

## FUNCTIONAL AREA 1

### Client Server Application Development (CSAD)

Incumbents in this functional area use software tools and/or programming languages to produce and implement properly engineered and tested Client Server software solutions to meet the defined business needs of State departments. The application software components may reside on any Client Server platform and may consist of many interrelated programs spread across multiple platforms.

<b>CLIENT SERVER APPLICATION DEVELOPMENT</b>	<b>Asst</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>Knowledge of:</b>				
Systems development life cycle management concepts.	X	X	X	X
Basic IT principles and practices, general computer architecture (CPU, memory allocations, peripheral devices. I/O, etc., in order to perform basic programming functions, and basic arithmetic (binary, hexadecimal, etc.).	X	X	X	X
Application development principles and methods.		X	X	X
Client Server Programming languages (e.g., C, C++, VB, .NET languages, Java, Cobol-RPC).		X	X	X
Database principles and methods		X	X	X
Client Server usability concepts and best practices		X	X	X
Client-side programming concepts, techniques and best practices		X	X	X
Server-side programming concepts, techniques and best practices		X	X	X
Client Server privacy and security issues and techniques for addressing these issues		X	X	X
Data query languages (e.g., SQL, MDX, DMX, Datalog)		X	X	X
Program debugging concepts, techniques, and tools		X	X	X
Software testing and evaluation principles, methods, and tools.		X	X	X
Client Server interface design best practices			X	X
Accessibility issues and how to address them in Client Server applications			X	X
Client Server application implementation and integration techniques and best practices			X	X
Client Server Services [e.g., Resource and Data Sharing, Data Integrity, Centralized Storage, Software Integration]			X	X
Client Server Design Patterns and associated operational vulnerabilities [n-tier, Peer to Peer]			X	X
Client Server Protocols [e.g., ODBC, ADO, JDBC, X-Windows Systems]			X	X
Client Server Standards and Standard Bodies [e.g., ODBC, CORBA, OSF, DCE, RPC]			X	X
Principles, methods, and procedures for designing, developing, optimizing, and integrating new and/or reusable system components.			X	X
IT change management practices and their application in the software development environment.			X	X
Interrelationships between Client Server applications and networking components.			X	X
Customized Commercial Off-the-Shelf (COTS) products and components.			X	X
Comprehensive knowledge of departmental policies and procedures as it relates to IT.			X	X
New and emerging application software technologies and industry trends.			X	X
Advanced Client Server systems development concepts including structured design, supportability, reliability, scalability, maintainability, and survivability.				X
Database management principles and methods.				X
Advanced Client Server application software theories, concepts, principles, standards, methods, or practices.				X
<b>Ability to:</b>				
Write simple Client Server program code based upon detailed program specifications.	X	X	X	X

Learn and use standard programming principles	X	X	X	X
Learn and use at least one programming language to develop application code.	X	X	X	X
Present solutions to problems with clarity and precision in written and/or graphic form	X	X	X	X
Write clear and concise narrative statements and draw logical diagrams	X	X	X	X
Learn to detect, analyze, and correct errors in programs	X	X	X	X
Learn additional programming languages	X	X	X	X
Organize applications into logical components		X	X	X
Suggest alternative application development strategies to meet user requirements and constraints		X	X	X
Write detailed program specifications		X	X	X
Analyze information and situations, reason logically and creatively, identify problems, draw valid conclusions, and develop effective solutions		X	X	X
Apply creative thinking in the design and development of methods of processing information with information technology systems		X	X	X
Ensure that applications meet design specifications.		X	X	X
Write, test, debug, and maintain more complex applications that meet technical and functional requirements.		X	X	X
Develop secure applications that restrict access to confidential, sensitive, and personal data to those individuals with a business need to access this data.		X	X	X
Develop, execute, and evaluate application test plans, scenarios, and scripts.		X	X	X
Participate in the design of new or modified client server applications.		X	X	X
Design and develop efficient and effective client server applications through the use of reusable components.			X	X
Write the most complex client server application programs			X	X
Ensure applications are consistent with the current and planned infrastructure and data environments.			X	X
Interpret client server programming policies, standards, and guidelines.			X	X
Plan and carry out difficult and complex client server application development assignments and develop new methods, approaches, and procedures.			X	X
Provide advice and guidance on a wide range and variety of complex client server programming issues to management, peers and customers.			X	X
Develop and implement security requirements.			X	X
Provide technical direction/leadership to applications development program or project work.			X	X
Gather data to analyze system utilization, capacity and performance, and incorporate findings in the development and deployment of an application.			X	X
Advise other IT experts throughout the organization on a variety of situations and issues that involve applying or adapting new software theories, concepts, principles, standards, methods, or practices.				X
Develop comprehensive software development plans for cross functional applications.				X
Lead application development teams with authority to initiate and influence key decisions and obtain necessary project resources.				X
Develop new theories, concepts, standards and methodologies in application development.				X
Ensure optimal use of commercially available products through integration at the Operating System or Application layer.				X
Evaluate and recommend adoption of new or enhanced approaches to the delivery of IT services related to application development.				X
Investigate, analyze, and evaluate project feasibility; develop project cost and benefit estimates; evaluate risks; and estimate resource needs for staff and consultants.				X
Resolve complex problems related to interfaces and connectivity of multiple hardware platforms, operating systems, database management systems, and various other applications.				X
Provide technical guidance concerning system technical constraints, acceptance testing,				X

performance criteria, complex design issues, and complex programming logic.				
Analyze, define, develop, and implement the department's software design, development, and testing strategies, incorporating advanced security standards.				X
Research emerging technologies and provide guidance to ensure applications are optimized for state-of-the-art technology and functionality.				X

## **CLIENT SERVER APPLICATION DEVELOPMENT**

### ***Assistant Information Technology Specialist Range A - C (Client Server Application Development)***

Incumbents at this level work under direct supervision applying a basic understanding of information technology and Client Server programming to maintain an assigned module of code for a deployed application and/or modify assigned code according to well-established procedures. Incumbents assist in the development, modification, testing, and/or installation and maintenance of Client Server software to support business user applications.

### ***Information Technology Specialist I (Client Server Application Development)***

Incumbents apply a comprehensive understanding of Client Server application development principles and methods. This level works under direct technical supervision to write Client Server applications, according to technical specifications, using a variety of Client Server programming languages and tools to meet business requirements. These software solutions may support new and/or existing customized-off-the-shelf, or in-house developed applications. Incumbents have authority to plan, design, code, test and implement software development tasks, independently, within a clear framework established by the supervisor.

### ***Information Technology Specialist II (Client Server Application Development)***

Incumbents take an independent, lead technical role within a Client Server application development area. Incumbents demonstrate proficiency of business and technical IT competencies, with a specialization in Client Server application development. Incumbents apply knowledge of the organization's technology and business infrastructure to perform the full-range of duties to effectively develop, modify, test, install and maintain complex custom-off-the shelf and/or in-house developed Client Server software. Incumbents take responsibility for analyzing and translating technical specifications into integrated Client Server applications that automate business processes and execute the life cycle change process to implement design changes in response to changes in customer functional requirements.

Technical decisions, recommendations and specifications are developed at this level based on analytical data and business requirements. The system development life cycle and change management processes are utilized to provide structure to the planning, implementation and deployment of new software to minimize impacts to the customer.

***Information Technology Specialist III (Client Server Application Development)***  
***Range A***

At the advanced Range A level, incumbents demonstrate extensive knowledge of the Client Server application development process for multiple platforms, diverse and/or distributed IT environments. They serve in a lead capacity and direct the work of assigned staff and/or serve as expert specialists who work independently and deal with the most complex integrated enterprise Client Server applications. Incumbents evaluate the feasibility of new systems design methodologies that best meet the business requirements and recommend the adoption of the most promising new methodologies. They interpret software development standards to develop complex Client Server applications for multiple platforms. At this level, they are required to lead the development of alternative solutions to ensure Client Server applications optimize technology and functionality to best meet a department's business needs. They also provide technical guidance concerning system technical constraints, acceptance testing, performance criteria, complex design issues, and complex programming logic. In addition, they resolve complex problems related to interfaces and connectivity of multiple hardware platforms, operating systems, database management systems, and various other applications.

***Information Technology Specialist III (Client Server Application Development)***  
***Range B***

Incumbents perform the state's most complex IT Client Server application development and direct major state-wide projects. Incumbents function as architects for large, extremely complex enterprise-wide Client Server applications typically found in either large departments or data center IT environments. Incumbents make decisions or recommendations to establish state or department-wide standards, policies, and practices for software development, requirement analysis, reusability of systems and or code, and performance metrics. Incumbents use in-depth experience and expertise of methods, paradigms and tools to advance software development practices for the state or department. They apply superior leadership skills to direct large project development teams and negotiate and interact with consultants. Incumbents use their broad understanding of the business and organization structure to predict and manage time, cost and capital expenditures related to these projects.