SPACE (Strategic Planning, Architecture, Controls & Education)

Patterns Overview

SPACE (Strategic Planning, Architecture/Acquisition, Controls, and Education) is a computer aided planning, engineering and management environment. Patterns and knowledge repositories, as shown in Figure 1, is the core component of SPACE that is heavily utilized by the Games, the Planners, and the SPACE Initiatives and Tools.
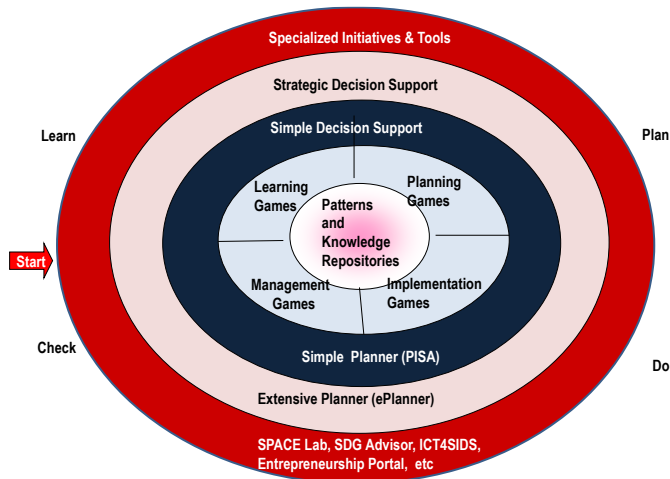

Figure 1: Conceptual View of SPACE

The Patterns Repository for Industry Sectors (PARIS) captures the core knowledge needed by SPACE (more than 100 services in more than 10 sectors such as healthcare, education, public safety, public welfare, transportation and others).

Patterns are a well-known format for capturing engineering knowledge. The idea was introduced by Christopher Alexander, a civil engineer, who observed that well accepted buildings have common structures. Based on this, he devised a set of rules for architects to construct such buildings. The "Gang of Four" extended the pattern format to software design. Since then, patterns have been used extensively in software design and have been extended to e-business patterns, requirements patterns, architecture patterns, integration patterns, security patterns, and others. See the website (www.hillside.net/patterns) for extensive discussion, tutorials, and articles on patterns.

At a very basic level, a pattern T is a template $T(p, c, s)$ where p is the problem to be solved, c is the context (under what conditions the pattern holds, i.e., why the problem needs to be solved), and s is the solution (what works in practice). Additional information such as examples and limitations can also be added to a pattern to help the designer. In addition, each pattern is assigned a name. Exhibit 1 shows a simplified

example of a Business Pattern for retail store. We have developed such business patterns for a very large number of public and private sectors and stored them in PARIS.

Exhibit 2 shows a few sample patterns of ICT Services and Enterprises supported by SPACE. The samples patterns are listed from sectors such as Economic Development, Education, Healthcare, Law Enforcement and Safety, Transportation, Agriculture, Public Welfare, and Environment Services Common Services.

Exhibit1: Business Patterns

Business patterns provide a powerful tool for representing a wide range of enterprises in different industry segments. Given a business pattern that has been modified for a specific enterprise, the main task of the enterprise management is to find the best service providers (SPs) that can support the critical BSs shown in Figure 2. In addition, a company can expand and transform its business by adding new BSs from new SPs. For example, a wired telephone company can add a wireless service provider, a manufacturing company can add a retail outlet provider, etc. In addition "service bundles" can be created by different SPs to meet user needs and to compete for user business. For example, a user may add, delete, change and merge SPs that provide the best services for a city. After identifying the needed business services, the user needs to make the following decisions:

- Decide which business services/processes take place at each location of the business.
- Include business outsourcing, i.e., determine which BSs/BPs take place at the outsourced sites.
- Assign employees to sites. The number of employees at each site helps determine the type and "intensity" of work performed at each site. Outsourcing reduces the number of business employees.
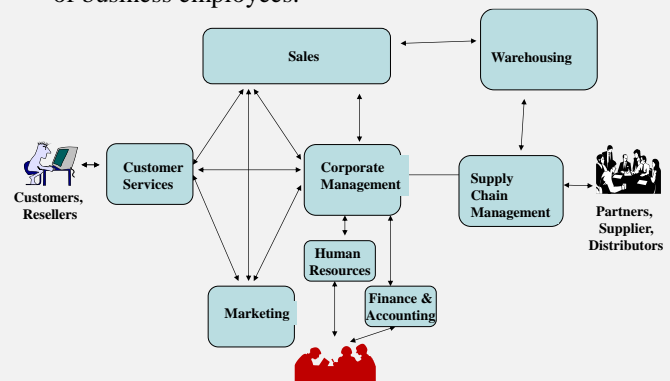

Figure 2: Sample Business Pattern of a Retail Store

Exhibit 2: Sample Patterns of ICT Services and Enterprises Supported by SPACE

SPACE supports almost 100 services in sectors such as economic development, education, healthcare and others (see the table below). In addition, the ICT infrastructure is a horizontal sector that supports all vertical sectors. These services can also be combined into "Service Bundles" that represent inter and intra enterprise composites such as villages, communities, cities and B2B marketplaces. This is a very powerful capability that can be used to build models of a large number of configurations in public and private sectors.

Economic Development	Education	Healthcare	Law Enforcement & Safety	Transportation & Agriculture	Public Welfare & Environment Services	Common Services
Entrepreneurship Micro-Entrepreneurship Micro-Financing Information Systems e-Employment e-Tourism e-Library (public)	Educating Primary School Teachers e-learning for the handicapped e-Learning Support System e-Library (school)	Mobile Health Clinic Electronic Health Records Emergency Medical Service m-Health (General) Hospital Information System Patient Information System Decision Support for Health Telemedicine e-Behaviourial Health	Police & Fire Services Police Crime Investigation Services Social Network Services for Governments Additional Law and Order Services Weather Alert and Travel Warning Food Quality and Drinking Water Purity Disaster Management and Recovery Services	Optimal Route Planner Alert Systems Automobile Licensing e-Agriculture 2.0 E-Agriculture Phone2SMS Eservices for Food Safety Precision Agriculture eServices for Agriculture	Social Services Citizen Welfare Services Public Healthcare Service eLearning for Needy Children Assisted Living eCare for Aging Populations Entrepreneurship Welfare Programs Clean Air Environmental Monitoring Environmental Analytics	Corporate Management Services Customer Services Marketing Services Sales Services e-Payment EFT – Electronic Fund Transfer Credit Card Detection System e-Banking System

ICT Infrastructure Services (Horizontal)

- Broadband Access, Network Management, Social Networking (*e-Participation, e-Voting), Cloud Computing

Enterprise-Wide Service Composite (Service Bundles that Combine Many Individual Services)

-   Offices, Departments, Initiatives (e.g., MDG, Mobility, Telemedicine, Aging Population) Services, Firms, Business Units, eCities, eCommunities, Government Specific Initiatives

Inter-Enterprise Service Composites (Service Bundles for B2B and G2G Integrations)

-   G2G Services (Interagency Exchanges), Supply Chain for Food Distribution, Health informational Networks, Educational Networks, Entrepreneurial Networks, B2G Services

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