Generation Internet for the corporation (the company has bought into the “IP dialtone” notion): See Chapter 4 of this module.

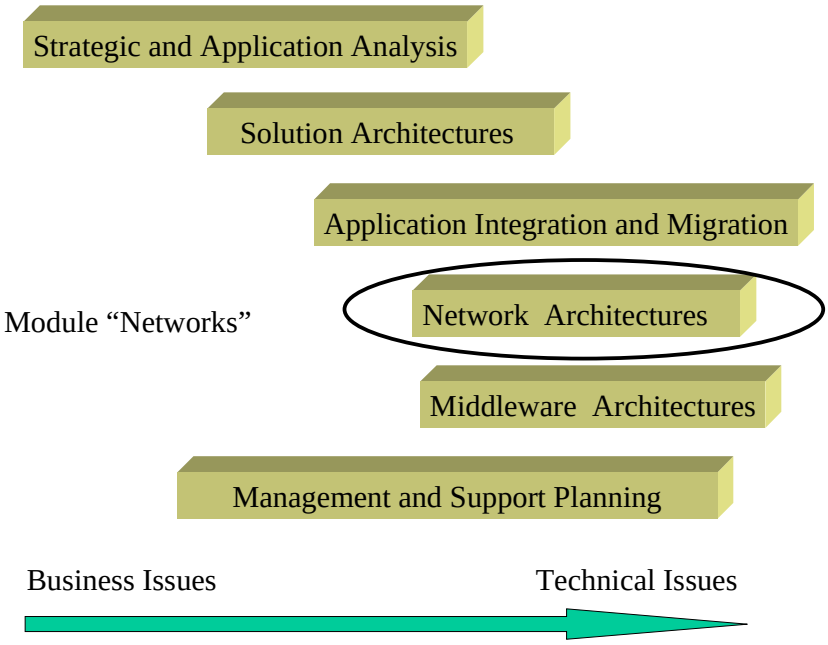

Figure 2: XYZCorp Networking Tasks

Additional Case Studies and Examples

Several additional case studies and examples are discussed in the chapters of this module. A number of case studies that are relevant to the topics discussed in this module appear regularly in trade magazines, vendor documents, web sites and books. Chapter 5 of this module gives a sample of relevant case studies and points to numerous sources for additional case studies and examples.

In addition, the following case studies in the "Case Studies and Examples" chapter of the "Overview" module can be used to illustrate different aspects of the material in this module:

Section 2.3 Ecommerce/e-business Examples:. These examples can be used to develop network architectures for these cases.

Section 2.5 A Financial Marketplace. After reviewing this case study, you can choose a network architecture for this marketplace. In particualr, what role financial networks such as SWIFT (www.swift.com) can play in this problem.

Section 2.6 City of Seattle Public Utilities Go Wireless. This case study shows how the decisions were made in 1999. How would you develop a wireless network for it today?

Section 2.8 An Integrated Manufacturing System. How would you design a network for this manufacturing system? Are there any special considerations?

Section 2.9 A Customer Relationship Management Portal. What would the network architecture for this CRM look like?

Section 2.11 Networking Examples. These examples should be reviewed.

Module Contents

MODULE CONTENTS -- DETAILED