The recent announcement by the Government of Canada to create a single shared services organization is the ideal context to illustrate the value of Cloud Computing.

It’s a technology program that is ideal to underpin cost-cutting initiatives, in particular establishing shared service organizations, because the fundamental purpose of Cloud Computing is to provide a platform which makes sharing IT infrastructure easier between multiple organizations, for reasons of creating cost and other efficiencies.

http://SharedServicesCanada.com
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Executive Summary

The Canadian Federal Government recently announced plans to create a single IT department ‘Shared Services’ that will save $100-200m a year through consolidation-driven efficiencies. As highlighted in this fact sheet there is lots of ‘low hanging fruit’ for cost savings due to a spread of many different email systems, networks and data-centres.

Huge cost savings will be achieved through standardizing on single systems for functions like email, and by reducing the number of data-centres from over 300 to less than 20.

Cloud computing, specifically the 'Community Cloud' model, is a key design architecture for achieving these goals.

Program Overview

The role Cloud Computing can play in supporting and accelerating a shared services initiative is defined through three main program areas:

• The business case for Government Cloud Computing – Understanding and planning a transformation strategy that best leverages the potential of the technology.

• Shared service design – Designing new systems to exploit these benefits, through technical architectures that enable sharing of common infrastructure.

• Consolidation and migration – Planning and managing the process of migrating legacy applications to these new environments.
Government Cloud Computing

Cloud computing will be the technology that’s key to the success of this initiative, as it provides the means to reduce data-centres and consolidate applications this way, with Canada following the lead of the USA where this same approach is being proven successful.

Under the leadership of Vivek Kundra the USA launched a ‘Cloud-first’ procurement policy to lead their own efficiency drive, under the umbrella of President Obama’s overall *Campaign to Cut Waste*. This was detailed in a *25-Point Implementation Plan* (40-page PDF).

They’re achieving great progress. As highlighted in [this Whitehouse update](#) they’re already closing many data-centres and are on track to save $ 3 BILLION of taxpayer monies. This recent [survey](#) by NetApp reported American CIO’s have already reduced data center counts by 31% and saved 20% of their IT budgets based on consolidation thus far.

5-Point Cloud Consolidation Plan

Cloud Computing is the key mechanic for a shared service initiative because in simple terms it is literally a technology for enabling shared services – It provides the means for many different organizations to share the same infrastructure, for purposes of IT and cost efficiencies.

CIO’s can leverage Cloud computing to quickly drive cost savings in 5 key impact areas:

- **Infrastructure consolidation** - As the Whitehouse news report highlights the principle challenge is that these vast numbers of data-centres typically only operate at hardware utilization levels as low as 25%, but they still consume all the associated real-estate and power costs. This means that as much as 75% of these costs is wasteful spending, and can be eliminated by migrating the applications to Cloud computing which manages utilization much more efficiently. By doing so many of these data-centres can then be closed.

- **Application maintenance costs** - Migrating older applications from their older hardware on to new Cloud platforms is known as ‘Legacy Modernization’, and it reduces costs in many ways. In addition to the above physical consolidation it can also reduce the staff costs associated with maintaining the applications in these older environments, one of the biggest costs. Migrating many applications into a single Cloud environment reduces the overall support burden for all of them.

- **Shared Services Architecture** - These new approaches to designing how applications work in these new environments offers further IT efficiencies. Indeed the ‘Community Cloud’ model is key because it is literally a ‘Shared Services architecture’, meaning that rather than having many agencies each run a separate and different instance of their own application for the same purpose, they can all instead reuse the same code base. This reduces software costs even further.

- **SaaS contract consolidation** - This approach offers an equivalent, very simple and very powerful commercial model. The Government of Canada will find that they have multiple different software licence agreements, with vendors like Microsoft, and by consolidating these all into one will be able to negotiate bigger overall discounts and lower the associated administration costs. Furthermore by moving to Cloud systems they can leverage SaaS contract approaches, which streamline costs into a per-seat, utility model.
• Integrated Service Delivery - Costs also arise due to other complexities in the IT environment. Every domain like servers, storage, applications and networks each has their own management systems, help desk and support teams, and furthermore even different suppliers each have their own web portals for managing their services. This multitude of service management systems not only creates unnecessary costs but also causes the complexities which hamper quick and efficient service.

In short as large organizations grow over many years they inevitably accumulate excess and unnecessary capacities in a variety of areas.

Utilizing Cloud computing and best practices like ITIL to create Shared Service Centres leverages modern technology to achieve the large-scale consolidation required to trim these inefficiencies, simplifying and standardizing processes across infrastructure support areas, reducing costs, raising efficiency and responsiveness, and increases elasticity to handle future changes.

Business Transformation – Best practices

Before diving into the technicalities of migrating applications to the Cloud, it's essential to first quantify the nature of the business case for doing so.

For organizations like government considering a move to Cloud services, it's helpful to consider there are different levels of Business Transformation that can be engaged.

This is succinctly explained in this OMG program ADM (Architecture-Driven Modernization). In the white paper ‘Transforming the Enterprise’ the author describes how transformations, moving from one system to another, can have three different dimensions: 1) for technical reasons where the underlying IT pieces are moved around but the business doesn’t change (T)echnical Architecture, 2) re-engineering the software architecture (A)pplication Architecture, through to 3) a full reinvention of the whole organization and business model (B)usiness Architecture.

Moving to Cloud can actually represent activity on all three fronts:

1. (T) Virtualizing the platform to simply improve the underlying hardware usage, reducing all that excess hardware capacity to only what's needed. The application software and business model is not changed at all.
2. (A) Re-architecting apps – Software applications are re-designed as part of the process of migrating them to the Cloud, but the business model stays the same. Create a consolidated software base for shared services, like Identity sign-on and linking customer records across systems.
3. (B) Transforming business model – The whole business model is transformed as part of migrating the software to the Cloud. This will provide the foundation for better online interactivity, where users can have simplified, single views of all their government claims.

Programs like ‘Digital Switchover’ give an insight into the demands that will drive this trend.

In the UK’s recent Digital Britain innovation policy they described a program of “Digital Switchover”, referring to government agencies being obliged to ‘go digital’ in the same way analogue TV was decommissioned and replaced by Digital TV.

In this case they refer to government services, like tax returns, Student Loans, Companies House Registration, electoral roll registrations and so forth, and how they will be migrated to be serviced online only.
Crowd Computing – Harnessing Open Innovation

This third tier of transformation defines that this function of moving processes online presents the opportunity to radically enhance them take advantage of the new Web 2.0 social media world, most notably utilizing modern techniques such as 'Collective Intelligence', also known as “Crowdsourcing”.

Recently MIT published a paper ‘Harnessing Crowds: Mapping the Genome of Collective Intelligence’ (20-page PDF), that distills the key mechanics of this science.

It also represents the core ethos of the principles involved in ‘Open Government’, the policy announced by Barak Obama to make government more transparent and accountable to the public.

They recommend policies that transform government processes to be inherently participative and that harness the public as a collective intelligence the same way, proposing that agencies build ‘Public Participation Plans’ to engage their local communities more proactively in setting and reporting on policy performance.

Led by Beth Noveck the Open Government program pioneered flagship examples of how powerful this transformation can be. As her Peer to Patent portal project illustrates, this is not simply about connecting an existing IT system to a web interface or just publishing the reporting data online, but rather utilizing the nature of the web to re-invent the process itself.

The full case study is documented in this 40 page Harvard white paper. In essence it transforms the process from ‘closed’ to ‘open’, in terms of who and how others can participate, utilizing the best practice of ‘Open Innovation’ to break the gridlock that had occured due the constraints caused by private, traditional ways of working.

Not only did this cause a bottleneck due to the number of resources being utilised but also in terms of the volume and quality of subject matter expertise being applied. With no involvement from outside contributors, such as experts from the scientific community, then awards were being granted for applications based on very limited and often inaccurate knowledge.

By moving the workflow online to a Web 2.0 environment they have been able to “open up” the workflow to a distributed community of experts from across many different organisations, and apply collective efforts to increase both quality and speed.

Cloud technologies and principles can be built atop one another to achieve this escalating maturity.

Maturity Model

This top down context can be complimented by a bottom-up focus on the technology, and how it can be matured within the IT organization to support these goals.

This Vmware white paper ‘IT Value Transformation Roadmap’ (24 page PDF), provides a high-level blueprint for engineering high performance organization through business transformations.

“This cloud computing strategy brief presents a virtualization- and private-cloud-centric model for IT value transformation. It combines key findings from several primary research studies into a three-stage transformation road map.”

A 3-Step maturity model is proposed that begins with virtualization and grows into full utilization of Cloud computing across three stages of:
• i) IT Production,
• ii) Business Production,
• iii) ITaaS.

Most importantly it quantifies this in terms of the IT organization becoming more mature in terms of their ‘Business Transformation’ abilities, their ability to quantify and exploit IT in terms of ROI and value for money.

Through the organization first mastering virtualization for their own basic IT operations, they can then become more confident and able to address the higher profile, business-critical applications from MS Exchange through to Line-of-Business apps.

This requires additive competencies and so it offers a general maturity program where IT themselves matures from an operations-centric organization to one where “organizations deploy private cloud solutions that pool computing resources into a shared and agile infrastructure where they can deploy an IT-as-a-service model that allows IT to quickly respond to emerging business opportunities.”

Shared Service Design

The Community Cloud Model

The primary method for achieving shared efficiencies via Cloud Computing is defined via various best practice blueprints from NIST, the US Government standards organization.

Most notably they define the the 'Community Cloud' model is defined as one shared by several organizations that have shared concerns, such as mission, security requirements, policy, and compliance considerations.

It may be managed in-house by the organizations, an On-site Community Cloud, or by a third party, an Outsourced Community Cloud.

3SO – Shared service organization, using shared service Cloud computing

For example in this case study 3SO shares infrastructure for a number of healthcare organizations collaborating to achieve an eReferral process.

They are an excellent case study example because they themselves are a shared services organization, an example of the same community effect at the people and process level.

It exists when a number of partnering organizations identify common needs and functions that they each duplicate, such as payroll or procurement, and they maximize their own individual efficiencies by consolidating them into single, ‘shared departments’ that acts as a supplier to them all.

An example of this process is the adoption of Community Cloud models. This allows them to each consolidate their data-centre infrastructure costs and workload, to operate a single platform that runs the same software they all use.
In January 3SO published this RFP for services to build the in-house version, the ‘On-site version’, of the Community Cloud.

This explains how they will utilize Vmware vSphere to create a platform for running virtualized Microsoft Sharepoint & Dynamics to implement an iteration of the eHealth Ontario ‘RM&R’ eReferal process, including:

• Development of a regional repository to securely share clinical documents
• Pilot development of web integration to tie the CDR content into portals
• Pilot integrations to hospital information systems in both LHIN’s
• Pilot integrations to primary care physician EMR’s in both LHIN’s

These capabilities would then be shared by the ‘LHIN’ members of the 3SO network. As such it sets the leading best practice for implementing the eReferal process via Cloud technologies.

The Canada Cloud Roadmap

For very large organizations like Federal Governments they further require an overall strategy and enterprise architecture; one that also encompasses other essential technologies like their WAN (Wide Area Network) and security systems.

The key component of a Business Transformation exercise is the “Target Architecture”, ie. the intended destination of your journey, broken down into a series of steps that defines a Roadmap for how to get there.

The 'Canada Cloud Roadmap' plan developed by the Canadian Federal Government provides a best practice blueprint for such a requirement.

It provides a framework which builds on the NIST foundation and identifies how it can be applied to the Canadian IT estate, based on a design model with three main sections:

• **Community Cloud Service Offering** - A multi-tenant application environment for their breadth of enterprise applications, like Oracle, SAP and Microsoft, used for their core business processes like PAY, and also their common IT requirements, like email and collaboration.

• **A 'Cloud OSS'** - to handle the automation of provisioning, delivery and cross-department billing, including “Cloud peering” privately between departments, and also “brokering” to the public Cloud.

• **A Cloud Security Model** - A logical architecture for segregating 'Cloud Security Zones', linking each Cloud area (IaaS, PaaS, SaaS) to a security infrastructure component, and describing how the computing environments will be integrated with their wide area networks and access control systems, through a Cloud Services Access Layer and a Cloud Peering Layer.

• **An Enterprise 2.0 Collaboration framework** - This technology platform enables staff to utilize a set of Web 2.0 collaboration tools and enable more interaction with the public.

This provides a complete blueprint for an Enterprise Cloud strategy, and specifically for the public sector a complete platform for Open Government Cloud Computing.
IDaaS – Identity as a (Shared) Service

A keen example of how technology can reflect the architecture of Shared Services is IDaaS – Identity as a Service.

IDaaS is a scenario where Cloud Providers will host and run Identity Management software, and provide it on a SaaS basis so the enterprise doesn’t have to install it on site.

This is a very powerful example of the new approaches to IT that initiatives like Shared Services Canada can benefit from.

A big pain point for citizens and government staff is having lots of duplicated identity systems, having to repeatedly supply a username and password for each one, over and over and over again.

This is because each agency and each application implements its own built-in identity authentication function, forcing the user to repeat the process, and so instead by moving to a shared service model then each application can instead rely on just one sign-on process, ie. they literally share it.

Open standards are key for universal adoption of common components like Identity, and relevant initiatives include organizations like Kantara.

In essence Kantara is a set of open standards that make this same effect possible across any combination of vendor technologies not just Microsoft.

In addition to their standard for Identity Authentication systems: ITSG-31 here, the Government of Canada has also standardized on (and contributed to) to Kantara, their specific implementation is defined in this document. (53-page PDF).

Requirement for these standards is documented in this RFP for a Branded ICAM solution, and this also provides the specifications for how to operate it as a managed service, the core Identity as a Service delivery model.

This will evolve them from their ePass Service of today, to a Cyber-Auth Service of the future. This will enable ‘My GC Services’ single authentication across multiple Gov applications.
Cloud Migration Management

Cloud Migration Management (CMM) refers to best practices for the process of migrating legacy IT and applications to new Cloud Provider environments.

CMM Best Practices

Becoming Cloud-ready requires a proactive approach to managing the service and infrastructure lifecycles of all IT, Networks, Facilities and Cloud resources—holistically. Whereas Cloud Migration Management (CMM) more specifically refers to best practices for the process of migrating legacy IT and applications to new Cloud Provider environments.

CMM best practices begin with building and maintaining an up-to-date inventory of infrastructure resources—both physical and virtual. In other words, IT organizations migrating applications to the cloud should know what resources they own, how they are connected, where they are, who is using them, how to change them, what do they cost, and what services depend on them. Successful CMM will require to:

- Maintain a complete, accurate and up-to-date view of the people, processes and technologies that make up the IT environment;
- Manage the inventory of IT resources and related costs used in delivering cloud services, such as physical servers, multi-tier applications, virtual machines, DBMS, complex storage, clusters;
- Document the required Facility resources and related costs used in delivering IT services like location, racks, power, etc;
- Document the required Network resources and related costs used in delivering IT services like bandwidth, communication links, etc;
- Plan and manage all changes according to best practices.

CMM solutions can assist IT organizations in a rapid identification, assessment, design, justification and migration of candidate applications to the Cloud. CMM solutions should provide key insight and decision support information for:

- Helping identify which applications are prime candidates for cloud migration;
- Delivering a comprehensive and accurate depiction of the service/application resources and their dependencies;
- Providing cost analysis and justification as an element of the decision support criteria both prior to and after the migration;
- Providing the ability to design and model a range of criteria-based “what-if” scenarios for effectively planning the changeover to the cloud;
- Performing due diligence to minimize the impact for a successful migration.

N(i)² Cloud Migration in 3 Steps

The N(i)² CMM solution (www.ni2.com) supports, enhances, and extends industry best practices in approaching the migration of applications to the Cloud via the following process:

1. Assessment: helps in assessing the current state of the application infrastructure by
delivering a clear depiction of all physical, virtual and logical resources, their
dependencies, and how they comprise the application architecture. In addition to service
and application dependencies, the system allows for the determination of the applications’
true cost prior to migration - including initial capital cost and recurring costs of supporting
resources like servers, network, racks, power, maintenance, bandwidth, storage, etc.

1. **Design and Modeling**: enables the design and modeling of the future state scenarios of the
application infrastructure within the Cloud. This serves in determining and comparing
future costs and evaluating various migration scenarios. This provides the proper due
diligence to significantly minimize the risks and eliminate errors to ensure a successful
transition to the cloud.

1. **Deployment**: having selected the optimal migration scenario, proceeds to automatically
generate the migration release plan, outlining all the required tasks and measures for
effectively planning and accurately coordinating a smooth deployment to the Cloud.

Throughout every stage of the process, the CMM solution is documenting, tracking, registering
and reconciling the new resource configurations and migration activities, all the while, delivering
added visibility by providing governance, quality management and project oversight to
stakeholders and management during the entire project lifecycle.

**Oracle databases in the Cloud**

Canadian Federal and Provincial government agencies are heavy users of Oracle databases.

Many government agencies and Ministries will often have Oracle databases running on multiple,
different platforms, even for the same application. Database maintenance, backups, data transfers,
compatibility and licensing are complex, labor intensive and expensive activities.

Islands of isolated data and non-standardized database layouts are another consequence of highly
distributed environment. In such an environment it is not easy to gather integrated, accurate
information on particular topic. In cases where coordinated multi-entity action is required
interagency communication is unnecessarily difficult and technologically challenging.

Once Oracle databases are migrated to Cloud environment it will be much easier and cheaper to
achieve centralized, standardized, reliable, integrated and economical database service. Cloud
databases and applications can be deployed and maintained in the most efficient manner possible.
Technology to migrate and consolidate Oracle databases to Cloud environments in a safe and
reliable manner exists today. Many service providers and products make it possible to migrate and
use your Oracle databases in versatile configurations, tailored to meet very specific needs.

Cloud Oracle databases are not yet another silver bullet technology or methodology that will solve
all IT problems. Cloud is simply applying the age-old idea of economies of scale savings to the
field of IT computing. Commodity based model of centralized, standardized, automated,
ondemand, elastic, self-serve usage, similar to the way electricity is consumed, is now being
adopted by corporate IT.

Cloud environments reached level of maturity where even the most demanding, complex, mission
critical applications like Oracle E-Business Suite and Oracle Database Enterprise Edition can be
safely migrated to Oracle certified platforms like Amazon Web Services Cloud.
Lotus Notes 2 Cloud

An important trend within this function will be the availability of tools for automating the process of migrating legacy applications to the Cloud.

For example CIMTrek is a new organization that specializes in this for Lotus Notes applications.

CIMTrek technology:

- Helps you understand the magnitude of the migration journey.
- Automatically migrates legacy IBM Lotus Notes/Domino applications to cloud platforms, such as the Google Application Engine or Azure from Microsoft, as well as on premise platforms such as Websphere from IBM.
- Enables your migrated applications to mirror closely the way your existing applications work
- Opens up locked away processes and data ready for additional modernization and new uses

This enables organizations to protect their intellectual investments in the business model logic, while taking advantage of modernizations of the underlying technology platforms, extending the scope and reach of your data and applications.

CIMTrek does far more than simply generate a new HTML based user interface that pretends you have a web application that's ready to use.

By taking a holistic view of the application and applying some artificial inference, CIMTrek is able to break down the application into its component parts and rebuild it as an n-tier application that is highly efficient and mirrors the way you used the original Lotus application. As a result you reducing expensive re-training and ensuring faster adoption of the new technology used.

CIMTrek uniquely allows you to deploy and execute the applications in the most appropriate environment and platform – from full on premise to total cloud or a hybrid of the two options.

Why would you consider migrating?

The imperatives for users to migrate now are many and compelling. The list of reasons given below is in no particular order and the real need to make a change becomes evident when the points are considered as a group rather than individually, as follows:-.

1. Notes Version 7 will cease to be supported by IBM in April 2011 – existing users (the majority still seem to be on V6) will have to move to a new platform and many will consider replacing Notes for The Cloud and in doing so will reduce their TCO by around 80%

2. IBM-Lotus keeps on combining different technology foundations into the Lotus brand, even competing products. IBM fails to set out a clear product roadmap and consistently reacts on developments of others. There is general market consensus that Lotus is not on the forefront of innovation.

3. The average age of the Lotus Notes consultant is rising, leading to a shortage of fresh people to fill-in the gaps of the retired consultants, resulting in an ever shrinking pool of resources and experts in the proprietary Lotus technology. This will lead to higher fees and rates. Large system integrators are no longer investing in the development and retention of Lotus Notes skills.

4. Newer platforms are easier and more cost effective to manage and develop.
The Process of Migrating:

What do I need to migrate?

Before we can migrate an application we need to understand some of its characteristics. In order to do that we run what we call the discovery process. This process accesses your Domino servers and provides you with a complete list of all the NSF files you have. We can analyse those in detail to determine what needs to be converted and how much effort it might take.

As part of the CIMtrek Lotus Notes migration suite we have the capability to extract not only the data from and application but the attached documents (word, Excel, PDF etc.) and move them to the repository of choice – in the example shown below we are using Google Docs. Cimtrek will run through application denoted as type DocLib and move the documents to the users directories as required.

The following screen shots show how this process works and the results of the migration.

The data migration can be performed as part of an overall migration or can be done without having to migrate the rest of the application’s components.

The application Migration Process:

As seen above, CIMtrek will analyse the applications functionality to determine how it works and what it does. We then take the application and break it down into its component parts ready to migrate it. The component parts are in the appname.CIM file.

Once everything is in an open format CIMtrek generates a new application using a traditional Client/Server architecture for implementing migrated applications. The migrated applications are delivered via a browser and therefore the solution requires a webserver (IIS or JBOSS or whatever), either reusing what you have today or a dedicated platform (in-house or cloud based). The data used by the migrated applications resides in a database – this can be Oracle, SQL, MySQL etc. Again the database can be dedicated to the CIMtrek migrated applications or can reuse an existing implementation of an existing database environment you have today.

Generating the new cloud based application:

The migrated application – and the key word here is “application” comprises the following logical components: -

- **Authentication & Securities**: this is used to handle user authentication/securities.
- **Business/Application Logic**: for handling all the Notes application logic and data communication to the client via HTTP request / response protocol. Is also used to communicate with the database and Authentication and Securities components
- **Data Access Layer**: includes data access logic and database connection handling with a relational database;
- **The object data model**: that is mapped to the relational database tables / fields;

When the migrated application is deployed, the CIMtrek “server” is simply your database, webserver and application servers, which as stated above, can either be using the existing servers you have or a dedicated environment. In other words it is not an environment that needs to be managed in its own right unless you want it to be.

This unique approach allows you to migrate to Cloud, On-Premise or Hybrid environments – you
can even put your applications in more than one place – quickly and easily.

What Next?

The output from the Migration tool delivers, on average, 85% of the functionality found in the original Notes application. This means that there is remedial work and testing to do to ensure the new cloud application fully meets the user’s requirements.
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Jon Pyke - Jon is the Chief Executive and founder of CIMtrek - CIMTrek provides the tools that help end user organizations understand the magnitude of the migration journey to the cloud. Prior to CIMtrek, Jon founded the Process Factory, now part of Cordys and before that he was the Chief Technology Officer and a main board director of Staffware Plc from August 1992 until was acquired by Tibco in 2004. More recently Jon has Co-Authored a book covering both technical and business aspects of Cloud Computing. The book, published by Meghan-Kiffer Press, is called Enterprise Cloud Computing.

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