

Overview

In order to create a concise way to work with the full range of skills, we organized the individual skills into logical clusters. The result was a set of seven broad competency areas with specific skills associated with each. Collectively, these competency areas encompass the entire IT function of state government.

In general, higher proficiency ratings are evident in the competency areas we call management, systems and databases, technical support services, and legacy technologies. Lower proficiency ratings are evident in the competency areas of infrastructure, web computing, and management and use of information as an asset. Training demand is higher in management, web computing and infrastructure competencies, and lower in systems and databases, management and use of information as an asset, technical support services, and legacy technologies.

Creating the competency framework

The data on individual skill proficiency ratings and training needs generated an overwhelming amount of detail. In order to manage so much information more economically and effectively, we used several data analysis techniques to organize the skills into logical clusters. Table 9 shows the competency area definitions and lists their associated skills. Statistically, some individual skills are associated with more than one competency area and, logically, competency areas can overlap in their coverage of concepts. For example, object-oriented analysis and design methodology is commonly used in the traditional systems development process, but it is also heavily used in web-based applications development. Similarly, proficiency in data warehousing not only requires good understanding of database design and development principles, but also information analysis and management skills and sound business understanding. However, for simplicity of analysis and presentation, each skill was assigned to the single competency area where its statistical association was strongest.

Table 9. Competency areas and associated skills

Management: (23 skills) Competency encompasses both general and IT management. General skills are associated with working at a leadership level in organizations, including managing staff, communicating, managing relationships, and planning and directing work. IT-oriented management is associated with the treatment of information technology and services as organizational assets, including planning, procuring, monitoring, and protecting those assets.		
<ul style="list-style-type: none"> IT asset management Business continuity planning Capacity management Change management Managing consultant staff Contract management & vendor relations Customer Relationship Management (CRM) Customer service 	<ul style="list-style-type: none"> Financial management Internal controls Leadership Managing agency staff Negotiation & conflict resolution Oral communication Organizational awareness & business knowledge 	<ul style="list-style-type: none"> Planning & evaluation IT procurement Project management IT project portfolio management IT risk assessment management IT strategic planning Supervisory skills Written communication
Infrastructure: (33 skills) Competency comprises those skills that assure the effective design, operation, and integration of networks, security features, operating systems, and associated support services.		
<ul style="list-style-type: none"> Network and architecture design principles Backup & recovery Biometrics Broadband technologies Cellular technologies Computer forensics Cryptography Disaster recovery & planning Encryption Firewalls Hardware & maintenance support 	<ul style="list-style-type: none"> Identity management & directory services Intrusion detection Linux operating systems Mac OS /OS X operating systems Mobile computing Network configuration Novell operating systems Open systems server administration Public Key Infrastructure (PKI) Principles of operating systems Satellite technologies 	<ul style="list-style-type: none"> System security applications Technology training activities Telephone /PBX Unified messaging services Video imaging Voice over IP Wide Area Networks (WAN) Web/IP Windows operating systems Windows network operating systems Wireless technologies
Web Computing: (29 skills) Competency associated with the Web encompasses the application of principles and effective use of tools and techniques that allow the Web to be used as a platform for well-designed, accessible information-based services.		
<ul style="list-style-type: none"> Borland JBuilder C C++ ColdFusion DHTML/ HTML/ XHTML Eclipse IBM WebSphere Studio Java JavaScript Java Studio 	<ul style="list-style-type: none"> Microsoft Access Microsoft SQL MySQL Unix operating systems Oracle JDevStudio Perl/CGI PHP Unified Modeling Language (UML) Visual Basic Visual Basic Script 	<ul style="list-style-type: none"> Visual Studio .NET Web accessibility Web design & development Web-based graphics & multimedia Website management Website privacy Website search administration Web servers XML/XSL
Systems & Databases: (19 skills) Competency encompasses the principles and techniques of system analysis, design, development, and implementation, including the ability to build applications and databases as integral		

components of systems.		
<ul style="list-style-type: none"> Database applications & development techniques CASE tools Database design & development standards Joint Application Development (JAD) System life cycle planning principles 	<ul style="list-style-type: none"> Object-oriented analysis & design principles Oracle Business process analysis Principles of programming SQL Quality assurance Rapid Application Development (RAD)/ prototyping Requirements analysis 	<ul style="list-style-type: none"> Structured system analysis & design principles Systems architecture Systems implementation Systems integration Technical documentation Testing & evaluation
Technical Support Services: (3 skills) Competency encompasses the skills associated with effective end-user computing and customer support.		
<ul style="list-style-type: none"> Support for desktop applications 	<ul style="list-style-type: none"> Help desk activities 	<ul style="list-style-type: none"> Call center activities
Management & Use of Information as an Asset: (12 skills) Competency in this area focuses on creating, preserving, and generating value from information content, including skills associated with data definition, records management, knowledge and information sharing, data analysis, and support for collaboration and decision making.		
<ul style="list-style-type: none"> Artificial Intelligence (AI) Collaboration software Content management Data warehousing 	<ul style="list-style-type: none"> Decision support systems Enterprise Resource Planning (ERP) systems Geographic Information Systems (GIS) Knowledge Management (KM) 	<ul style="list-style-type: none"> Metadata management Modeling & simulation Records management Workflow management
Legacy Technologies: (7 skills) Legacy-oriented competency encompasses the skills associated with effective use and management of mainframe computing and related programming languages and operating systems.		
<ul style="list-style-type: none"> COBOL Fortran IBM/DB2 	<ul style="list-style-type: none"> IBM mainframe Mainframe operations 	<ul style="list-style-type: none"> PowerBuilder Unisys mainframe

Statewide competency patterns

We used several methods to assess the relative strength of proficiency across the competency areas. These included calculating an overall mean proficiency rating for the skills in each competency area, counting the number and proportion of skills in each area that had mean proficiency ratings in the highest(1) and lowest(2) range, and looking at the number of skills in each competency for which the most frequent proficiency rating was high(3) or low(4). All of these methods produced the same pattern. Table 10 provides a summary. Overall, higher proficiency ratings exists in technical support services, management, systems and databases, and legacy technologies while lower proficiency ratings exists in infrastructure, web computing, and management and use of information as an asset.

Table 10. Statewide competency overview - skill proficiency ratings

Higher overall skill proficiency ratings occurs in these competency areas	Lower overall skill proficiency ratings occurs in these competency areas
<ul style="list-style-type: none"> • Technical services • Management • Systems and databases • Legacy systems 	<ul style="list-style-type: none"> • Infrastructure • Web computing • Management and use of information as an asset

We conducted a similar analysis of the training demand data looking for patterns of high numbers and proportions of employees who want training in skills assigned to each competency area. Training demand patterns by competency area are summarized in Table 11.

Table 11. Statewide competency overview - training demand

Higher training demand occurs in these competency areas	Lower training demand occurs in these competency areas
<ul style="list-style-type: none"> • Management • Infrastructure • Web computing 	<ul style="list-style-type: none"> • Systems and databases • Management and use of information as an asset • Technical services • Legacy systems

Higher training demand for infrastructure and web computing match well with lower proficiency rating patterns for these competency areas. Lower training demand matches the higher proficiency ratings reported for systems and databases, technical services, and legacy systems. Management exhibits both higher proficiency ratings and higher demand, as noted above, while the management and use of information as an asset exhibits both lower proficiency ratings and lower demand. We use these results, along with the IT forecasts provided by the CIO surveys to conduct the gap analysis described later in this report.

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- (1) Selected if the mean was 2.0 or higher on a scale of 1 – 4 or a mean of 3.0 or higher on a scale of 1 – 5.
 (2) Selected if the mean was 1.5 or lower on a scale of 1 – 4 or a mean of 2.5 or lower on a scale of 1 – 5.
 (3) Selected if the mode was equal to 3 or 4.
 (4) Selected if the mode was equal to 1 or 2.