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STATISTICAL OFFICE OF THE
EUROPEAN COMMUNITIES (EUROSTAT)**

**ORGANISATION FOR ECONOMIC COOPERATION
AND DEVELOPMENT (OECD)
STATISTICS DIRECTORATE**

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Topic (i): Governance and management strategies

PROCESS-BASED IT ORGANIZATION AT STATISTICS NEW ZEALAND

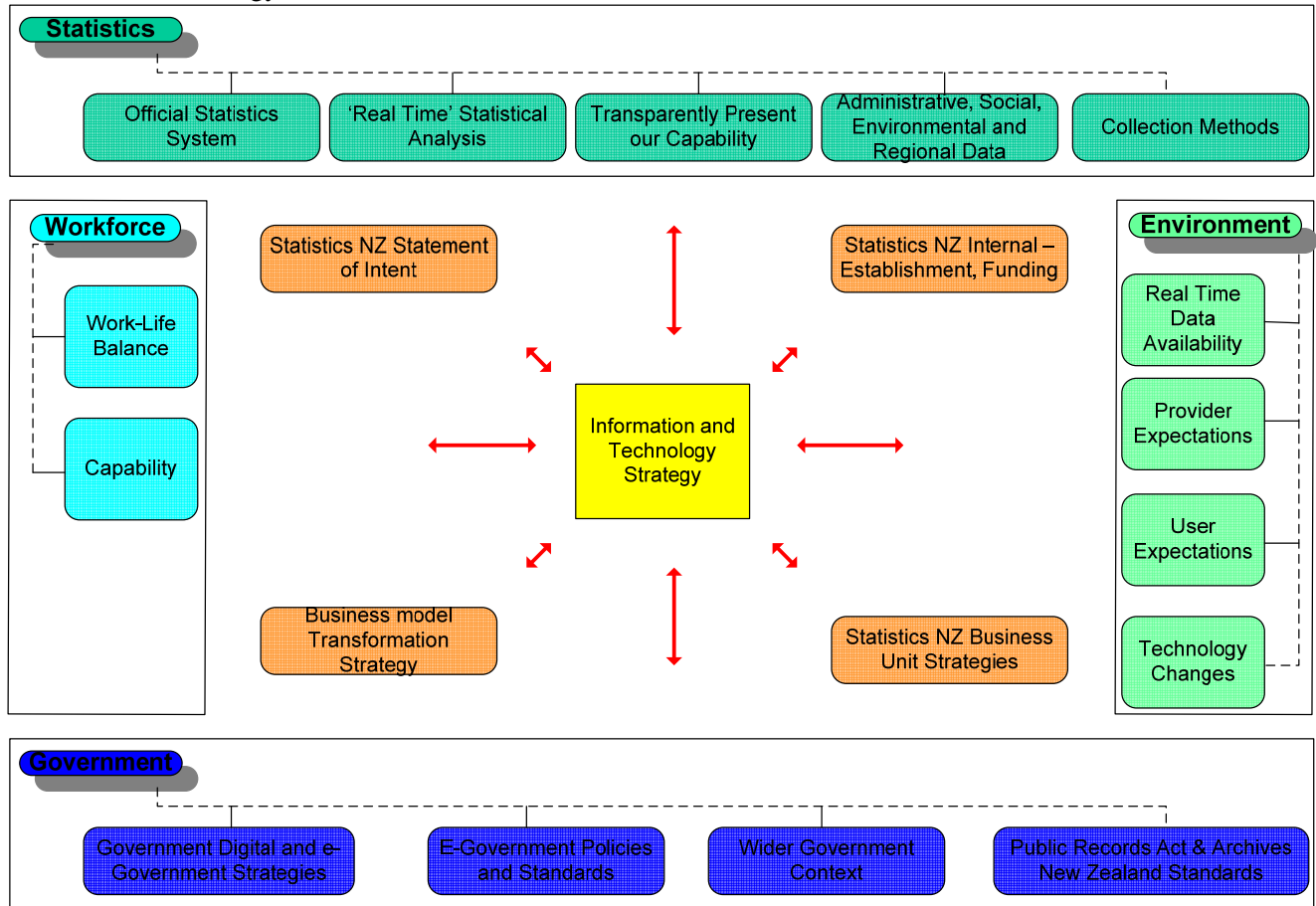
Invited Paper

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I. INTRODUCTION

1. During the last couple of years IT organization in Statistics New Zealand underwent a big transition. Main drivers for this change were increased need for quicker response to business needs, efficiency and standardisation. One of the major exercises that IT is a part, is the business process reengineering programme, called Business model Transformation Strategy (BmTS). Part of the programme has also moved from a silo oriented information system to a generic service-oriented information environment.
2. The programme is a tremendous organizational, methodological and technological challenge. In order to deliver on the goals of the BmTS, internal IT was faced with the need to introduce new methods and organization. The paper will present a short overview of steps the Statistics New Zealand IT Group has made towards the process-based organization. It will provide more detailed information about the latest achievements, as well as the challenges we are still facing. The paper will also reveal our experience related to the introduction of the state of the art IT organization & processes within the internal IT shop.

Picture 1: I&T Strategy 2006 – 2010; Influencers and Drivers



II. FROM A TRADITIONAL TO PROCESS-BASED IT ORGANIZATION

A. Drivers for the change

3. In Statistics New Zealand's I&T Strategy 2006 – 2010 we have identified a number of significant influencers and drivers (see Figure 1) which are viewed as initiators for changes in Statistics NZ's information and technology environment. These changes require IT to more quickly respond to business needs, increase efficiency and standardise processes.

4. One of the main drivers was the Business model Transformation Strategy (BmTS). It is a 9-year programme of business process reengineering, standardisation & modernisation of IT systems. A key change in the architecture was to move progressively away from the development of two-tier, based on Centura and Sybase, to n-tier software applications based on .NET and SQL Server. In addition there was a clear understanding that data warehouse techniques would need to be adopted widely within the development team (BmTS Charter, 2004).

5. The new IT platform relies on several for Statistics New Zealand relatively new technologies like Customer Relationship Management (CRM), integration & process management, workflow management, On-Line Analytical Processing (OLAP) etc. The implications for the IT Group were significant, particularly on the technical environments & skills area. Introduction of a variety of new products without any significant reduction of legacy systems made our IT environment much more complex than before and therefore more difficult to support. The new concept of generic components in a new service-oriented architecture is a big shift for both IT & business. The stovepipe application systems are relatively independent from each other. On the other side generic components are connected and interdependent within the single cooperative environment. Most of the legacy systems have been developed by small teams of developers with similar skills using the

same technology for the whole end to end stovepipe system. For development in a new service-oriented environment we need IT experts with very different fields of expertise working together very closely in a relatively large and diverse team. Excellent documentation and good transfer of knowledge have become extremely important.

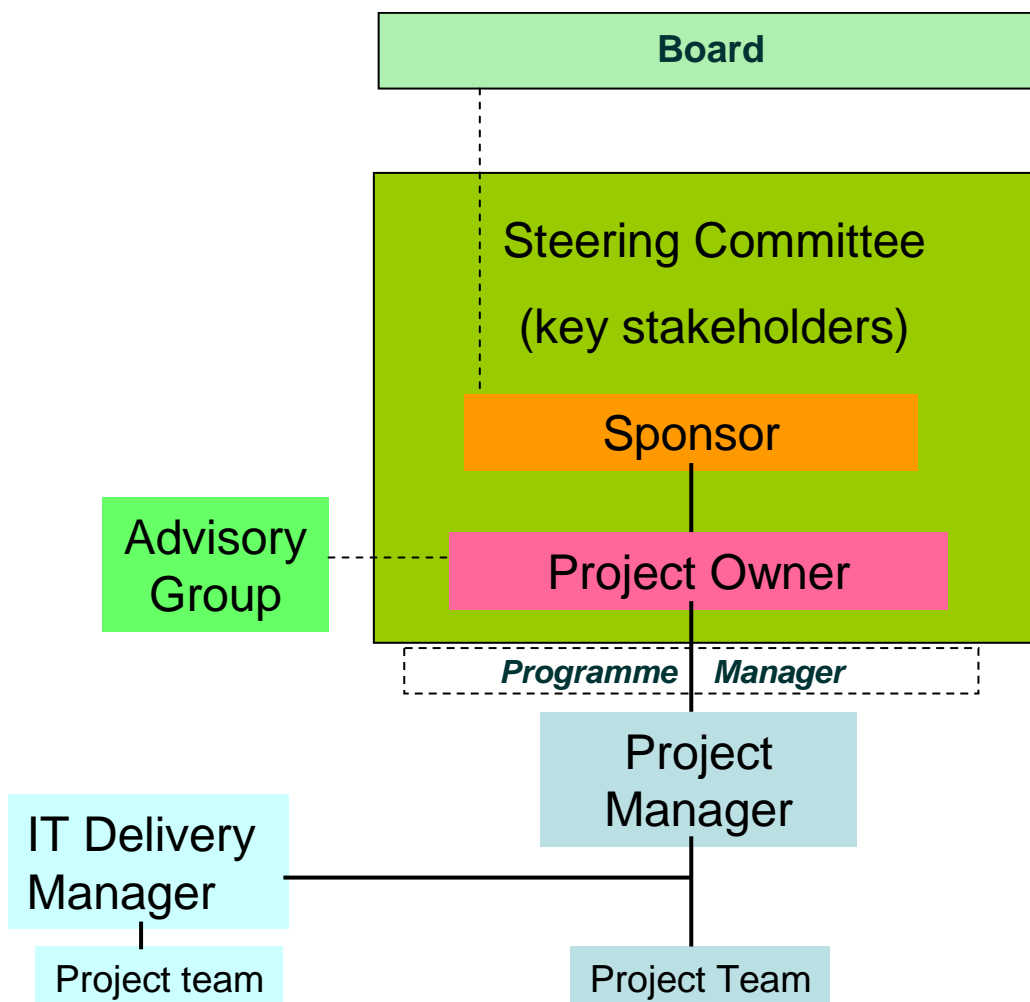
6. The BmTS programme has brought a lot of challenges to the IT Group. As a result IT went through a big transition upgrading skills & capabilities and developing/adopting new methods & processes.

III. PROCESSES

7. The three main methodologies defining our IT processes are as follows:

- (a) Project Management Framework (PMF);
- (b) Software Development Lifecycle (SDLC);
- (c) IT Infrastructure Library (ITIL).

Figure 2: Project Governance Structure at Statistics New Zealand



A. Project Management Framework (PMF)

8. The Revised Project Management Framework (PMF) was introduced in 2004. Project Governance structures (see picture 2) support the Framework and provide accountability for Outcomes and Outputs. Formal structures include stakeholder input through Steering Committee. The Framework covers a

formalised process for stage approvals and sign off. The phased approach with clear go/no-go decision points aims to focus effort and investment in projects that meet current strategic needs.

9. Statistics New Zealand has more than 50 different projects each year. Most of them have a large IT component: development of new systems, upgrades of existing ones, adoption of third-party tools and sometimes even combination of all of that. The scale varies from small projects to large multiyear programmes like Census of Population or BmTS.

10. Engagement of IT in a very early project stage has become extremely important – by the time project activities have been transferred to our work programme it can be too late to be really prepared for the implementation. Having the people with the right skills in place, tools evaluated, work done in research area if needed etc. would reduce risks and assure on time & cost delivery.

11. Development of survey processing systems, based on generic components infrastructure, has revealed some new challenges related to our project governance framework. While some generic systems like integrated data collection systems or dissemination systems have their natural business owners, some other new corporate systems like input data environment, transformations framework etc. look for business more like an IT tool needed for successful implementation of surveys from different subject-matter areas. Development & upgrades are performed within the core infrastructure projects however with business projects (like introduction of new surveys) relying on their outputs governance structure has become much more complex and interdependent. The second problem is the large number of small projects making our work less efficient.

B. Software Development Lifecycle (SDLC)

12. In 2004 an audit was carried out into the capability of the software development process within Statistics New Zealand. Result was CMMi Capability Level 1 (Management by Heroics). Software development lifecycle (SDLC) was introduced to improve this rating and therefore increase credibility of IT. Statistics New Zealand has embarked on process improvement, through the introduction of SDLC-fit within the Application Services Division. Last update to SDLC-fit v2 was done in 2006.

13. Systems Development Life Cycle (SDLC) is defined as a software development process, although it is also a distinct process independent of software or other information technology considerations. It is used by a systems/business analyst to develop an information system, including requirements, validation, training, and user ownership through investigation, analysis, design, implementation, and maintenance. An SDLC should result in a high quality system that meets or exceeds customer expectations, within time and cost estimates, works effectively and efficiently in the current and planned information technology infrastructure, and is cheap to maintain and cost-effective to enhance. The most significant medium term outcome will therefore be the increased predictability, cost-effectiveness and quality with which IT projects and services are planned, budgeted, scheduled, and delivered.

14. The current understanding and take-up of SDLC-fit V2.0 across the IT is still not consistent - despite the long introduction period. We are currently working on activities to spread the use of SDLC across the whole IT Group, to reduce administrative burden connected to the use of templates and to integrate SDLC into the wider project framework. We plan to develop and implement metrics over the across all project software development tasks and work products. As more actual measurements of SDLC tasks are made, they will inform better estimating in future projects, leading to sounder business cases and more predictable realisation of project cost-benefits.

C. IT Infrastructure Library (ITIL)

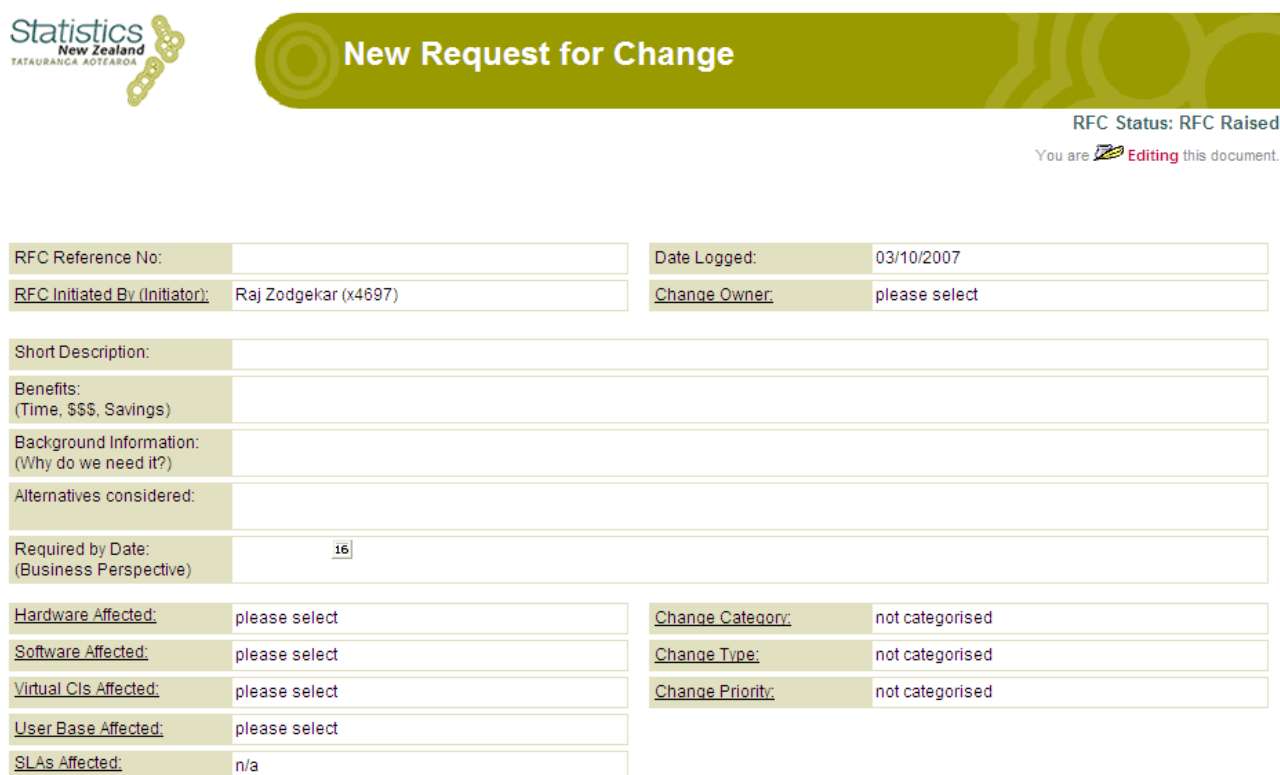
15. Statistics New Zealand has organized IT service support and service delivery processes by using ITIL (IT Infrastructure Library) framework. Starting with the Service Desk and following with other processes like

incident management, problem management etc. most of the processes have been successfully implemented within IT Operations and Services Division.

16. ITIL is the most widely accepted approach to IT service management in the world. ITIL provides a comprehensive and cohesive set of best practices (drawn from the public and private sectors internationally) and promotes a quality approach to achieve business output effectiveness by using information systems efficiently. The set of best practice processes are defined by the UK Office of Government Commerce (OGC) and supported by the British Standards Institution's standard for IT service Management (BS15000).

17. The environment in Statistics New Zealand is relatively diverse. Current legacy environment with stovepipe systems and corporate reference systems (CARS¹, INFOS² etc.), some new infrastructural components in production (Contact system for respondent management integrated with Blaise applications). Altogether we are supporting more than 400 applications. Our last improvement in ITIL area was introduction of ITIL-based Change & Release policies, approved by Board in May and deployed in November 2007. The new application for Change & Release (see figure 3) has been developed in Lotus Notes enabling us to manage the process more efficiently.

Figure 3: Change and Release Management Database – Request for Change form



Statistics New Zealand
TATOURANGA AOTEAROA

New Request for Change

RFC Status: RFC Raised
You are Editing this document.

RFC Reference No:		Date Logged:	03/10/2007
RFC Initiated By (Initiator):	Raj Zodgekar (x4697)	Change Owner:	please select
Short Description:			
Benefits: (Time, \$\$\$, Savings)			
Background Information: (Why do we need it?)			
Alternatives considered:			
Required by Date: (Business Perspective)	16		
Hardware Affected:	please select	Change Category:	not categorised
Software Affected:	please select	Change Type:	not categorised
Virtual CIs Affected:	please select	Change Priority:	not categorised
User Base Affected:	please select		
SLAs Affected:	n/a		

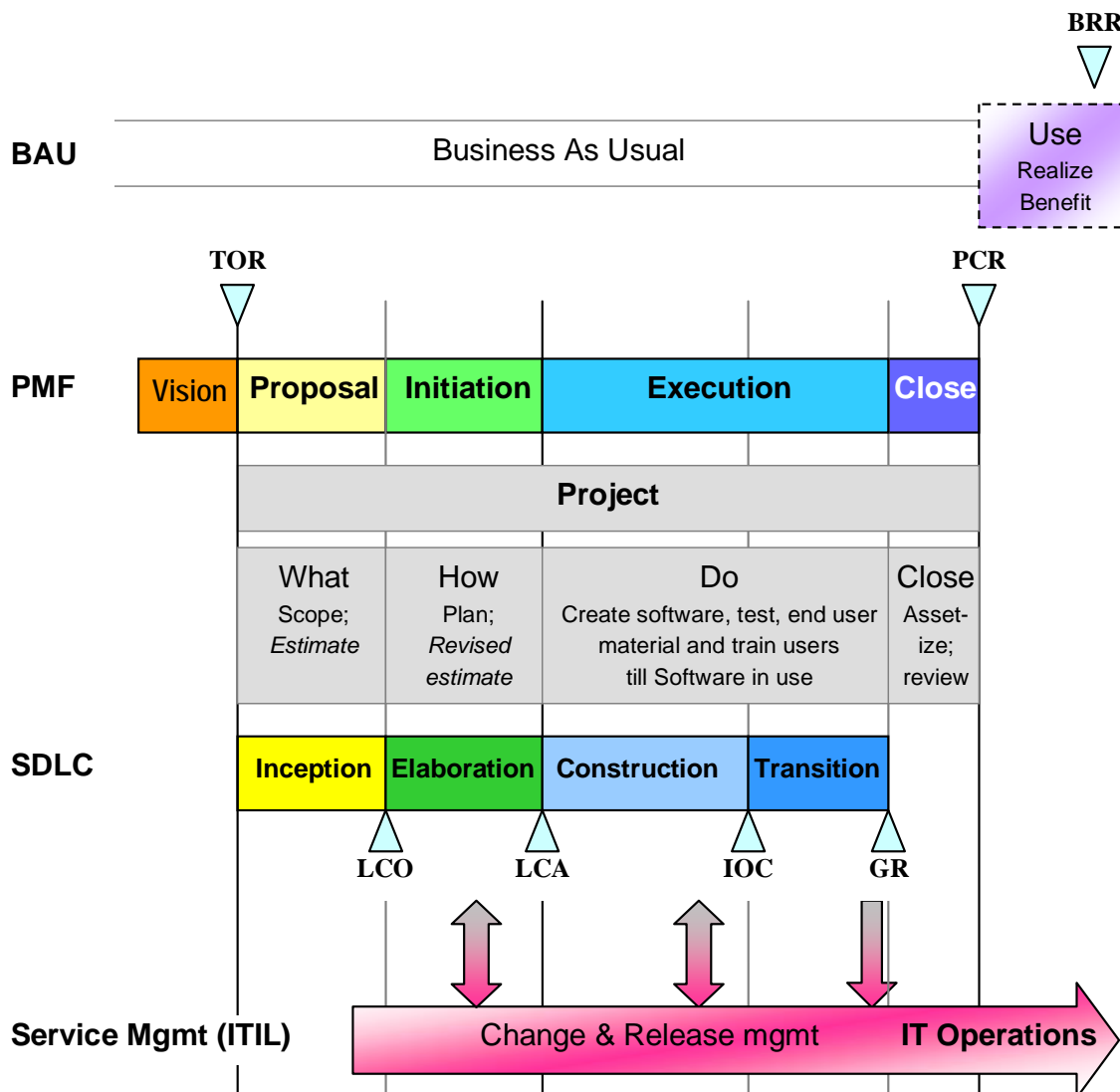
¹ Classifications And Related Standards

² Statistics New Zealand's published time-series database

D. Relations between PMF, SDLC & ITIL Processes

18. Described methodologies enable us to cover most aspects of IT processes. Figure 4 presents how they are related. PMF covers programme/project lifecycle from Vision to the Close stage. The four stages in SDLC: Inception, Elaboration, Construction and Transition are corresponding to PMF phases Proposal, Initiation and Execution. ITIL processes are connected to SDLC using Change & Release functions. After successful deployment to production ITIL processes cover deliverable's lifecycle long after project and development have finished.

Figure 4: Relations between PMF, SDLC & ITIL Processes



IV. CHANGES IN ORGANIZATIONAL STRUCTURE

A. Introduction of functional roles and teams specialization

19. Statistics New Zealand has three offices in Wellington, Auckland and Christchurch. IT Development teams are located in all three locations as well. Between 2000 and 2006 several functional roles were established breaking the traditional structure where developers have been responsible for the whole software development lifecycle:

- (a) Business Analyst (BA)
- (b) Project Manager (PM)
- (c) Programmer/Designer
- (d) Resource Development Manager
- (e) Tester
- (f) Architecture Manager
- (g) Application Architect

20. Following the introduction of specialized roles the specialized teams were established, too. After establishment of architecture team Architecture Reviews became mandatory for all new development. Dedicated test team was created to provide single point for testing and maintenance of test environments. Application support has been separated from new development introducing support team as a separate unit.

21. Delivery model changed to resource management model. Development managers were responsible for managing skilled and flexible resource pools of developers. Their main tasks were recruiting, training & allocation of staff to different projects as well as line management of staff. All tasks related to the project scope were managed by project managers. After the first process-based organisational scheme BA team & PMO have been formed to finish the change.

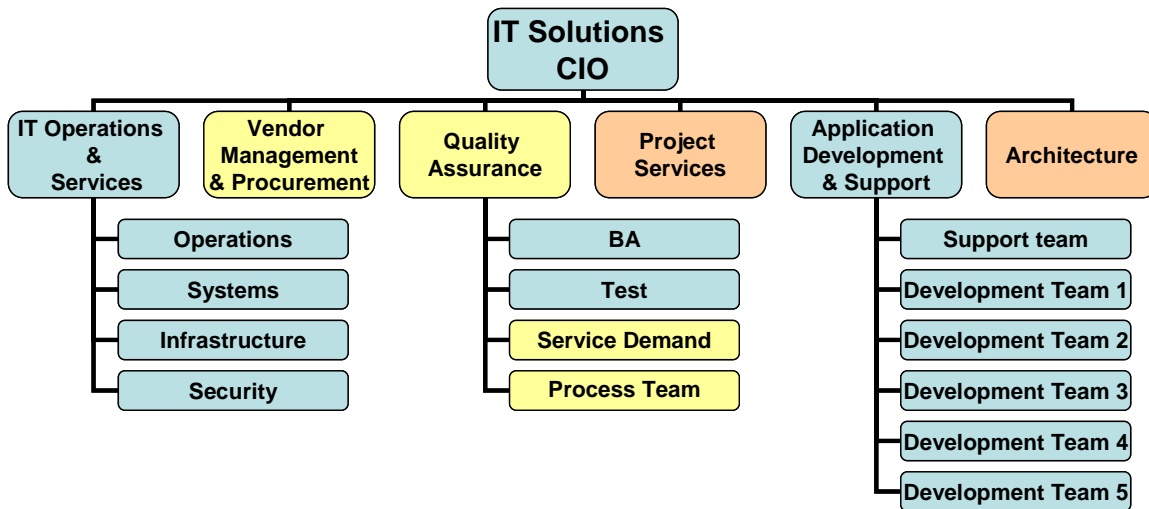
B. Centralization and consolidation of IT within new IT Solutions Group

22. Following the introduction of CIO role in 2007 IT changed its organizational structure. Main goals of restructuring were:

- (a) Centralization: in old structure there were two large divisions in central IT Group, namely IT Operations and Services and Application Services. Some units were within the other groups in organisation. All IT units are now part of the new IT Solutions Group.
- (b) Consolidation: new Vendor Management & Procurement unit was established to provide consolidated services across the whole IT Solutions Group and wider.
- (c) Quality: all end-to-end functions like core IT processes covered by ITIL & SDLC methodologies, business analysis and testing have been centralized within newly established Quality Assurance division.
- (d) Demand/delivery: earlier introduction of processes and specialized roles & teams has contributed to increased overall complexity within IT. Project managers managing business projects were faced with a lot of interaction with different parts of IT they needed to manage to get their IT deliverables. The answer to that problem was introduction of Demand/Delivery management within the Quality Assurance (QA) division.
- (e) Change from resource management to output delivery model in application development area: the resource model with project managers managing all team members directly has not been proven as efficient enough. Statistical office is organization with well defined core business so internal IT can be organized according the outputs we are providing to the organization. Moreover, specializing teams for particular type of output (data collection, data dissemination, user interfaces, analytical systems, transformations etc.) helps us to achieve more standardization in software development as well as sustainable and staged development.

23. The new structure follows the common guidelines for organizational design (Forrester, 2005):
- (f) Type of work: combination of application development and application maintenance in one division enables us to easier manage the similar type of work, tools and knowledge; however there is still a clear line between application development and support in order to make development lifecycle process transparent. QA team combines the customer-oriented teams and roles, responsible for the end-to-end process and the whole software lifecycle.
 - (g) Location of people: it is quite difficult for Statistics New Zealand to have the teams based on location principle however we have succeeded to place each development team within the same location (two teams based in Wellington and Christchurch, respectively and one based in Auckland). Architecture, testing, BA, infrastructure, systems and operations teams are still spread across different locations.
 - (h) Management experience: the skills and experience needed for each role is well defined.
 - (i) Span of control: generally the number of direct reports to the CIO should not exceed 6 to 10. As a middle size IT Shop we have 6 direct reports to CIO role.
 - (j) Accountability: the proposed IT organization is consolidated under small number of managers which makes their accountability high and clear. Introduction of service demand/delivery roles and change of delivery model from resource to output oriented will also increase accountability.
 - (k) Operational versus non-operational: there is not a lot of direct combination of operational and non-operational tasks. Application support is separated from development teams. However separation of application support and development is becoming more and more difficult with the new technologies requiring highly specialized skills and very small teams we have in some areas (Blaise, SAS).
 - (l) Independence: the QA team is separated from developer teams to avoid conflict of interests.
 - (m) Career path: in all divisions there is a combination of different functions under single manager providing possibilities for career growth and flexibility, for example possibilities for staff to easy move between development and support, between BA and test team etc.
 - (n) Statement of importance: the statement to the whole organization is that functions covering quality assurance area and roles needed for establishment and management of well defined and transparent process within software development lifecycle are crucial for our efficient and effective work.
24. After the IT Solutions Group was established it was placed within the new Organisation Development Group, combining IT, Finance, HR, Corporate Support and PMO. In terms of processes, this provides us with the opportunity to be able to make them more visible within the other corporate processes and policies, wider Group is responsible for. The final organizational structure is found in Figure 5.

Figure 5: New organizational structure



V. LESSONS LEARNED

25. During the last few years Statistics New Zealand has organized internal IT according to industry best practice models. Process-based organisational structure & implementation of processes have a lot of benefits; however it comes with side effects we have to mitigate:

- (a) Adoption of new processes is often seen as a new **administrative burden**;
- (b) **Governance** becomes more **complex**;
- (c) **Process** from the vision to the delivery can be **time consuming** comparing to previous praxis.
- (d) Increased focus on **building things on the right way versus building right things**
- (e) Challenge **how to find and retain skilled staff** has increased with the introduction of standard roles used in most organizations.

A. Administrative burden

26. The best example of a problem with an administrative burden was the introduction of SDLC. Templates have often been criticized as too complex, not enough clear etc. It is very important to keep an eye on reducing the administrative burden all the time. Some examples of the ongoing improvements we plan in that area are single document repository; lotus notes application supporting process workflows, easy single click versioning and signing off mechanism etc. Introduction of the new process always brings new administrative task(s), but additional work is spent on very important goals: to ensure better documentation, tested code, more predictable time frames etc.

B. Complex governance

27. Complexity is connected with IT almost by definition. The introduction of new SDLC & ITIL processes and specialization of development teams for defined outputs has caused the increase of number of people involved in each particular project. Planning has become crucial and projects which are facing changes and delays can be very hard to manage – each change can has an impact on delivery dates. However with the proper level of cooperation of all parties complexity can be maintained at a reasonable level.

C. Time-consuming processes

28. The introduction of multiple environments in software development process (development, system test UAT, production) added to the time needed for applications to be redeployed and tested. A lot of reasons have been identified why the promotion through the environments is still time consuming: from the lack of planning and coordination to the undocumented changes in configuration settings, problems with new technologies etc. With the new change and release policies we have introduced different levels of change and enabled prioritisation so high priority changes can be progressed as fast as possible. On the other side only good cooperation between teams and proactive approach can contribute to better results.

D. Building things right is not enough – we have to make sure we are building right things

29. Described processes and organization help us to build the IT solutions on a right way. However more and more project failures or costly surprises are actually not connected to the way how we are building things but rather to the fact that we shouldn't build them at all. Processes & methodologies are not of much use to prevent this to happen. It is still very easy to lose the big picture and develop wrong applications. Business analysts will make their best to transfer requirements to the technical language, project managers will manage deliverables within time & resource constraints, developers will develop required outputs, testers will test the code according specifications, change & release management will take care for safe deployment to production and at the end support will assure the proper maintenance.

E. External factors – how to retain skilled staff

30. In the tight New Zealand IT labour market the introduction of best practice methodologies comes with the capability problem. Large demand for some key IT roles (business analysts, delivery managers etc.) can cause significant risks to our process-based organization. The best way to mitigate this problem is to work on strategies how to retain staff. Focus on team building, professional challenges and good work/life balance has become very important part of manager's work.

VI. CONCLUSIONS

31. The changes described were often triggered by the BmTS implementation programme. However, the benefits coming with their implementation will be seen in any IT delivery project we have. We will now be able to focus on a long-term challenge: to establish value governance and portfolio management (ValIT, 2006) to make sure we are doing the right things and getting the benefits as well as continuously improving the execution to efficiently deliver IT solutions to our organisation as a first choice team of IT professionals.

References

- (BmTS Charter, 2004) Statistics New Zealand Business Transformation Strategy – Charter, April 2004.
 (SNZ I&T Strategy, 2006) Statistics NZ Information and Technology Strategy 2006 – 2010.
 (Smartmatix, 2006): SDLC-fit, Software Development Life Cycle, Statistics NZ Specific Implementation, Smartmatix Ltd, 2006.
 Forrester on IT Organizational Design, Forrester Research Inc., Summer 2005.
 (ValIT, 2006): Enterprise Value: Governance of IT Investments, the Val IT Framework, IT Governance Institute, 2006.
 ITIL, SDLC, PMF: internal documentation.