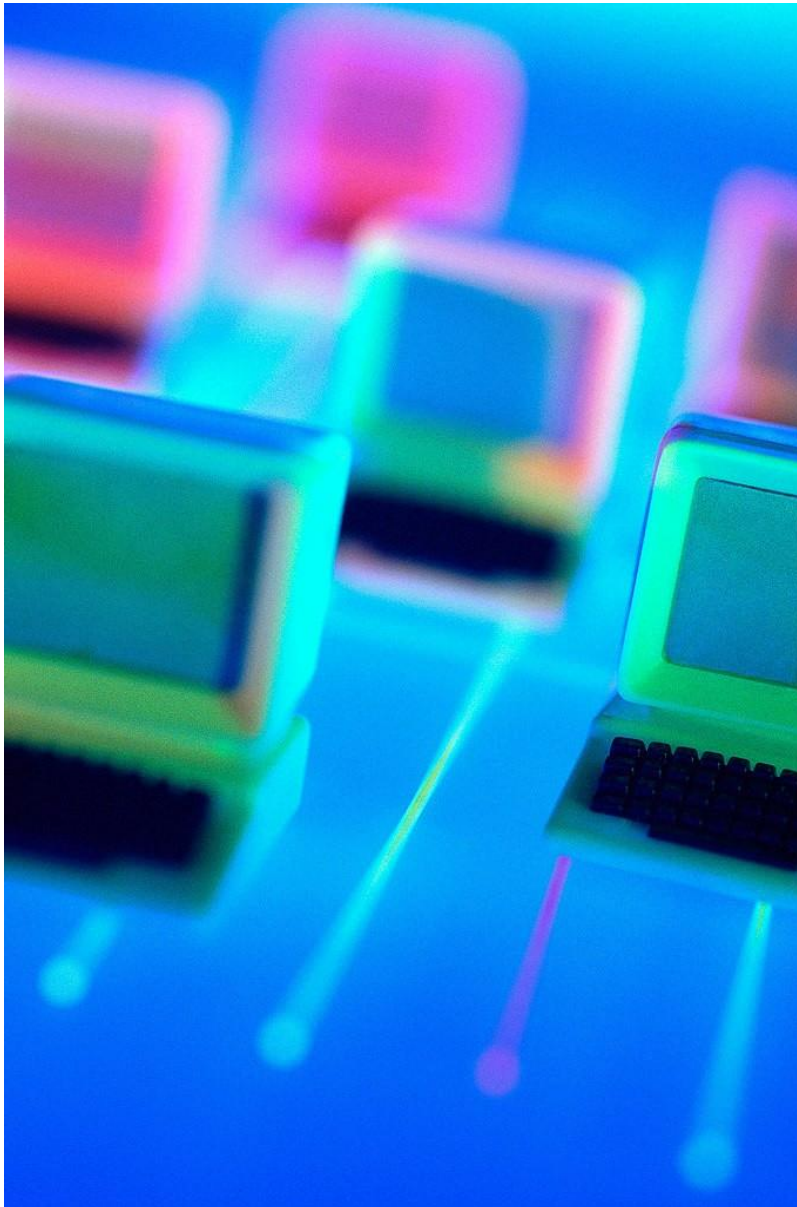




Information Technology

2018 – 2022 STRATEGIC PLAN



October 30th, 2017

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Introduction

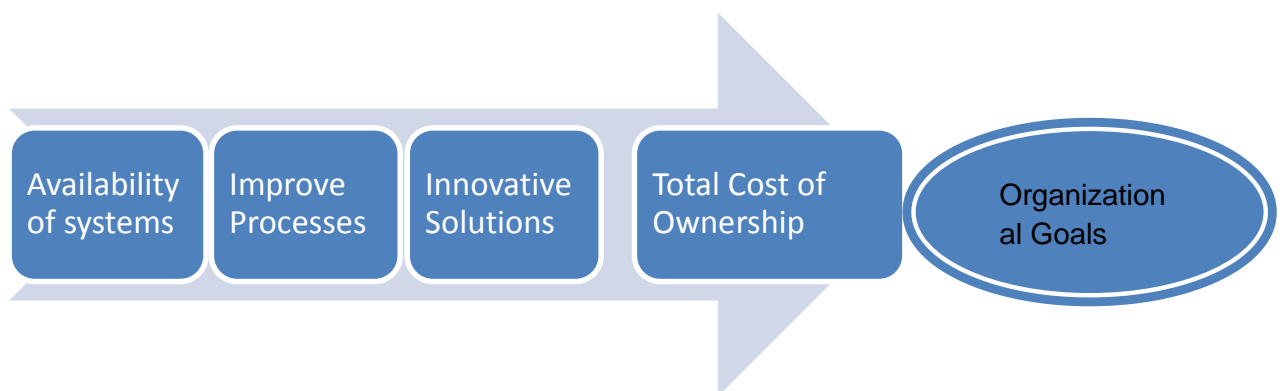
The strategic plan is a multi- year view that is broad in nature and provides a long-term overview of key technology based initiatives. Information Technology is vital to the success of any organization and involves arranging the right mix of skilled individuals who share common objectives and defined processes to deliver services and solutions that support the mission of the organization. Lake Michigan College is served by a dedicated team of individuals whose purpose is to deliver technology to students, faculty and staff in an accountable and cost effective manner.

Mission of IT

Information Technology is a service organization that works in partnership with members of the College to provide technical solutions, systems and services that support the faculty and student relationship, improves business processes, protects informational assets, and kindles innovation that advances Student Success.

Primary Service Delivery Objectives

IT has four constant objectives as it provides services and solutions for the organization. The first objective targets the availability of key information services and systems. The second objective is a progressive focus on improving business processes that enables the organization to be more efficient. The third focuses on growing the organization through the deployment of innovative solutions that allows the organization to offer new services and applications. The fourth is to deliver and manage cost effective services that align with goals of the organization.



Availability of Systems

IT must ensure the availability of vital information services to the organization at all times. This is accomplished through capacity planning, requirements validation and solution design, project management, risk management and through the monitoring of critical systems and processes. The lack of vital services can harm the reputation and

effectiveness of the organization and result in financial loss and missed opportunities. It is also critical that the confidentiality and integrity of information be maintained for all systems. This requires traceability and strong access controls. Without confidentiality, information is not secured and without integrity, information cannot be trusted.

Improve Business Process

IT must also work closely with key business process owners to improve operational efficiencies. In many cases this relates to the discovery, understanding and documenting business processes and business rules. The goal of IT is to assist the organization in the development of effective processes that are repeatable, sustainable and transferable. Improvements are also realized through the full utilization of existing technology investments and through the alignment of software solutions with the needs of the business. Improvements may also include the procurement and deployment of new technical solutions.

Innovation

IT must partner with key organizations within the College to select and deploy innovative solutions that grows and furthers the mission of the College. Traditionally, IT organizations spend 70% of their operational budget maintaining what they already have. It is essential that IT allocate part of its budget to support growth opportunities for the College.

IT Planning & Alignment Process

One of the key roles for IT is to align its internal goals and objectives with that of the organization. This is a continuous process that involves developing a constructive dialog with members of the College. A key element of success involves IT building trust with members of the College to work collaboratively to solve problems and build solutions. IT must listen collectively and embrace positive tension as an opportunity for building a more effective organization.

IT must not only align with the organization goals, but must also develop agility and capacity to respond to unplanned needs and opportunities.

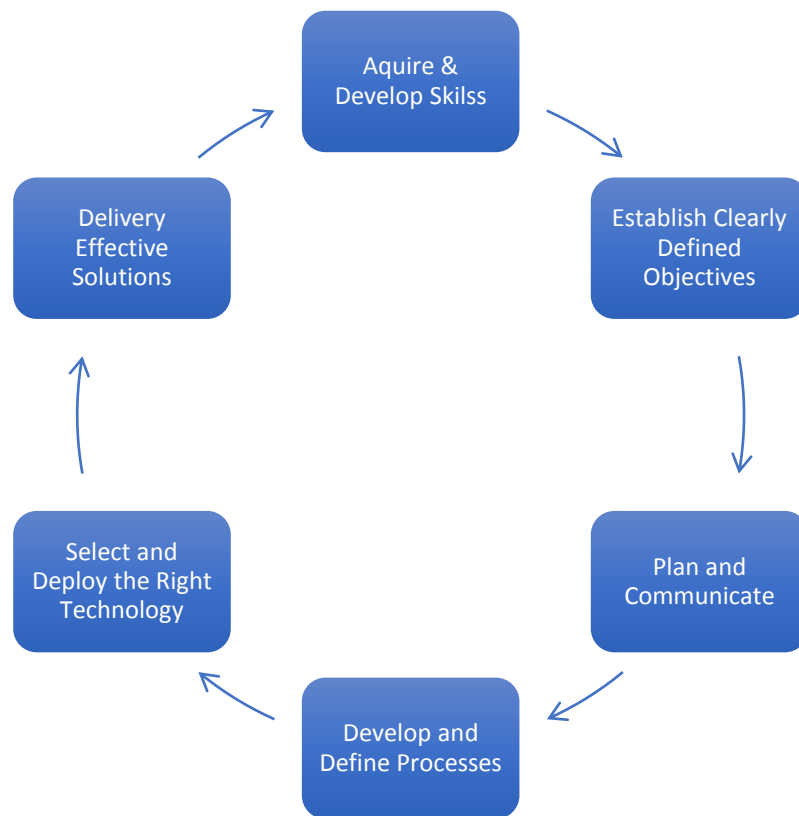


IT Service Delivery Model

One of Its Goals is to align Service Delivery Model to continuously align projects and services with the needs of the organization. The goal of this model is to deliver cost effective solutions and services that enables and furthers the mission of the College.

Planning

IT must maintain an effective user engagement model for meeting the goals of the organization in a timely and cost effective manner.



Service Model

IT has developed the following service and execution model for managing user support.

IT Service and Execution Model		
Ref	Objectives	Activities
1	IT strives to make technology work for the first minute in the classroom	Quality Check per Term
		Instructor stations are to be replaced every 4 years and labs every 5 years.
		Lab Owners are engaged and training plans are in place
		Manage Academic Upgrade Plan (list of all labs, owners, stakeholders, training needs)
		Classroom documentation for IT Support (day hours, after hours' support)
2	Continuous Evaluation and Stakeholder engagement is vital for effective Support procedures and strategies	Academic Fall Upgrade Plan
		User Training and Support Content; work with TLC to support and develop training.
		Email Feedback email sent on ticket state
		Stakeholder meeting (TLC, Library, CIS, Academic, ???)
		Visibility - Being available within the right context helps manage the perception that IT Cares
3	Follow-up and Feedback is a vital part of providing effective support and meeting user expectations	Known when and how to follow-up (Observation skills)
		IT Helpdesk Training
		IT Onboarding Training
		Procedure follow-through
		User Feedback
4	Provide the right "resources" for the task at hand	Clearly defined roles
		Training
		Enable all of IT to support the Core "5"
		Workstudies need name tags as part of the IT support team
		Have team members document personal growth area skills
		Need to provide the right hardware and technology
5	Manage "Change Management" and Communications	Manage Change Management Requests
		Stakeholder Communication Plans
		Academic Changes

		IT Broad User Updates
6	Planning and Project Execution is vital to managing deliverables.	Project Plans for Major Projects
		Academic Plans
		Weekly Stand-up Meetings (Internal teams)
		Academic Planning and Stand-ups
		Training
7	Security Control measures is a function for all IT activities.	Patch Management
		Continuous Scanning
		Desktop
		Layer security measures (UTM, App Firewall, VLAN, Virus, etc.)
		Assessments (Pen Testing, Reviews, etc.)
8	Capacity Planning, High Availability Management and Risk Management or core activities within IT that must be executed well.	Production Planning
		Quarterly Risk Management Plans
		IT Governance (Randy to Board Audit Committee)
		External Audits
9	Customer Support and Services is a key component of our IT service delivery model.	Customer Service Training
		Conflict Management
		Email ticket ownership change or closure
		Process satisfaction
		Managing Expectations
		Understanding the dynamics of working with users within a college environment
10	Quality Control	Assess what quality control is needed for the task at hand.
		Strive DIRTFT
		Desktop support Checklist
		Networking and Data Center Hardware Checklist
		Software Testing

2018 – 2022 High Level Objectives

The strategic plan covers seven broad categories from 2018 to 2022 that include the following:

1. IT Risk Management & Security
2. Cloud Computing, Data Center and Computing Resources
3. IT Helpdesk & Instructional Support
4. Network Infrastructure and Telephony
5. Capital Outlay Construction Management
6. Enterprise Applications
7. Digital Transformation

IT Risk Management & Security

Continue to manage compliance and reduce risk across the organization to safeguard IT assets and information.

1. Continue to manage business continuity plan using our existing CommVault investment.
2. Extend backup services to the cloud and secondary onsite for a three-tier recovery model.
3. Move backup storage from tapes to hard drives that speeds backup and recovery processes.
4. Continue to build upon the existing high availability service model using Hyper-V for virtual computing services by adding a new node to the cluster and by replicating critical infrastructure.
5. Continue to add cluster capacity for the VMware environment.
6. Continue to strengthen the use of IT's new vulnerability internal security scanner and security management skills and capacity.
7. Strengthen pen test and other security assessment requirements by extending scope of testing to be on prem for internal VLAN testing and DMZ testing.
8. Formalize an IT Governance model that provides oversight for IT risk management.
9. Establish new security stress testing model that includes internal hacking and aggressive scans with support from the IT Governance committee.
10. Maintain the IT risk management plan to safeguard IT assets and to reduce exposures.
11. Continue to promote security awareness by leveraging the KnowB4 training service. Educating our internal stakeholders is a key component of have an effective information security program.
12. Extend security awareness by phishing testing users and providing an educational context for safeguarding our network from the most common attacks.
13. Strengthen the security program to include a team approach for managing threats by leveraging layers of security tools that include: deep packet inspection using our unified threat management firewall, event correlation, syslog management, vulnerability management and configuration management.
14. Strengthen the controls for sys-logging for Network devices and Servers that support critical applications and information. Implement an event correlation solution to better manage security incidents.
15. Maintain and validate LMC's disaster recovery plan for critical systems (ERP, SIS, credentialing services and Email)
16. Extend two factor authentications for external network access for critical systems (Banner, Reporting

systems, SharePoint).

17. Explore options for encrypting selected PII data attributes stored at rest.
18. Encrypt remote user devices to safeguard data stored on mobile devices.
19. Implement a Mobile Device management solution for safeguarding informational assets for selected laptops and mobile devices.
20. Continue to integrate an Application firewall that monitors web application and helps integrate further authentication methods such as two factor.

Cloud Computing, Data Center and Computing Resources

LMC IT desires to continue to develop an “IT as a Service model” using private and public clouds strategies to lower operating cost and improve agility. IT as a Service” includes the dynamic provisioning of computing services within a managed framework for the following class of services:

- **Infrastructure as a Service (IaaS)** - Delivery of raw, virtualized computing infrastructure such as servers and storage as a service to build applications. (Windows Server / Linux Server / Virtual Desktop)
- **Platform as a Service (PaaS)** -Delivery of a virtualized application runtime platform that has a software stack for developing applications or application services. PaaS applications and infrastructure are run and managed by the services vendor.(IIS / HTTP / SQL)
- **Software as a Service SaaS** - Cloud based delivery of complete software applications that runs on infrastructure the SaaS vendor manages. SaaS applications are accessed over the Internet and typically charged on a subscription basis. (Email / CRM / SharePoint)
- **Microservices** is an approach to application development in which a large application is built as a suite of modular services. Each module supports a specific business goal and uses a simple, well-defined interface to communicate with other sets of services.
 - Docker allows services to be containerized making them small and portable allowing multiple services to be run on a server while maintaining isolation and security.

IT will continue to evaluate options for migrating to the cloud over the next five years within the following categories:

Evaluation Timeframe for Cloud Migration

Time-Line	Solution - Services	Cost Impact
2018-2022	Move applications to Docker where practical to reduce compute requirements on clusters and increase flexibility.	Cost neutral
2019-2020	Exchange (SaaS)	Cost neutral
2020	SharePoint (SaaS)	Cost neutral
2020-2022	Banner (SaaS)	Increase

2021-2022	Windows Cluster (IaaS)	Operational cost increase will offset route capital.
2021	SQL (PaaS)	Operational cost increase will offset route capital.
2022	Other Solutions CRM, etc. (PaaS)	Operational cost increase will offset route capital.

1. Continue to build upon our Dynamic provisioning of Servers using Microsoft Hyper-V and VMWare.
2. Leverage our new dynamic provisioning of storage using EMC 10G storage solution. Provide SSD storage options for critical systems.
3. Continue to leverage our new 10G High speed backbone for storage and virtualization.
4. Continue the adoption of provision tools such as “Strider” to automate web application deployments.
5. Develop a pilot program for testing one solution in the cloud for building cloud support skills and validating cloud production use of the F5 Application firewall.
6. Reduce physical data center footprint as we continue to adopt blades and migrate services to the cloud. Focus on reducing operational and support cost where possible.

IT Helpdesk / Academic Team

1. Maintain the 5 Year PC refresh plan – Refresh systems as needed to ensure that there is adequate hardware to support the infrastructure as it ages. IT has selected Dell as our manufacturer of choice based on pricing, support, reliability and platform stability. Target to lower the desktop acquisition cost and manage lab footprint. Currently, IT manages over 2,000 devices where 1,500 devices are Academic Labs.
2. Select and Implement desktop virtualization solution for select staff PCs in open space to manage security risk
3. Continue the Windows 10 Migration Plan and complete migration by July 2019. Review options for the Post PC Era.
4. Establish Quality Gates for key processes within IT to deliver effective services and to provide accurate information.
5. Assist the Academic team in building an instructional support models for lecture capture and virtual learning services.
6. Continue to grow the IT customer service model providing 24/7 support and identify service capacity gaps.
7. Strengthen the QA process for managing academic software applications including software subscriptions.
8. Prepare for the next generation of Academic applications that are cloud based and delivered through the browser. Ensure that our service models are tuned to support remote users and provide sufficient bandwidth management tools for prioritizing Academic content over the network.

9. Continue to monitor and optimized our print and copying services.
10. Extend the Helpdesk ticket submission process to end-users and improve feedback and follow-up processes.
11. Replace legacy Canon MFP fleet in 2020 to next generation devices. Reduce footprint if possible and operational cost.
12. Expand the use of digital signage solution across the campus that supports effective communication with students and staff.

Networking & Telephony

1. Replace Core Switch to next generation Cisco solution to provide robust connectivity to closet switches.
2. Replace top of rack switches in data center to support 10 GIG connectivity and software defined networking that provide enhance security and management controls.
3. Replace closet switches with Cisco next generation switches that supports mGIG (5 - 10 gigs) for distribution. This will support future WIFI density and throughput in the classroom.
4. Replace legacy firewall with next generation unified threat management solution. Ensure that edge services provide high availability of services and network aggregation, bandwidth management (Student non-academic use), web filtering, deep packet inspection and virus/malware protection.
5. Continue to expand WIFI density within the classroom to support BYOD and new Academic applications.
6. Expand Network drops within the classroom to support new technologies and address growth needs.
7. Continue to expand outdoor WIFI for all LMC campus to support BYODs and other WIFI applications.
8. Continue to expand security cameras across the campuses where needed to support campus safety. Evaluate options for extend cameras in the parking lot and entryways to enhance security controls.
9. Reduce telecommunication cost where possible while expanding capacity and redundancy where needed. Today LMC maintains internet and phone provider diversity that supports high availability of vital services.
10. Implement Meaningful Network services metrics - IT is continuing to develop the means for reporting on a monthly basis critical and meaningful metrics which will best represent the level of success and quality of our product of our changes and implementations. The main goal is to provide a means to easily spot trends which might over time affect service levels. This will help capacity planning and resource development. The key to this is not quantity of information, but appropriately selecting the few metrics that best represent our service level.
11. Continue to Increase gigabit backbone bandwidth and Increased local area network reliability.
12. Provide video Kiosk services and enhance video conferencing support for conference rooms and user collaboration.
13. Provide ample bandwidth and bandwidth management tools for supporting virtual learning environments in and outside the classroom.
14. Replace and upgrade end of life phones and convert legacy analog device to IP based phones.
15. Replace legacy cat3 wiring in the conference and events center.
16. Provide conduit access on the Napier campus that provides telco vendor access to the IT DMARC. This could reduce build-out cost for bringing in new internet and telco providers.
17. Centralize network and data center operations to two areas if possible.
18. Implement **Network Access Control (NAC)** and port authentication. NAC is an approach to computer

security that attempts to unify endpoint security technology (such as antivirus, host intrusion prevention, and vulnerability assessment), user or system authentication and **network** security enforcement.

19. Address port density concerns by adding ports for drops not currently patched to a network switch.

Capital Outlay Construction Management

1. When possible during construction future proof classrooms by adding additional network drops in the classrooms and in common areas to support expanding technology and student needs. Address wiring deficiencies across the Napier campus.
2. Orchestrate and manage staff and classroom moves as needed. Develop a robust relocation process for supporting planned moves and access to technology.
3. Extend video conferencing services to the Western Building that support virtual meetings and collaboration.
4. Provision Networking and Telephony services in Western Building.
5. Manage E-911 as phones are relocated across three buildings.
6. Expand security cameras and Alerting System (IP clocks) to the Western Building.
7. Address WIFI density concerns by providing an access point for each classroom.

Enterprise Applications

1. Continue the rollout of single-sign-on for student and staff for all web applications.
2. Continue to build upon the staff remote gateway for secure access for all web applications. Include two-factor authentication for Banner and other systems that contain bulk data.
3. Migrate Banner systems to the next generation Banner system. Implement single-sign-on, Ellucian Identity solution, Ellucian solutions manager, Ellucian communications manager and Ethos data service.
4. Upgrade the Banner supporting technology stack that include: hardware, operating system (Redhat 7) and database (Oracle 12) to next versions. This includes moving the Oracle database to solid state storage for faster IOPS.
5. Virtualize all Banner instances and move to micro services (Docker) for manageability and performance management. Banner will be installed using an n-tier horizontal scaled model load balanced through the F5.
6. Refactor Banner security and roles to provide a least privilege access model and address segregation of duties.
7. Provide customization of Banner web application for document imaging Webhooks. This will enable a user to view documents from the document management solutions from within Banner form views.
8. Provide a modern student portal that supports SSO, mobile access and robust navigation across multiple systems. This will include integration with Degreeworks, Microsoft Office 365, a Digital Guided Pathway solution and Banner self-service pages.
9. Modernize the Student password reset process to include two-factor security and text based password resets.

10. Support the integration of the Employee onboarding solution with Banner.
11. Continue the migration of document scanning to other areas within the college.
12. Document business rules and key business processes to retain knowledge of core business processes and to improve operational efficiencies.
13. Strengthen Banner support by exploring options for securing and expanding functional Banner resources for Human Resources, Student, Finance, Payroll and Accounts Receivable.
14. Implement the Ellucian mobile solution after completing the Banner 9 upgrade.
15. Complete the phase one of the Banner Gap analysis in 2018 to identify missing functionality.
16. Upgrade Degreeworks and implement the planning module as lead by Student Services.
17. Review and migrate all legacy in house Banner bolt-ons to use Ethos where possible and reduce support footprint.
18. Consider the procurement of a new operational reporting tools (Argos) to meet reporting needs across the college.
19. Upgrade the Atomic job process management tool to support the latest version of Oracle.
20. Provide a robust Intranet by leveraging SharePoint
 - a. **Provide a Modern Experience:** Provide a robust Intranet site for content sharing and consumption on any modern web device.
 - b. **Build a Centralized Digital Repository:** Provide staff and partners a single portal for accessing high value content. Establish a taxonomy for consuming and building content that supports effective knowledge management and compliance reporting.
 - c. **Leverage Enterprise Search Services** - Provide search services that enables relevant content to be readily located across the college.
 - d. **Expand Document Collaboration Services** - Provide cloud based document collaboration services that enables users to collaborate from the Cloud with Microsoft Word, Excel & PowerPoint.
 - e. **Support Cloud based content** - Provide access to web-based content outside the college network that enables collaboration with external partners.
 - f. **Provide new Microsoft's Cloud based Application** - Users can leverage new web-based applications for various use cases that include project planning, video storage, digital storytelling and digital hubs.

Digital Transformation

Digital transformation is the change associated with how digital technology is adopted in all aspects of engaging students, staff and faculty within learning environments, business processes, network, telephony and collaboration services, digital sensors, virtual environments, digital feedback systems (dashboards, signage, messaging), compute and general digital consumption. Digital transformation in many cases induced by stakeholders and customers as technology adoption is accelerated and driven by consumerization. IT must increase its ability to adopt and responded to these shifts while maintaining security and controls around informational assets and provide sufficient levels of technical support. Services will continue to grow from internal hosted to cloud based which will require new funding models, integration models and support models.

1. Continue to support the transition to the Post-PC era

IT will need to develop a device agnostic support model over the next five years as more applications become browser based, the Internet of things (IoT) becomes more mainstream and users adopt new form factors. This transition will include planning and support for funding, security (endpoint protection and data loss prevention), software licensing, cloud based enterprise applications, user support and training.

2. Continue to streamline business processes through electronic workflows.

IT will need to support stakeholders at different levels for automating and streamlining business processes through electronic workflows. This will lower operational cost by reducing the need for paper, reduce time to complete a process by streamlining business processes through notifications and automation and by providing access to workflow transactions that includes digital attachments. IT will need to support workflows at the following levels

- Existing Applications - Vendors will continue to integrate workflow models within their application stack. These solutions provide native integration within the application tier of a solution.
- General Workflows and Form Services - This includes workflows that works across multiple systems and integrate with existing systems.
- Job Process Automation - Job process management includes support for managing long running jobs

3. Business Activity Monitoring & Analytics

Provide operational metrics for measuring digital processes and activities. This includes reporting tools, dashboards and analytics tools that provides visibility and transparency into business processes and digital interactions.

4. Mobile Enablement

This involves ensuring that vital applications are available on mobile and small form factors through mobile apps or progressive web applications. Within these applications, users are enabled to

complete tasks on any device from anywhere. This will be a transition where vendors will need to upgrade their solutions and IT will need to provide security for remote access.

5. Provide Effective Collaboration Tools

This involves the adoption of collaboration tools at all levels of the organization and includes messaging, video chat, virtual learning tools, screen capture, VoIP, screen sharing, video kiosks, virtual learning tools and virtual meetings. IT must provide the following to support the growth of collaboration tools and services:

- Sufficient network bandwidth
- Network troubleshooting diagnostic tools
- Traffic prioritization through quality of service
- Remote user support - IT must provide remote login services to troubleshoot end user devices.
- Usage metrics - Provide insight to utilization and manage capacity.
- Support and Maintain a portfolio of collaborative solutions based upon the needs of the business.
- User provisioning tools that assist with password resets and provisioning new users.