Computer Aided Strategic Planning for eGovernment Agility
A Global Instrument for Developing Countries

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Abstract

Most of the developing countries are re-inventing the wheel in their efforts to launch egovernment initiatives — especially in the areas of healthcare, education, economic development, supply chains for food distribution, and emergency services. A Computer Aided Strategic Planner, part of the UN eNabler Toolset, has been developed to quickly and effectively produce detailed strategic plans for a wide range of egovernment services based on best practices and standards. The generated plan is highly customized for the type of service as well as the country/region by using the latest thinking in AI, ontologies, and patterns. The Planner, available through the UN-GAID initiative, can be and has been used very effectively to educate as well as assist the government officials of developing countries to accelerate progress in crucial areas.

Introduction

Strategic planning is a crucial task for the public as well as private sectors. Given a strategic project (or an initiative), a strategic planning process identifies the main alternatives and the key business/technical issues involved in each alternative, and helps in evaluation and selection of the most viable alternatives *before* initiating the project. Computer aided planning, as compared to the manual planning process, offers significant benefits especially to the developing countries because it can:

- accelerate the development processes by quickly generating plans (hours instead of weeks or months)
- hide technical details and thus can be used by people with different backgrounds
- introduce and enforce the same standards and best practices quickly and uniformly across all users
- be accessed by people living anywhere and thus level the playing field between developed and developing countries

- support what-if analysis of different planning scenarios
- be used as a training and educational tool

Computer aided strategic planning can be of great value to the developing countries because most of the developing countries (more than 100 countries are in this category) are re-inventing the wheel in their efforts to launch egovernment initiatives. Examples of these services include healthcare, education, economic development, supply chains for food distribution, and emergency services. In many situations, the solutions already exist but the most appropriate ones need to be selected, customized for the particular country, and deployed by using the local suppliers.

For example, an official involved in launching an egovernment service faces many questions: "how do I understand the basic issues, policies, and approaches", "how do I develop a customized plan that is specific to my country", "how do I successfully execute the developed plan", "how do I monitor and evaluate the progress being made", and "how do I do everything without re-inventing the wheel - what tools and solutions are available out there that I could use?"

We are working with the United Nations GAID (Global Alliance for ICT Development) Initiative to answer these questions by building a Computer Aided Strategic Planner (Planner). The current focus of the Planner is to accelerate the pace of Millennium Development Goals (MDGs) to address the issues in healthcare, economic development, education, poverty and hunger (see www.un.org/ millenniumgoals/*).* This Planner is based on previous research [8, 9, 10, 11, 12] that has resulted in a planning, integration, security and administration (PISA) environment that is currently being used for small to medium businesses (SMBs).
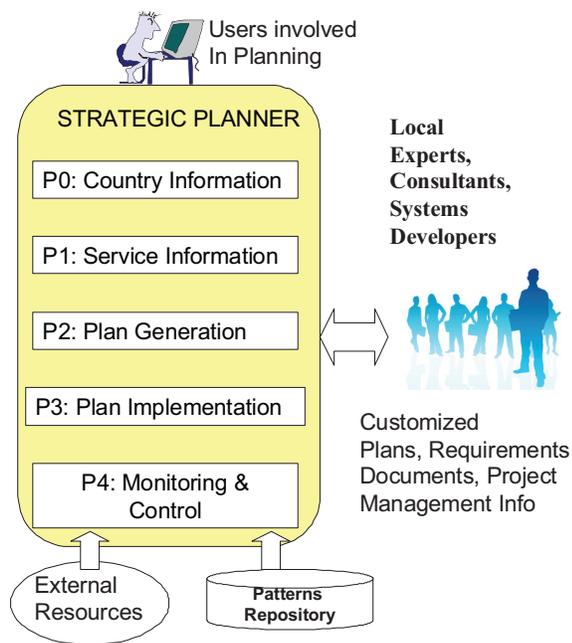
Figure 1: Strategic Planner Conceptual View

Overview of the Planner

Figure 1 shows a conceptual overview of the Computer Aided Strategic Planner (Planner) – it serves as an instrument to help the developing countries quickly by producing highly customized plans based on best practices for the type of service as well as the region and the country/region. In particular, the Planner is part of a comprehensive planning environment that offers capabilities for entrepreneurship, industry analysis, and detailed planning. A working prototype of this planning tool has been developed and demonstrated in UN conferences in Geneva (May 2010), Riyadh (July 2010), Bahrain (August 2010), New York (September 2010), and Abu Dhabi (December 2010) with strong support from more than 70 countries and international organizations such as the World Bank, World Health Organization (WHO), Red Cross, UNESCO, Microsoft and WITSA (Worldwide IT Services Alliance) . In its present form, the Planner generates plans for over 20 services that include potentially high impact services such as the following:

- Healthcare, especially mobile health clinics that are proving to be very effective in combating HIV, infant mortality and maternal health
- Economic development, especially entrepreneurship networks between VCs and startups
- Document/information exchange networks between different government and business agencies for rapid industrial growth
- Emergency response systems that require real time sup-

port from various agencies
- Supply chains for food distribution in developing countries

The Planner covers five phases (P0 to P4), shown in Figure 1. The first two phases (P0 and P1) capture country and service specific information. Phase 2 generates a customized plan based on P0 and P1. P3 supports execution of the plan and phase P4 supports monitoring and control with heavy emphasis on project management and quality controls

The outputs produced by the Planner contain a mixture: of generic and customized information. The generic information captures common best practices (e.g., security). Country/ region specific information is customized by using the factors published by the World Economic Forum (www.weforum.org), and service specific information by using business patterns [1].

Use of the Strategic Planner in Practice.

The following example illustrates the overall flow of the Planner to introduce broadband access as a service in a developing country. The purpose here is to help the governments widely provide broadband access services (through wired or wireless means) to its constituents. The following description shows the flow of the Planner, as displayed in Figure 1:

In the P0 phase, the user (government agency) chooses a country (e.g., Nigeria).

In the P1 phase, the user selects a service to be deployed (broadband). It then goes through a self assessment (based on the capability maturity model) and gets access to general information, educational resources and best practices (e.g., reports from UN, other links, university courses etc.) on broadband access.

In the P2 phase, the government agency is led through strategic analysis (buy, rent, outsource) and cost-benefits tradeoffs associated with the broadband service. The agency is also guided through policies and procedures needed for the broadband service. It is very likely that the government agency will choose the strategy of "outsource", i.e., the actual development and deployment of broadband will be done by the third parties (e.g., telecom providers). The output of this phase is a detailed bid that can be used by the agency as a starting point.

In the P3 Phase, different implementation options are evaluated through simulations, games and decision support tools.

In the P4 Phase, the progress of the project is monitored and controlled through established techniques specified in the Project Management Book of Knowledge (PMBOK). In this phase, the quality of the results produced is evaluated by using the best practices in quality control and using

standards such as COBIT (www.isaca.org/Knowledge-Center/**COBIT**/).

This short example highlights the main flow of the Planner. At the end of each phase, extensive documentation is provided to support the next phases. For example, at the end of P3, complete documentation is made available to the users to support the later phases of implementation and monitoring/control. The Planner integrates and aggregates the external information already available in portals such as the United Nations Public Administration Network (www.unpan.org) and the UN-GAID website (www.un-gaid.org). In addition, it provides access to useful educational and training materials in different steps of P0, P1, P2, P3 and P4 to educate the users as they develop the plans.

As illustrated in Figure 1, the outputs generated by the Planner are used by the local experts who may customize and modify the plans generated by the Planner for local considerations. Our main objective is to produce very detailed and highly customized plans that are based on best practices and open standards in a 30-40 minute session. The Planner does 80% of the work, the other 20% is done by the local experts.

In its mature prototype (Beta) mode, the Planner is currently being used by developing countries to quickly generate detailed ICT plans that can be used as the basis for RFPs (Request for Proposals) for outsourcing development. In particular, the Planner is currently being used by the Macedonia Ministry of Information Society to generate RFPs for an edocument exchange (eDoc) project. This project will exchange government documents (e.g., birth certificates, property ownership, tax payment status) between government agencies.

The Knowledgebase & Knowledge Processing

The Planner is not an expert system, but is a set of expert systems ("advisors") that collaborate with each other through an extensive knowledgebase. Thus it is an integrated intelligent system (IIS). Figure 2 shows a more detailed view of the Planner. The core of the Planner is a knowledgebase (KB) that contains best practices, patterns, and rules needed to address various domains in egovernment. In particular, it contains a *pattern repository* that **h**ouses government/business patterns for more than 20 industry segments including education, healthcare, transportation, public safety, telecom, and manufacturing. The pattern repository also consist of application patterns, platform patterns, security patterns and integration patterns. In addition, commercial products are stored in a separate repository and the generated planning models are stored in yet another repository. The knowledgebase and its underlying ontology is explained in detail elsewhere [11].

All phases of the Planner (P0 to P4) use a common knowledge processing algorithm that is based on the following relationship:

$PM_j = f(E, U_j, T_j, PM_{j-1}, C_j)$ for j = 0 to 4

This relationship shows that the planning model produced in phase j (PM_j) is constructed by using enterprise parameters such as country information (E), patterns T_j for phase j, accumulated knowledge PM_{j-1} in the planning repository, phase specific inputs U_j and COTS (Commercial Off-The-Shelf) database entries C_j for phase j. The common algorithm shown in Figure 2 implements this relationship and the Planner advisors (each phase is supported by an advisor) specialize this algorithm for their tasks as needed. The main output produced by this process is the planning model *PM,* a set which consists of several subsets where each subset represents results of a planning stage. The initial planning model (*PM*) created is a simple sketch that is successively enriched as more advisors are invoked. Basically, *PM* is a set which consists of several subsets and each subset is created by and maintained by an advisor. At the conclusion of an interview, a complete plan is represented in the *PM*, i.e., *PM* = {*M, A, I*} where *M, A*, and *I* represent the enterprise model, the application plan, and the integrated architecture plan, respectively.
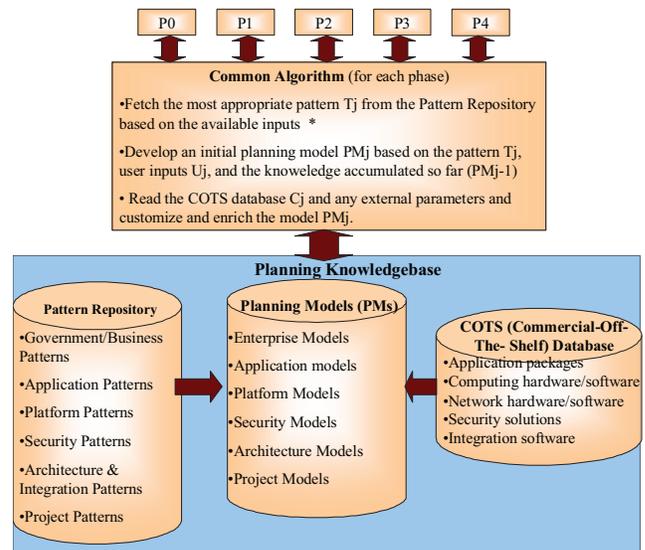

Figure 2: Detailed View of the Strategic Planner

Concluding Comments and Next Steps

We have developed a powerful planning instrument for the developing countries to achieve the MDGs quickly, universally and effectively. The instrument, currently in a mature prototype stage, is designed to advance the MDGs especially in economic development, healthcare, education. The demo version of this planning instrument has been demonstrated in a series of UN-GAID conferences and

individual meetings with very positive results. A production version (Release 1) will be available for general users in early 2011. Based on field use and feedback for one year, an improved system (Release II) for global use will be available in Fall 2011. The Planner is a key component of the MDG eNabler Toolset at the UN.

Our long range goal is to make the Computer Aided Strategic Planner a very powerful tool that can play a crucial role in advancing the MDGs. Some of the future directions for research and development are:

- Provide deeper and broader knowledge support by expanding the capabilities of the patterns repository

- Expand the intelligence capabilities of the inference engine by improving the reasoning and learning features through use of recent developments in machine learning, fuzzy logic and case-based reasoning

- Support more complex services that span multiple agencies (e.g., multiple government agencies from multiple countries). In particular, we are currently reviewing the EU (European Union) specifications of 20 services that will be available throughout Europe. .

- Allow composition of larger systems from smaller systems by tying them into a government/business network (e.g., a health information network) This is currently operational at a simpler level and needs to be expanded.

- Propose new areas of work in ontologies, government patterns, patterns languages, case based reasoning and similarities for governments. For example, we are somewhat disappointed with the current work on enterprises ontologies. We are currently using some of the WEF factors for customizing the plans and also to determine if a case study (a success story) from one country can be applicable to another country. We need to better understand and generalize this process.

Acknowledgments

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