# The Evolution of the CIO

# Technician to Executive Strategist

**The Baintree Group**

# Office of the Chief Information Officer
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# Introduction

The use of the Chief Information Officer (CIO) in the public Sector is relatively new. The term, CIO, begins to surface in literature sometime in the early 90s. Canada appointed the first CIO for the Canadian government 1991[1]. Prior to this period the public sector had Director Generals of Information Systems (MIS) and some organizations had Director Generals of Informatics as the top tier in managing the technology we now refer to as Information Technology (IT).

Information/Communications Technology use in government has grown in lock step with the internet and the democratization of information. The growth of stakeholder webs for government has permitted the citizenry to become owners' not just consumers of government services. This trend has seen governments move to more transparent levels of interaction with the constituents and has led the CIO to find more effective technological methods of providing the services required. The citizenry has an unprecedented visibility into the behavior, performance and management of government than ever before and thus drives the CIO position as an executive of the Crown to provide for cross functional services and single points of contact.

This runs contrary to the current organization of most governments where services are organized as vertically integrated silos each with a mandate and in many cases legislation to support autonomy. The CIOs' challenge in government is to find a method of integrating services and offing them horizontally to citizens while respecting the legislative parameters and fiscal limitations through the use of technology.

The common look and feel offered by the Province of British Columbia Web sites provides the first high level step in this direction. However actual use of many of the sites demonstrates that how information is requested, the level of navigation required in activating services, the large differentiation in transaction cost to the citizen, and the final transaction closure requirements differ widely from ministry to ministry.

The responsibility to deliver on the promise of technology while not tearing apart the machinery of government is a challenge that will test the best of executives and require a team of first class resources working in a collaborative environment of change.

**Governance**
In some respects the CIO in a public sector organization has a more complex role than a private sector CIO because as public servants they are bound by the interest of the Canadian populace as represented by the elected officials. This difference forces the public sector CIO to be much more sensitive to issues of "privacy and security of information" and the technologies that support this enhanced environment.

A review of the governance model for the United States and Canada shows somewhat different approaches the two countries use at the federal level. The United States has focused efforts since 1996 to pass legislation dealing with information and communication technologies[2]. Recently the legislation has been modified to include the CIO role in the governing of Information/Communications

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[1] Treasury Board Secretariat
[2] Information Technology Reform Act 1996

Technology (ICT) expenditures and direction[3]. Thus the CIO has a great deal of influence on departments and can leverage strategic cross functional projects more easily.

In Canada no such specific legislation exists or is currently planned. The Treasury Board has passed a set of guidelines and principles that govern ICT but there is no legal consequence to departments and agencies that do not follow the guidelines[4]. Moreover in Canada the CIO has no specific accountability for the delivery of services to the Canadian public thus the departments are reluctant to enter into cross functional or horizontal projects that are not funded from other than operating budgets. This model also seems to hold true for the Province of British Columbia.

In parts of Europe the model changes again. In the instance of some EC nations all ICT expenditures and initiatives fall within the equivalent of a Crown Corporation having the public as shareholders. Cross functional initiatives are more easily planned and executed and the results are directly measurable. Other nations have extensive partnerships between the public and private sectors to achieve the execution of cross functional ICT under the governance of a CIO.

The critical success factors of all of these approaches remains to difficult to document. There is no country in the world that has had sufficient experience with the new enabling technologies to be able to say "they got it right". Some approaches and structures have advantage over others[5]. All jurisdictions that were reviewed in this paper experience organizational tension between the service centers that are organized vertically and the program centers that carry horizontal accountability. This tension will continue to increase as citizens (customers) demand more and wish to deal with single points of contact. The solution may well be found in the balance between the governance framework, accountabilities and management style of the CIO. The United States Model of legislative imperative matched with a collaborative CIO and an effective CIO Council may have the highest likelihood of succeeding in delivering the services to the citizen while preventing over expenditure, redundancy and failed projects.

**The Role of the CIO**
The role of the CIO in most organizations in North America was established to monitor the horizon for new technologies, communicate the value of IT and to implement technology within the organization. In the 1980s the term CIO didn't exist. In fact, the term information technology didn't exist. The first commonly used term was data processing (DP), which developed into management information systems (MIS).[6]

The CIO position was born from governments realizing the strategic value of IT. Ever so slowly, CIOs have entered the Deputy Minister's radar, gaining influence, and prestige. With this improved visibility also comes higher risk and higher expectations for performance. No longer is this the group of techies in the basement that may deliver for the Deputy or may not. The CIO was to become the person the organization would turn to for on time, high quality, reliable and stable delivery of technology in support of the public agenda.

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[3] E-Government Act 2002
[4] Enhanced Management Framework Revised 2003
[5] Government Executive Series – E-Government Leadership: Engaging the Customer 2004
[6] Don Parkers Shoppers Drug Mart CIO

Governments in Canada have spent billions of dollars to be the most online public service in the world and to supply citizens with services that are more convenient to access, faster to respond, superbly secure and reliable. Yet we have not seen reduced infrastructure costs, a decrease in citizen disenchantment or decrease in service delivery cost. The CIO of the future must address these challenges.

The role of the chief information officer is dramatically different now from what it was 10 years ago or even two years ago. Chief information officers today are true executives, and as such they are being asked to display real business skills and strategic insights that can benefit the organization as a whole. There has been a shift in perception that has opened the door for all CIOs to expand their contribution to the needs of the citizenry.

The opportunities for CIOs to provide new kinds of value to the taxpayer, redefine the contribution that technology can make to the needs of the public, and assist in building the knowledge economy, are staggering. It will take courage, business acumen and leadership. The vision of a public sector CEO in the near future is a highly skilled leader who will bring government closer to the people it serves while at the same time controlling costs, securing privacy, and providing 100 per cent reliability. In the mid future the public sector CIO has the opportunity to forge a renewal of government services through the strategic use of technology.

**The Position of the CIO**
The CIO is a senior executive responsible for all aspects of their organizations' information management and information technology and enterprise systems. The CIO directs the use of IT to support the organizations' goals. With knowledge of both technology and business process and a cross-functional perspective, the CIO is usually the manager most capable of aligning the organization's technology deployment strategy with its business strategy[7].

In government, as in industry, CIOs oversee technology purchases, implementation and various related services provided by the information systems department. However, at many leading-edge organizations, the CIO delegates many of the tactical and operational issues to "trusted lieutenants" in order to focus on more strategic concerns[8]. These lieutenants are commonly referred to as Chief Technology Officer or the Director/Director General of Information Technology in addition many have added a Chief Security Officer and an Intellectual Property Officer.

The "information" part of the CIO's job is increasingly important in government. The effective and strategic use of common enterprise-wide information requires someone with a cross-functional perspective. CIOs have taken a leadership role in reengineering their organizations' business processes and the underpinning IT infrastructures to achieve more productive, efficient and valuable use of information within the enterprise. Many also take a leadership role in knowledge management and the valuation of intellectual capital[9].

CIOs usually report to a Deputy Minister. In some public sector organizations they report to a President, CEO, COO, CFO and they often have a seat on the executive steering committee (or at

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[7] John Leggate CIO for British Petroleum
[8] CIO Focus Study 2003/4
[9] CIO Focus Study 2002/3

least have frequent and close access to top officers). The specific title CIO is generally a clear indication of an IT executive's senior rank and strategic influence.

**The Mandate[10] of the CIO of British Columbia**
The Chief Information Officer provides leadership and strategic direction to government's information management and information technology (IM/IT) resources. It establishes and manages the IM/IT governance framework. In addition, the CIO leads the transformation to electronic government service delivery and develops strategies to position British Columbia citizens and businesses to participate in the global economy.

The governance framework for IM/IT includes establishing strategic directions for IM/IT and electronic government service delivery as well as developing related corporate policies, standards and architectures. More specifically, the Chief Information Office has responsibility for:

- IM/IT governance
- leadership, direction and strategic planning for corporate IM/IT
- IM/IT legislation, policies and standards
- enterprise business, IM and IT architectures
- leadership with respect to e-government initiatives and delivering government services electronically
- IM/IT investment control including procurement decisions
- determination of IT service delivery levels
- strategies to bridge the digital divide and enable British Columbia citizens and businesses to participate in the global economy
- manage and promote strategic IM/IT initiatives

This description of the mandate of the Chief Information Officer is in alignment with all of the literature that has been reviewed for this report and is supported by the interviews and discussions held with CIOs.

# History of Change for the Office of the CIO

There are many enablers of technical change. The enablers have permitted the use of technology to develop data into usable information and then to knowledge (see History Timeline). Although it has been difficult to predict when the shifts would be enabled, the events of Y2K, the growth of the Internet, increases in processing power and memory size have all been part of an underlining shift in how the business value of technology is viewed.

The overview of the timelines demonstrates the enablers that have been influencing the evolution of the CIO role in public sector organizations. In order to assess the impact of these enablers we have focused our analysis on the six enablers that appear consistently in the literature and seem to have the largest influence.

- Business Requirements
- Technology Capability
- Networking Capability

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[10] From the CIO Web Site 2004

- Storage Capability

Knowledge Creation

- Security and Privacy of Information

There seems to be general consensus in the literature that these six trends have been instrumental in moving the CIO role from where it started to where it is today.

As the role changes so does the knowledge, skills and competencies that are necessary for the CIO to posses in order to secure a successful mandate. Starting essentially as a managing engineer and moving to a business executive with responsibilities for stakeholder value is a huge change in less than a 20 year period. It is no wonder that the turnover rate in these positions is so high[11].

Essentially each generation of CIO, regardless what they may have been called, has defined the job as it grew around them. Between the rapid pace of technological change and the demanding citizen expectations the public sector CIO has experienced perhaps the most complex set of difficult to quantify changes of any CIO.

## Evolution of the CIO

| | 1980s | 1990s | Today |
|---|---|---|---|
| CIO Role | Managing Engineer | Chief Technology Officer | Chief Information Officer |
| Business Processes | Technical Specialist Business Centric | Evolving | Business Generalist Customer Centric |
| Technology | Mainframe Centric | Desktop Centric | Network Centric Virtual Connections |
| Networking | Dedicated Connections One to Many | Evolving | Many to Many |
| Information Storage | Centralized Limited Access Linear | Evolving | Decentralized Anyone/Anywhere Anytime Relational |
| Knowledge | Disconnected | Evolving | Managed |
| Security | Physical | Evolving | Physical/Virtual |

As the information continuum becomes democratized and more constituents have access to more information the demands on the CIO will continue to increase exponentially. The expectations for the protection of the privacy of information and the security of information have already become paramount to the average citizen. The expectation that the intelligent transformation from information to value added knowledge and services will become more and more commoditized is already beginning to appear in the population. These rising expectations are the underlying cause of the need for strategic business thinking on the part of the CIO.

The same trends analyzed from the perspective of the CIOs role over time indicate some opportunities in the shift of the CIO role within public sector organizations. Specifically the CIO of the future will have the opportunity to be a business partner in the organization. Jaikumar's research on technological innovation concluded that: People, companies and national economies have fallen on their ability to understand and master "game-changing" technologies[12]. This observation should be a critical lesson learned respecting the CIO and IT units of the past.

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[11] The State of the CIO, The IT Executive Professional Agenda 2003/4
[12] Harvard Business Review professor Jai Jaikumar

| Role Differentiation | | |
|---|---|---|
| Managing Engineer | Chief Technology Officer | Chief Information Officer |
| High level of Technical Knowledge | High level of Technical Knowledge | Little to no Technical Knowledge Concept Knowledge |
| High level Subject Knowledge | High level Subject Knowledge | High Level of Information and Knowledge Management |
| Engineering Management Skills | People Management Skills | Leadership Skills Communications Skills |
| Driven by Automation Agenda | Driven by Standards and Controls | Driven by Shareholder Value and Business Process Management |
| Tracks IEEE Publications Reads Byte, Attends Computer Conferences | Tracks IEEE Publications, Reads Byte, Attends Management Conferences | Tracks Business Trends, reads CIO, Wired, BPMI, WSJ, Attends Policy and Management Conference |
| Budgets based on what was wanted and available | Budgets based on affordability and criticality | Budgets based on Return on Shareholder Value |

The CIO will need to transform the IT organization into one that is leading the supply chain of goods and services to the public. It is a role that could bring innovative ways of interacting and collaborating with the citizenry and it is a position that will become very influential in the policy making business of government.

The CIO of the future will not have the time or the inclination to be focusing large amounts of effort on the IT business. It will be the business of the enterprise that will consume his/her time. The current trend of having Chief Technology Officers (CTO) and Chief Security Officers (CSO) for the day to day operations will most likely continue. [13]

The CIO will need to focus on business process management and stakeholder value in the future.

Hewlett-Packard Company, in its' focus to deliver the resiliency and agility expectations for technology put together a good representation of how the major events of the last twenty years have moved the use of technology from an emphasis on reliability and stability to one of speed and return on technology investment.[14]
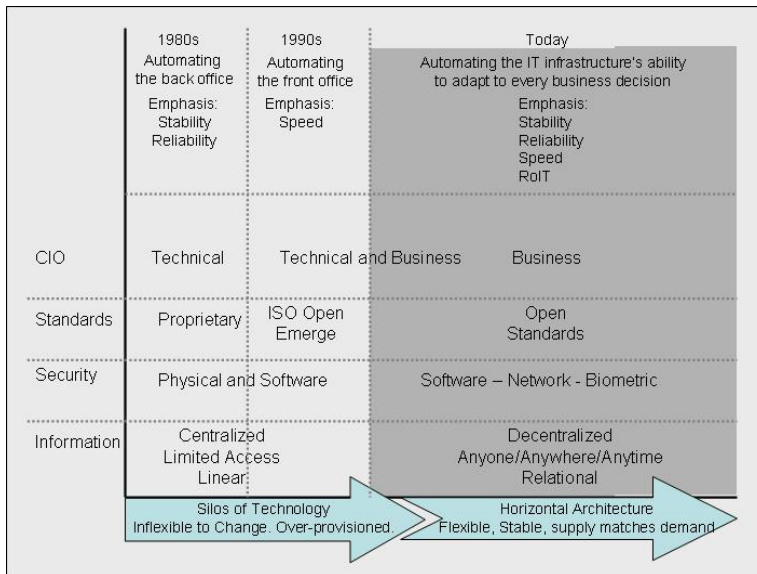
The HP paradigm track quite closely to the history time line (see History Timeline) and supports the notion that the business of the enterprise is the current and future driver of the need for a Chief Information Officer.
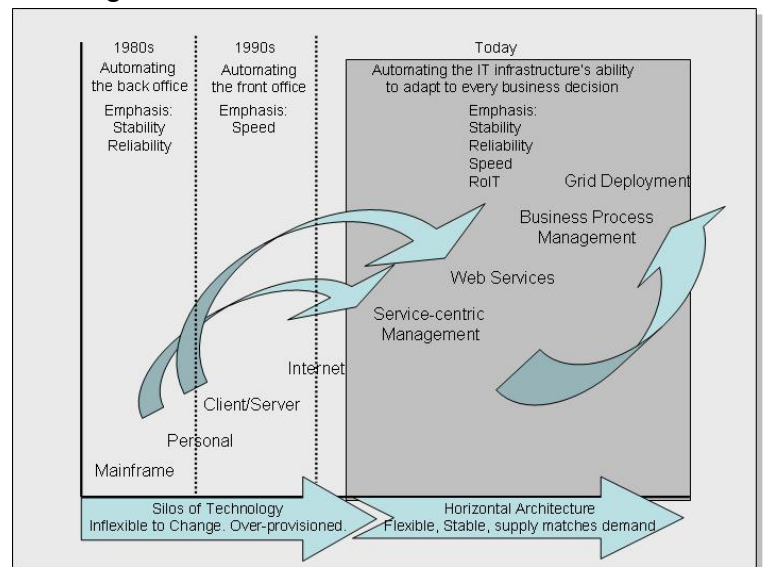


The HP analysis is supported by the literature from IBM, Accenture, Gartner and many other respected authorities (see Bibliography). If we take this model and superimpose the enablers now simplified and organized into Standards, Security, and Information we can see how the CIO must be a leader with a wide vision and a deep understanding of the changes that will be required to evolve the IT organization into the business enabler of the future.

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[13] Executive Issues 2003
[14] Adaptive Management 2004

| | 1980s | 1990s | Today |
|---|---|---|---|
| | Automating the back office | Automating the front office | Automating the IT infrastructure's ability to adapt to every business decision |
| | Emphasis: Stability Reliability | Emphasis: Speed | Emphasis: Stability Reliability Speed RoIT |
| CIO | Technical | Technical and Business | Business |
| Standards | Proprietary | ISO Open Emerge | Open Standards |
| Security | Physical and Software | | Software – Network - Biometric |
| Information | Centralized Limited Access Linear | | Decentralized Anyone/Anywhere/Anytime Relational |
| | Silos of Technology Inflexible to Change. Over-provisioned. | | Horizontal Architecture Flexible, Stable, supply matches demand |

It becomes clear that the CIO with his/her partners the CSO and CTO together have all of the skills, knowledge and competencies that will be needed to move an organization forward into the next ten years of bringing the people and government closer together through the information economy. The need for technical savvy, security, privacy and knowledge management is not going to be fulfilled by a single individual.

The team that begins to appear is a very different group of individuals from the ones that formed the heart of IT in the past. What is required is a great technology architect, a great security architect, a great knowledge architect, a great business architect and a great CIO. A team of this magnitude will be able to apply all of the promise of information/communication technologies as the business enabler of the future and the team will lead the organization to innovations not yet imagined.

**Practical Implications of the Evolution**

There are a number of elements that become clear from reviewing where we have been and where we are now in relation to the metamorphic evolution of the CIO mandate. These findings would serve well as the design rules for the IT/CT business units of the future.

- technical to business
- information to knowledge
- restrictions to no restrictions
- exclusive to inclusive
- competitive to collaborative
- function to process

In order to actually get to the future by stepping through the portal of the future it will be necessary to look at how the ICT groups are tactically operated by going through a common sense approach to change such as; determining where you are, determining where you want to be, planning how you are going to get there and managing the change during your implementation of the plan[15]. Simple, but very few organizations ever actually implement change in this way. Given the level of failure of ICT projects in North America[16] it should not come as a surprise[17] that a common sense model is not being used.

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[15] Six Sigma Principles
[16] Project Management Institute ITSIG
[17] Gartner Survey 2002

## The Decisions

The future-oriented CIO must be bold enough to ask some hard questions of their organizations. They must collaboratively lead their teams through a process of determining what type of information technology/communications technology group they wish to become.

Do they wish to be a service group, an audit group, a business group, a research group, or a policy group? Do they wish to be all of these? Do they wish to play the role of gatekeeper, in technology acquisitions? How will they deal with issues of privacy and security? What value do they bring to the organization? In the review of literature for this report all of these individual and collective attributes can be found in the offices of chief information officers. There are literally dozens of surveys, hundreds of articles too many books to list and more opinions from CIOs than you could possible catalogue regarding the future role of the position and the office.

Five best practices emerge in the synthesis of the literature;

The CIO must decide on the vision and then build towards it by evolving the organization through consensus to where it needs to be. A heavy hammer does not work in the business of information technology and business process enabling.

The vision must reconcile the readiness of the organization, the desirability for change from the constituents and the willingness of personnel to pick up the banner and march to the call of the CIO.

The CIO must ensure that the evolution of his/her organization is timed exactly in alignment with the resources the organization can afford to dedicate.

The CIO must forge partnerships with business units in the public sector and help them to translate policy into achievable technology enabling targets.

The CIO in a public sector organization must be a leader with a vision and the street smarts to navigate the organization with a consensus seeking, bridge building, collaborative style that has been developed through the experience of achievement.

**"It's not the strongest of the species that survives, nor the most intelligent; but the one most responsive to change."**
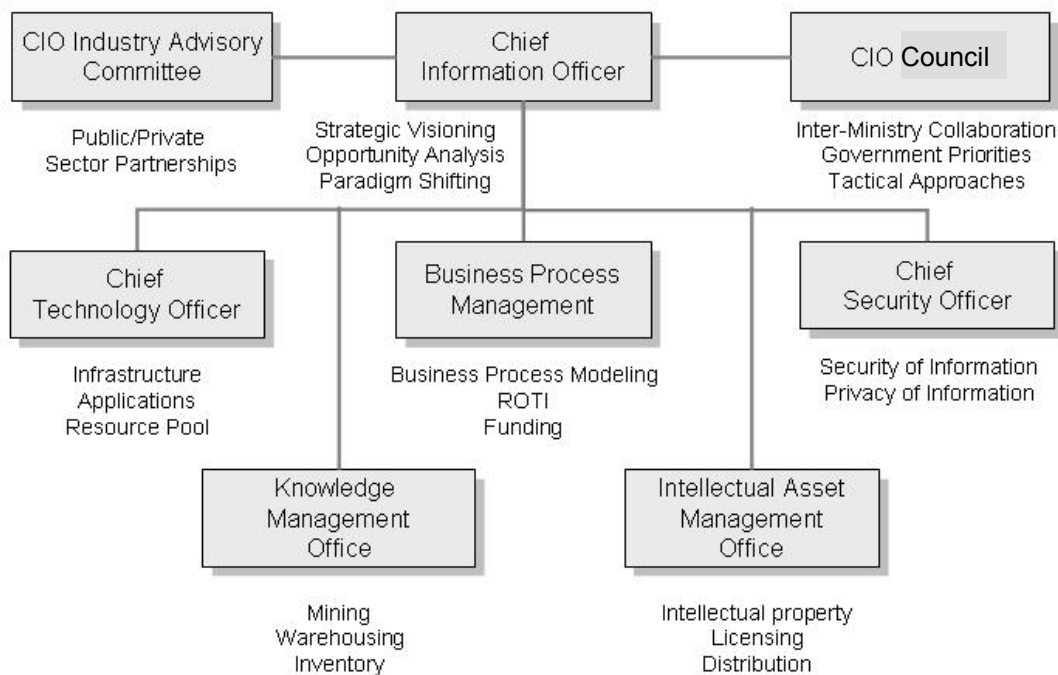
Charles Darwin

## The Portal to the Future

If we look forward 24 months and assume that the desired future state is to be a CIO Office with the ideal structure supporting it based on the best practices found in the literature; we would peer through the portal and see an organization that is adaptive, resilient, reliable and secure. We also would decide how to evolve the organization into that vision. We would envision leading the organization into providing for the citizens of British Columbia;

privacy of their information (information is not used inappropriately)
security of their privacy (information cannot seen by unauthorized entities)
just-in-time anytime/anywhere services
reduction in cost per transaction
one time information provision/many times information use (capture once use many)
elimination of technology overcapacity

These goals can be accomplished with strategic investment, effective leadership and a willing executive. The mandate of the CIO of British Columbia is aligned with the findings contained in the literature at the strategic level and is well documented in the mandate statement. What remains to be accomplished is the tactical capability to deliver on the mandate. The CIO will need to organize a core team of trusted resources at the senior level to aggressively and gently align the resource base and policy infrastructure with a vision for the future that is strategic, collaborative, and accountable. The team will need the tactical smarts to influence the ministries of the Province to facilitate ICT effectiveness.

A proposed first tier structure that is tactically aligned with the mandate and vision might look like this;

# Main Events History

| Enablers | 1980s | 1990s | Today | Future |
|---|---|---|---|---|
| Network | Fixed Dedicated | Telecommunication | Tunneled Virtual | Virtual |
| Desktop | Mainframe Terminals First PCs | High Powered PCs still serving as mainframe terminals but also as PCs | More Powerful PCs with windows into mainframe environments | Portable and wireless. |
| Software | Centralized with remote Terminals | Highly portable with many applications available | More powerful with unlimited applications available from the enterprise | More powerful with unlimited applications available from the network |
| Data Storage | Mainframes | Distributed Servers and Mainframes | Primarily Distributed Servers with some Mainframes | Entirely Distributed |
| Security | Minimal and mostly physical | Many forms from software to physical and clearances | Software and hardware security based on standards | Biometrics |
| Facilities | Centralized | Decentralized server bases for knowledge workers but mainframes still in centralized facilities | Decentralized with server farms specialized secure data storage and backup | Decentralized into the network |
| Personnel | Centralized Engineering Level | Decentralized all levels using technologies only technicians required for maintenance | Decentralized many working from home. Growth of the SOHO | Mobile |
| Standards | Few or non existent most proprietary | Emerging from the ISO layers to software, networks, hardware and portable devices | Standards stabilized for desktop, network, communication, storage security, and privacy. | Universal standards |
| Business Process Management | none | Beginning to be of concern but no real answers | Standards emerge business drivers become paramount | IT becomes a commodity tool standard business rules emerge |
| Financials | Very low budgets as a % of total spending | Very large budgets with no limitations up to Y2K | Controlled budgets based on ROI and business contribution | Targeted Investments tied to business value |

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