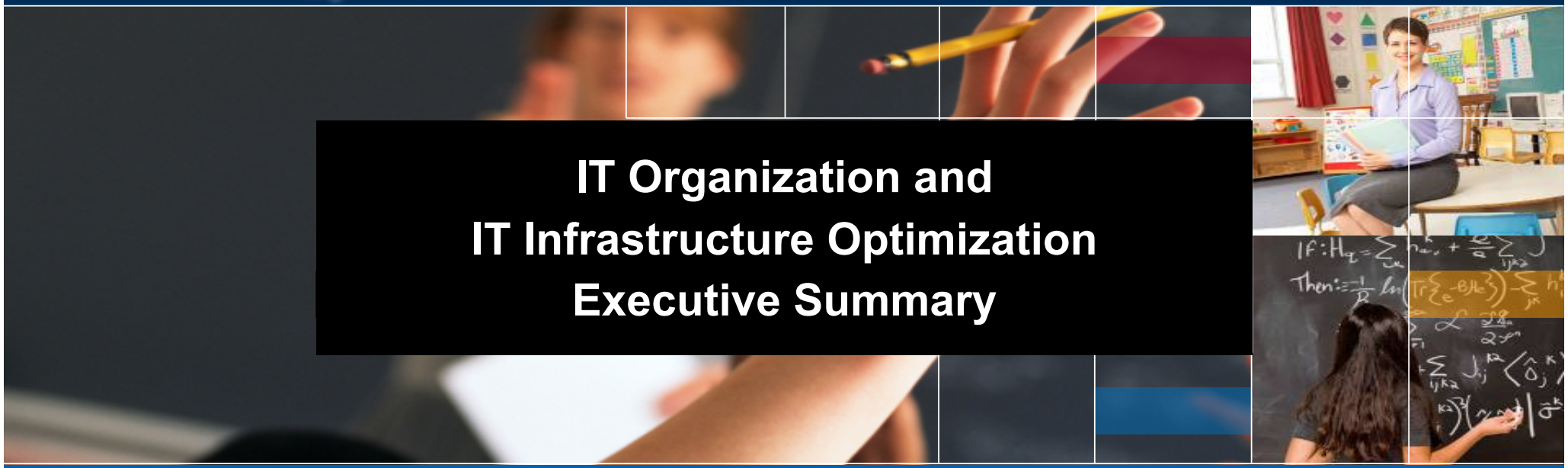
School District 8 Kootenay Lake

IBM K-12



IT Organization and IT Infrastructure Optimization Executive Summary

IBM K-12 Education Consulting

January 23, 2018

Objectives

1. IT Optimization Review - analysis of the current IT systems, networks, organization and related policies in the district as compared to leading practices in other school districts in Canada.

2. IT Department Organizational Review - analysis of the IT Department's organization structure, roles, processes and workflows.

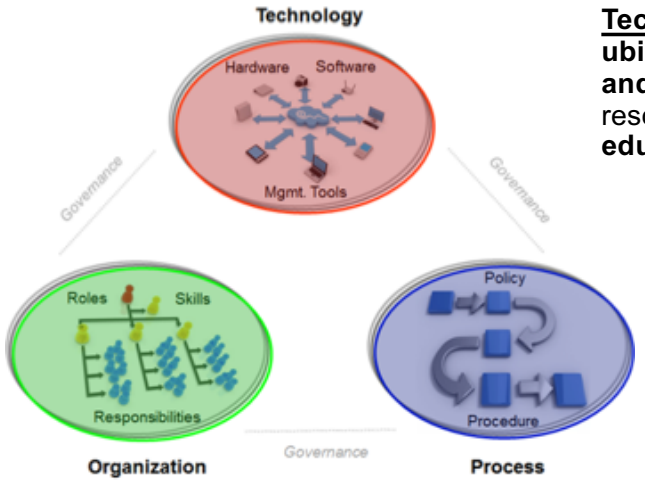
Celebrating Success in SD 8

- ✓ The implementation of the Next Generation Network (NGN) has been very successful and eliminated many challenges
- ✓ Implementing remote support for district hardware
- ✓ A solid backup solution is in place
- ✓ In the process of implementing the print management solution PaperCut
- ✓ Centralized purchasing of technology
- ✓ Implementing Google Apps For Education
- ✓ User access to mobile devices
- ✓ Hot line for technical support
- ✓ An evergreening plan for hardware

Key IT Organizational Recommendations

Information Technology Organizational Structure and Governance

A complete IT governance strategy addresses three critical components:



Technology: Providing **barrier-free**, **ubiquitous**, role-based access to internal **and external** electronic resources/systems, and **supporting educational priorities/needs.**

Organization: Ensuring that the **right skills, roles and responsibilities** are well positioned **to deliver support services (IT and Curriculum)** using **leading practice processes**.

Process: Provide and standardize the **policies** and **procedures** that align with technology and organizational structure to deliver a **dynamic and flexible environment.**

Keys to Mitigating IT Challenges

There are three key areas, through which best practices should be applied, in order to address these challenges and drive IT Department efficiencies.

1) Strategic Planning

2) Mapping Organizational Structure and Governance to the Strategic Plan

3) Metrics for Continual Service Improvement

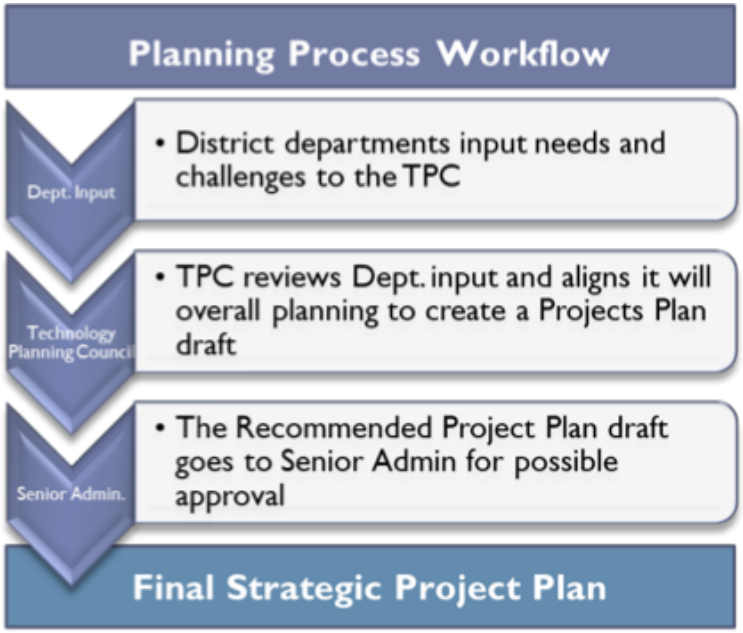
Strategic Planning

Process

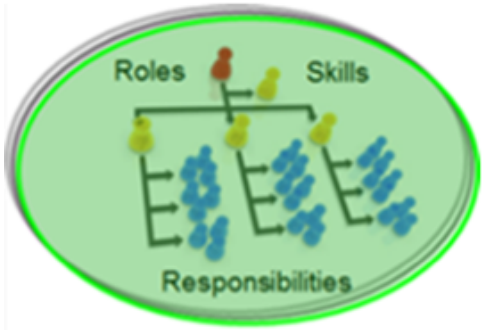
Top IT Organizational Recommendations

1. **Strategic Planning**
   - Form a Technology Planning Council (TPC).
     - Superintendent of Schools
     - Secretary Treasurer
     - Director of Operations
     - Director of Innovative Learning
     - Director of Independent Learning
     - Director of Information Technology
     - 1 Principal
     - 1Teacher

2. **Technology Planning Council Process**
   - Result is a well defined, strategic plan for the upcoming year, as well as plans for future years.
   - Assigned appropriate budgets, realistic timelines, human resources, professional development support, and measures of success



Organizational Structure



Top IT Organizational Recommendations

3. **Appoint a Director of Information Technology**
   - Report to the Superintendent
   - High level background and experiences::
     - A strong background in K-12 education experience and knowledge.
     - Proven experience in leadership.
     - Strong communication and collaboration skills.
     - Business acumen.
     - Change management experience.
     - A depth of understanding of the complexity of technologies required to support a leading school district.
   - More specifically, the role of the Director of IT should include:
     - A position at Senior Administration meetings, and on the Technology Planning Council
     - Developing department goals and objectives that support the goals and priorities of the district.
     - Development and management of the IT Dept. annual budget.
     - Leadership in communication, maintaining technology standards, and support for the district's education and business functions.
     - Provide Project Management for IT related projects
     - Facilitate the training needs of technical staff to maintain a department of skilled employees.
     - Ensuring good vendor and community relationships.

Top IT Organizational Recommendations

4. **Role of Technology Coordinator**
   - Reporting to the Director of Information Technology.
   - Provide leadership in supporting IT infrastructure.
   - Managing the day to day operations of the IT Dept. staff in support of the education and business needs.
   - Provide support for Project Management of IT related projects.
   - Oversee Help Desk requests and reporting.
   - Manage technology evergreening.
   - Supporting training needs of technical staff.
   - Security Officer duties which typically include
     - Maintaining the district's stability and reputation by complying with legal requirements.
       - E.g. Completing Privacy Impact Assessments for cloud based solutions.
     - Monitoring the implementation and application of data protection policies.
     - Assigning responsibilities to employees.
     - Ensuring the training of staff involved in the processing district data.
     - Act as the contact point for senior administration.

Top IT Organizational Recommendations

5. Additional 0.5 FTE MyEdBC Support

- Deep understanding of MyEdBC
- Thorough knowledge of the daily operation and needs of schools

6. No changes in the number of IT Technicians are recommended

Description	District 1	District 2	District 3	District 4	District 5	District 6	District 7	District 8	AVG.	SD8
# of PC Computers	3,000	3,600	4,000	6,000	10,000	10,800	16,000	35,000	11,050	1612
Technicians:										
Field	8	4	5	7	10	17	9	60	15	4.5
Help Desk	1	0	0	1	0	1	0	2	1	0.5
Network	0.5	2	1	1	2	5	2	3	2	0.5
Data Centre	0.5	1	3	1	2	4	2	6	2	0.5
Special Ed	1	2	3	2	3	4	7	5	3	0
Total:	**11**	**9**	**12**	**12**	**17**	**31**	**20**	**76**	**23**	**6**
Computers per Field Tech	375	900	800	857	1,000	635	1,778	583	866	358
Enabling Technologies:										
Strategic Plan	✓	✓		✓	✓	✓	✓		✓	
Middleware		✓			✓	✓	✓		✓	
Mgmt. tool										
Remote Imaging		✓			✓		✓			
Single Image		✓			✓		✓	200+		

Governance

Top IT Organizational Recommendations

7. **Communication**
   - Formal Communication Plan
   - Staff Portal Updates
   - Collaborative Installation Process
   - IT Leadership Meetings
   - IT Dept. Meetings
     - Scheduled and proper format
   - Celebrate Successes

8. **Workflow Management**
   - Projects broken down into yearly sections with monthly time frames.
   - Present yearly plan, outlined month by month, to district office staff, school principals, and the IT team.
   - Monthly meetings IT staff to go over the plan for the upcoming month
   - Communication

Top IT Organizational Recommendations

9. Service Level Agreement

- How support tickets will be prioritized, based on priority/severity levels, aligned with resolution times
- Channels of communication and escalation processes.
- What hardware and software will and will not be supported
- How successful implementation of the SLA will be measured and reported

10. Help Desk

- Purchase and fully implement a robust help desk solution
- Staff creating their own help desk tickets and submit it themselves.
- Automate the assigning of tickets to IT staff. This will also speed up the process.
- Phoning the help desk for emergency requests only.
- Staff should not verbally request support when a technician is on site without creating a formal request through the help desk program.

Top IT Organizational Recommendations

11. Project Management Processes

- Project Initiating, Planning, Execution, Monitoring, Closure

12. IT Staff Training

- Annual Training Plan Based on Upcoming Projects

Metrics for Continual Service Improvement

Top IT Organizational Recommendations

13. Managing Improvement

- Define what is to be measured.
- Gather the data.
- Process and analyze the data.
- Act on the data.

Key IT Infrastructure Recommendations

Top IT Infrastructure Optimization Recommendations

1. ID Management

- Self-service Tools
  - Self-service tools should be made available to users to complete routine tasks, such as resetting or recovering passwords. The involvement of IT in these tasks is not a good use of their time.
- ID Automation & Scripting Sustainability
  - The creation of IDs should be automated, so that changes in the HR or SIS are automatically reflected in Active Directory, without IT having to run these scripts and manually complete provisioning.
  - User management scripts are currently owned, maintained and run by Larry Prosser. Given his pending retirement, and business continuity concerns, it is imperative that other members of the team fully understand these and are capable of continuing his work. Moving to industry standard scripts supported by an external vendor can alleviate these business continuity concerns.
- G Suite Management
  - Google's G Suite environment is not actively managed by IT. They do not enforce policies (such as archiving or other security features) or review use of the system.
  - Additionally, all user accounts are manually managed by IT and not automatically kept in sync with Active Directory. At some schools teachers are even managing their own student accounts, and at least one school has their own G Suite tenant. All user management should be consolidated under IT, synced automatically from Active Directory, and exist under a single, official district G Suite tenant.

Top IT Infrastructure Optimization Recommendations

2. Security

- Fine-grained Password Policies
  - The current password policy is simple in complexity requirements, and is applied equally to all users in the district. A fine-grained password policy should be used, with increasing complexity for older students and teachers.
  - With cloud adoption and SSO, these passwords will be the same for all services, making security more of a concern.
- Laptop Encryption
  - All teacher and staff laptops should be encrypted. This technology protects data in the event of a lost or stolen laptop. While not yet a clear Ministry requirement, most districts are moving to full disk encryption.
- Secure Print Release
  - Through the district's license of Papercut, secure printing (print and release) can be implemented. This ensures that confidential documents are not printed and then potentially viewed by others while sitting in the tray. This software would require that users authenticate prior to printing their work.
- Domain Admin Accounts
  - All technicians should have their own .admin accounts. This increases security primarily by adding an audit trail. The concept of least privilege is key, with only those who absolutely require domain admin rights being given them.
- Security Assessment
  - The district should utilize an external vendor to assess its overall security posture. This includes both the organizational processes and culture, as well as the security of IT systems and other technology.

Top IT Infrastructure Optimization Recommendations

3. IT Systems

- Microsoft SCCM
  - Microsoft SCCM is the standard in districts for the management of workstations. This includes the creation and deployment of images, as well as patching and monitoring tasks. The current methods used by SD8 do not scale and are far more labour intensive than the systematic and automated processes possible with SCCM.
- Helpdesk Software
  - As detailed in the technical report, Webworks is not an adequate system for IT use. It is significantly lacking in workflow, data tracking and reporting. It further compounds the issues IT faces, and impacts technical service.
- Unified Communication
  - With the implementation of the NGN network, services such as VoIP are easily within reach of districts. Moving to a fully integrated Unified Communication system will save the district money on traditional telephony, and greatly improve collaboration and conferencing options. These are critical in a geographically disparate district.
- System Monitoring
  - While Meraki is used for remote support and monitoring of workstation status, IT does not have automated insights into much of the district infrastructure. Servers are checked on a weekly basis for patches, backup status is manually checked, and there are no alerts if something malfunctions. There is no insight into patch and anti-virus status.

Top IT Infrastructure Optimization Recommendations

3. IT Systems

- L4U Centralization
  - The L4U library catalogs are currently unique to each school. They are also hosted on a separate VM at every school. It is recommended that catalogs be consolidated to simplify workflows for library use, and a single instance of L4U be used for hosting, either in the Data Centre, or preferably in the cloud.
- Cloud Assessment
  - As the district has almost no adoption of cloud technology beyond G Suite, it is recommended that an assessment be undertaken to understand where the district stands with respect to cloud readiness. With that perspective, appropriate technologies in the cloud can be recommended, and the on-prem technology footprint likely reduced.

Top IT Infrastructure Optimization Recommendations

4. Datacenter

- Nelson School Centralization
  - The seven schools in the Nelson area are connected by private 10Gbit fiber. This extremely fast network could be leveraged by hosting all school services in the central Data Centre, removing the expense and overhead of having separate servers and duplication of resources at each school.
- City Hall Data Centre
  - The hardware that is currently hosted at DESK should be moved to City Hall. This is a much better building, more suited to hosting server hardware than DESK. Additionally, the tower-based servers at DESK should be eliminated and replaced by rack hardware for better use of space.
  - In time, the district should consider moving to the new Data Centre area at City Hall. This is an even more appropriate hosting facility and should be the long-term permanent home for district on-prem hosted infrastructure.
- Backup/Disaster Recovery (DR) Revamp
  - The current backup system appears to be working well, however procedures are not documented, and data is not encrypted when stored on the target server. Similar considerations apply to DR, where procedures are not documented, and the recovery process is not fully tested on a regular basis.
  - Additionally, if the DESK Data Centre were no longer available, the equipment in Creston would require significant upgrades to host all district services. For these and other reasons, IBM recommends cloud-based DR.

Top IT Infrastructure Optimization Recommendations

5. Active Directory

- Cleanup Group Policy Objects (GPO)
  - SD8 has a total of 280 GPOs, which is a staggering number for any district. So many policies can reduce workstation performance, vastly complicate troubleshooting and contribute to other technical issues. Policies should be consolidated where possible, and a flatter layered hierarchy used.
- Collapse & Upgrade Domain Controllers
  - With NGN, there is less need to have domain controllers at every school. They complicate the technical environment, and use resources which could be centralized with a smaller footprint in the Data Centre. Additionally, the older domain controllers are limiting future adoption of other Microsoft products, and should be upgraded to a common OS.
- Azure AD Connect
  - In order to enable Office 365 and other cloud services, Azure AD Connect is required to sync the district's Active Directory domain to the cloud. This will then also enable single-sign-on (SSO) to other cloud applications such as G Suite. Leveraging SSO and AD credentials for cloud services is far preferable over having separate accounts.

Top IT Infrastructure Optimization Recommendations

6. Collaboration Tools

- Office 365
  - Most districts in BC have moved to Office 365. This frees up their infrastructure from having to host Exchange email, as well as reducing the IT overhead of supporting these services. Many other technologies and collaboration features are available in O365, adding to the positive ROI of moving to the cloud.
  - With the move to O365, archiving features for Exchange should be implemented. The benefit with O365 is that onprem storage is not used. It is a Ministry requirement to retain staff emails, which O365 tools easily accomplish.

- Portal Solution
  - There is currently no clearly defined portal solution in the district. Collaboration is enabled via G Suite, but mostly in classroom settings. While some users make use of Exchange public folders, it is not an ideal and all encompassing collaboration solution. Synamon's tool for file sharing is also available, yet many users have not heard of it, or have not had favourable experiences.
  - It is recommended that the district move towards an industry-standard portal solution, and specifically one that is purpose-built for K-12 and focuses on collaboration features.

Top IT Infrastructure Optimization Recommendations

7. Network

- Switch Upgrades & Consolidation
  - There are numerous vendors, and many different switch models in use in the district. Many are quite old, no longer in warranty with drastically limited performance and features compared to newer models. These slower switches often connect access points, and demonstrably limit the performance of the wifi network. They also lack configuration options which would help improve the robustness and stability of the network.
- Cabling
  - While much of the district uses Cat5e or even Cat6, there are still significant runs of Cat5 to be found. Acknowledging that this is a significant project, upgrading any Cat5 to Cat6 should be undertaken over time.
  - There is no colour scheme being used for network cables in the district. While this may seem like a minor point, it can greatly improve troubleshooting effectiveness and reduce errors if a consistent scheme is used across the district.
- Wireless
  - Some access points were found to be plugged into 10/100 switches, which creates a bottleneck for the wifi network. All access points should be connected to gigabit (Gbit) ports.
  - Heatmaps should be conducted for each school, and can be done using Meraki. Doing so will maximize the coverage and speed of wifi networks, while avoiding the cost of buying too many APs.
  - Bulk purchases of one model of AP (802.11ac) should be done, to reduce the cost of buying adhoc numbers.
- Public IPs
  - While few 142.x IPs still exist in the district, any remaining infrastructure using them should be transitioned to private IPs.

Top IT Infrastructure Optimization Recommendations

8. End-User Devices

- Printing Controls and Management
  - The district is currently licensed for Papercut software, but it has not been fully implemented across the district. In addition the secure print options, this software can provide for print quotas and reporting. This can reduce printing by changing behaviour, as well as enforcing a quota or charging for excessive printing.
- New Windows 10 Image
  - As part of an SCCM implementation, a new Windows 10 image would be required. It can be built much more efficiently and sustainably than the current method of building and managing images. These improvements come mainly through modularity and automation.
- Reducing Models & Warranty Structure Changes
  - There are currently 15-20 laptop models. Due to the rolling nature of the refresh cycle, it's not always possible to order the same model or spec a year later. As a result, IT is left supporting a multitude of models, each with their own set of drivers and other unique aspects.
  - IT purchases workstations with one year of warranty, then performs all repairs in house which aren't covered by warranty. While this does allow for a given budget to purchase more machines, it is not an effective use of IT's time. This is supported by helpdesk data showing roughly 25% of tickets being hardware related, which is very high for a district.
  - It is recommended that other purchase and warranty options be explored and evaluated for ROI. For instance, leasing terms with included warranty for 3-5 years can often be very favourable compared with the TCO of doing in-house repairs.


School District
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Kootenay Lake