



# CDC UNIFIED PROCESS JOB AID



## Independent Verification & Validation Activities

### Document Purpose

This Job Aid is a brief document listing the items to be noted, checked, remembered, and delivered when completing the accompanying template and/or Independent Verification & Validation practice.

### Activities

#### Project Management Activities

Task Item	Task Description
<b>Project Sponsorship</b>	Assess and recommend improvement, as needed, to assure continuous executive stakeholder buy-in, participation, support and commitment, and that open pathways of communication exist among all stakeholders.
	Verify that executive sponsorship has bought-in to all changes which impact project objectives, cost, or schedule.
<b>Management Assessment</b>	Verify and assess project management and organization, verify that lines of reporting and responsibility provide adequate technical and managerial oversight of the project.
	Evaluate project progress, resources, budget, schedules, work flow, and reporting.
	Assess coordination, communication and management to verify agencies and departments are not working independently of one another and following the communication plan.
<b>Project Management</b>	Verify that a Project Management Plan is created and being followed. Evaluate the project management plans and procedures to verify that they are developed, communicated, implemented, monitored and complete.
	Evaluate project reporting plan and actual project reports to verify project status is accurately traced using project metrics.
	Verify milestones and completion dates are planned, monitored, and met.
	Verify the existence and institutionalization of an appropriate project issue tracking mechanism that documents issues as they arise, enables communication of issues to proper stakeholders, documents a mitigation strategy as appropriate, and tracks the issue to closure. This should include but is not limited to technical and development efforts.
	Evaluate the system's planned life-cycle development methodology or methodologies (waterfall, evolutionary spiral, rapid prototyping, incremental, etc.) to see if they are appropriate for the system being developed.
<b>Business Process Reengineering</b>	Evaluate the project's ability and plans to redesign business systems to achieve improvements in critical measures of performance, such as cost, quality, service, and speed.
	Verify that the reengineering plan has the strategy, management backing, resources, skills and incentives necessary for effective change.
	Verify that resistance to change is anticipated and prepared for by using principles of change management at each step (such as excellent communication, participation, incentives) and having the appropriate leadership (executive pressure, vision, and actions) throughout the reengineering process.
<b>Risk Management</b>	Verify that a Project Risk Management Plan is created and being followed. Evaluate the projects risk management plans and procedures to verify that risks are identified and quantified and that mitigation plans are developed, communicated, implemented, monitored, and complete.
<b>Change Management</b>	Verify that a Change Management Plan is created and being followed. Evaluate the change management plans and procedures to verify they are developed, communicated, implemented, monitored, and complete; and that resistance to change is anticipated and prepared for.
<b>Communication</b>	Verify that a Communication Plan is created and being followed. Evaluate the

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<b>Management</b>	communication plans and strategies to verify they support communications and work product sharing between all project stakeholders; and assess if communication plans and strategies are effective, implemented, monitored and complete.
<b>Configuration Management</b>	Review and evaluate the configuration management (CM) plans and procedures associated with the development process.
	Verify that all critical development documents, including but not limited to requirements, design, code and JCL are maintained under an appropriate level of control.
	Verify that the processes and tools are in place to identify code versions and to rebuild system configurations from source code.
	Verify that appropriate source and object libraries are maintained for training, test, and production and that formal sign-off procedures are in place for approving deliverables.
	Verify that appropriate processes and tools are in place to manage system changes, including formal logging of change requests and the review, prioritization and timely scheduling of maintenance actions.
	Verify that mechanisms are in place to prevent unauthorized changes being made to the system and to prevent authorized changes from being made to the wrong version.
<b>Project Estimating and Scheduling</b>	Evaluate and make recommendations on the estimating and scheduling process of the project to ensure that the project budget and resources are adequate for the work-breakdown structure and schedule.
	Review schedules to verify that adequate time and resources are assigned for planning, development, review, testing and rework.
	Examine historical data to determine if the project/department has been able to accurately estimate the time, labor and cost of software development efforts.
<b>Project Personnel</b>	Examine the job assignments, skills, training and experience of the personnel involved in program development to verify that they are adequate for the development task.
	Evaluate the hiring plan for the project to verify that adequate human resources will be available for development and maintenance.
	Evaluate the personnel policies to verify that staff turnover will be minimized.
<b>Project Organization</b>	Verify that lines of reporting and responsibility provide adequate technical and managerial oversight of the project.
	Verify that the project's organizational structure supports training, process definition, independent Quality Assurance, Configuration Management, product evaluation, and any other functions critical for the projects success.
<b>Subcontractors and External Staff</b>	Evaluate the use of sub-contractors or other external sources of project staff in project development.
	Verify that the obligations of sub-contractors and external staff (terms, conditions, statement of work, requirements, standards, development milestones, acceptance criteria, delivery dates, etc.) are clearly defined.
	Verify that the subcontractors' software development methodology and product standards are compatible with the system's standards and environment.
	Verify that the subcontractor has and maintains the required skills, personnel, plans, resources, procedures and standards to meet their commitment. This will include examining the feasibility of any offsite support of the project
	Verify that any proprietary tools used by subcontractors do not restrict the future maintainability, portability, and reusability of the system.

### Quality Management Activities

Task Item	Task Description
<b>Quality Assurance</b>	Evaluate and make recommendations on the project's Quality Assurance plans, procedures and organization.
	Verify that QA has an appropriate level of independence from project management.
	Verify that the QA organization monitors the fidelity of all defined processes in all phases of the project.
	Verify that the quality of all products produced by the project is monitored by formal

Task Item	Task Description
	reviews and sign-offs.
	Verify that project self-evaluations are performed and that measures are continually taken to improve the process.
	Monitor the performance of the QA contractor by reviewing its processes and reports and performing spot checks of system documentation; assess findings and performance of the processes and reports.
	Verify that QA has an appropriate level of independence; evaluate and make recommendations on the project's Quality Assurance plans, procedures and organization.
	Evaluate if appropriate mechanisms are in place for project self-evaluation and process improvement.
<b>Process Definition and Product Standards</b>	Review and make recommendations on all defined processes and product standards associated with the system development.
	Verify that all major development processes are defined and that the defined and approved processes and standards are followed in development.
	Verify that the processes and standards are compatible with each other and with the system development methodology.
	Verify that all process definitions and standards are complete, clear, up-to-date, consistent in format, and easily available to project personnel

### Training Activities

Task Item	Task Description
<b>User Training and Documentation</b>	Review and make recommendations on the training provided to system users. Verify sufficient knowledge transfer for maintenance and operation of the new system.
	Verify that training for users is instructor-led and hands-on and is directly related to the business process and required job skills.
	Verify that user-friendly training materials and help desk services are easily available to all users.
	Verify that all necessary policy and process and documentation is easily available to users.
	Verify that all training is given on-time and is evaluated and monitored for effectiveness, with additional training provided as needed.
<b>Developer Training and Documentation</b>	Review and make recommendations on the training provided to system developers.
	Verify that developer training is technically adequate, appropriate for the development phase, and available at appropriate times.
	Verify that all necessary policy, process and standards documentation is easily available to developers.
	Verify that all training is given on-time and is evaluated and monitored for effectiveness, with additional training provided as needed.

### Requirement Management Activities

Task Item	Task Description
<b>Requirements Management</b>	Evaluate and make recommendations on the project's process and procedures for managing requirements.
	Verify that system requirements are well-defined, understood and documented.
	Evaluate the allocation of system requirements to hardware and software requirements.
	Verify that software requirements can be traced through design, code and test phases to verify that the system performs as intended and contains no unnecessary software elements.
	Verify that requirements are under formal configuration control.
<b>Security Requirements</b>	Evaluate and make recommendations on project policies and procedures for ensuring that the system is secure and that the privacy of client data is maintained.
	Evaluate the projects restrictions on system and data access.
	Evaluate the projects security and risk analysis.
	Verify that processes and equipment are in place to back up client and project data and

	files and archive them safely at appropriate intervals.
<b>Requirements Analysis</b>	Verify that an analysis of client and federal needs and objectives has been performed to verify that requirements of the system are well understood, well defined, and satisfy federal regulations.
	Verify that all stakeholders have been consulted to the desired functionality of the system, and that users have been involved in prototyping of the user interface.
	Verify that all stakeholders have bought-in to all changes which impact project objectives, cost, or schedule.
	Verify that performance requirements (e.g. timing, response time and throughput) satisfy user needs
	Verify that user's maintenance requirements for the system are completely specified
<b>Interface Requirements</b>	Verify that all system interfaces are exactly described, by medium and by function, including input/output control codes, data format, polarity, range, units, and frequency.
	Verify those approved interface documents are available and that appropriate relationships (such as interface working groups) are in place with all agencies and organizations supporting the interfaces.
<b>Requirements Allocation and Specification</b>	Verify that all system requirements have been allocated to a either a software or hardware subsystem.
	Verify that requirements specifications have been developed for all hardware and software subsystems in a sufficient level of detail to ensure successful implementation.
<b>Reverse Engineering</b>	If a legacy system or a transfer system is or will be used in development, Verify that a well defined plan and process for reengineering the system is in place and is followed. The process, depending on the goals of the reuse/transfer, may include reverse engineering, code translation, re-documentation, restructuring, normalization, and re-targeting.

### Operating Environment Activities

Task Item	Task Description
<b>System Hardware</b>	Evaluate new and existing system hardware configurations to determine if their performance is adequate to meet existing and proposed system requirements.
	Determine if hardware is compatible with the existing processing environment, if it is maintainable, and if it is easily upgradeable. This evaluation will include, but is not limited to CPUs and other processors, memory, network connections and bandwidth, communication controllers, telecommunications systems (LAN/WAN), terminals, printers and storage devices.
	Evaluate current and projected vendor support of the hardware, as well as the hardware configuration management plans and procedures.
<b>System Software</b>	Evaluate new and existing system software to determine if its capabilities are adequate to meet existing and proposed system requirements.
	Determine if the software is compatible with the existing hardware and software environment, if it is maintainable, and if it is easily upgradeable. This evaluation will include, but is not limited to, operating systems, middleware, and network software including communications and file-sharing protocols.
	Current and projected vendor support of the software will also be evaluated, as well as the software acquisition plans and procedures.
<b>Database Software</b>	Evaluate new and existing database products to determine if their capabilities are adequate to meet existing and proposed system requirements.
	Determine if the database's data format is easily convertible to other formats, if it supports the addition of new data items, if it is scalable, if it is easily refreshable and if it is compatible with the existing hardware and software, including any on-line transaction processing (OLTP) environment.
	Evaluate any current and projected vendor support of the software, as well as the software acquisition plans and procedures.
<b>System Capacity</b>	Evaluate the existing processing capacity of the system and verify that it is adequate for current needs for both batch and on-line processing.
	Evaluate the historic availability and reliability of the system including the frequency and criticality of system failure.
	Evaluate the results of any volume testing or stress testing.

Task Item	Task Description
	Evaluate any existing measurement and capacity planning program and will evaluate the system's capacity to support future growth.
	Make recommendations on changes in processing hardware, storage, network systems, operating systems, COTS software, and software design to meet future growth and improve system performance.

### Development Environment Activities

Task Item	Task Description
<b>Development Hardware</b>	Evaluate new and existing development hardware configurations to determine if their performance is adequate to meet the needs of system development.
	Determine if hardware is maintainable, easily upgradeable, and compatible with the existing development and processing environment. This evaluation will include, but is not limited to CPUs and other processors, memory, network connections and bandwidth, communication controllers, telecommunications systems (LAN/WAN), terminals, printers and storage devices.
	Current and projected vendor support of the hardware will also be evaluated, as well as the hardware configuration management plans and procedures.
<b>Development Software</b>	Evaluate new and existing development software to determine if its capabilities are adequate to meet system development requirements.
	Determine if the software is maintainable, easily upgradeable, and compatible with the existing hardware and software environment.
	Evaluate the environment as a whole to see if it shows a degree of integration compatible with good development. This evaluation will include, but is not limited to, operating systems, network software, CASE tools, project management software, configuration management software, compilers, cross-compilers, linkers, loaders, debuggers, editors, and reporting software.
	Language and compiler selection will be evaluated with regard to portability and reusability (ANSI standard language, non-standard extensions, etc.)
	Current and projected vendor support of the software will also be evaluated, as well as the software acquisition plans and procedures.

### Software Development Activities

Task Item	Task Description
<b>High-Level Design</b>	Evaluate and make recommendations on existing high level design products to verify the design is workable, efficient, and satisfies all system and system interface requirements.
	Evaluated the design products for adherence to the project design methodology and standards.
	Evaluate the design and analysis process used to develop the design and make recommendations for improvements. Evaluate design standards, methodology and CASE tools used will be evaluated and make recommendations.
	Verify that design requirements can be traced back to system requirements.
	Verify that all design products are under configuration control and formally approved before detailed design begins.
<b>Detailed Design</b>	Evaluate and make recommendations on existing detailed design products to verify that the design is workable, efficient, and satisfies all high level design requirements.
	The design products will also be evaluated for adherence to the project design methodology and standards.
	The design and analysis process used to develop the design will be evaluated and recommendations for improvements made.
	Design standards, methodology and CASE tools used will be evaluated and recommendations made.
	Verify that design requirements can be traced back to system requirements and high level design.
	Verify that all design products are under configuration control and formally approved before coding begins.

<b>Task Item</b>	<b>Task Description</b>
<b>Job Control</b>	Perform an evaluation and make recommendations on existing job control and on the process for designing job control.
	Evaluate the system's division between batch and on-line processing with regard to system performance and data integrity.
	Evaluate batch jobs for appropriate scheduling, timing and internal and external dependencies.
	Evaluate the appropriate use of OS scheduling software.
	Verify that job control language scripts are under an appropriate level of configuration control.
<b>Code</b>	Evaluate and make recommendations on the standards and process currently in place for code development.
	Evaluate the existing code base for portability and maintainability, taking software metrics including but not limited to modularity, complexity and source and object size.
	Code documentation will be evaluated for quality, completeness (including maintenance history) and accessibility.
	Evaluate the coding standards and guidelines and the projects compliance with these standards and guidelines. This evaluation will include, but is not limited to, structure, documentation, modularity, naming conventions and format.
	Verify that developed code is kept under appropriate configuration control and is easily accessible by developers.
	Evaluate the project's use of software metrics in management and quality assurance.
<b>Unit Test</b>	Evaluate the plans, requirements, environment, tools, and procedures used for unit testing system modules.
	Evaluate the level of test automation, interactive testing and interactive debugging available in the test environment.
	Verify that an appropriate level of test coverage is achieved by the test process, that test results are verified, that the correct code configuration has been tested, and that the tests are appropriately documented.

### **System and Acceptance Testing Activities**

<b>Task Item</b>	<b>Task Description</b>
<b>System Integration Test</b>	Evaluate the plans, requirements, environment, tools, and procedures used for integration testing of system modules.
	Evaluate the level of automation and the availability of the system test environment.
	Verify that an appropriate level of test coverage is achieved by the test process, that test results are verified, that the correct code configuration has been tested, and that the tests are appropriately documented, including formal logging of errors found in testing.
	Verify that the test organization has an appropriate level of independence from the development organization.
<b>Pilot Test</b>	Evaluate the plans, requirements, environment, tools, and procedures for pilot testing the system.
	Verify that a sufficient number and type of case scenarios are used to ensure comprehensive but manageable testing and those tests are run in a realistic, real-time environment.
	Verify that test scripts are complete, with step-by-step procedures, required pre-existing events or triggers, and expected results.
	Verify that test results are verified, that the correct code configuration has been used, and that the tests runs are appropriately documented, including formal logging of errors found in testing.
	Verify that the test organization has an appropriate level of independence from the development organization.
<b>Interface Testing</b>	Evaluate interface testing plans and procedures for compliance with industry standards.
<b>Acceptance and Turnover</b>	Acceptance procedures and acceptance criteria for each product must be defined, reviewed, and approved prior to test and the results of the test must be documented. Acceptance procedures must also address the process by which any software product

<b>Task Item</b>	<b>Task Description</b>
	that does not pass acceptance testing will be corrected.
	Verify that appropriate acceptance testing based on the defined acceptance criteria is performed satisfactorily before acceptance of software products.
	Verify that the acceptance test organization has an appropriate level of independence from the subcontractor.
	Verify that training in using the contractor-supplied software is be on-going throughout the development process, especially If the software is to be turned over to staff for operation.
	Review and evaluate implementation plan.

### **Data Management Activities**

<b>Task Item</b>	<b>Task Description</b>
<b>Data Conversion</b>	Evaluate the existing and proposed plans, procedures and software for data conversion.
	Verify that procedures are in place and are being followed to review the completed data for completeness and accuracy and to perform data clean-up as required.
	Determine conversion error rates and if the error rates are manageable.
	Make recommendations on making the conversion process more efficient and on maintaining the integrity of data during the conversion.
<b>Database Design</b>	Evaluate new and existing database designs to determine if they meet existing and proposed system requirements.
	Recommend improvements to existing designs to improve data integrity and system performance.
	Evaluate the design for maintainability, scalability, refresh-ability, concurrence, normalization (where appropriate) and any other factors affecting performance and data integrity.
	Evaluate the project's process for administering the database, including backup, recovery, performance analysis and control of data item creation.

### **Operations Oversight Activities**

<b>Task Item</b>	<b>Task Description</b>
<b>Operational Change Tracking</b>	Evaluate system's change request and defect tracking processes.
	Evaluate implementation of the process activities and request volumes to determine if processes are effective and are being followed.
<b>Customer &amp; User Operational Satisfaction</b>	Evaluate user satisfaction with system to determine areas for improvement
<b>Operational Goals</b>	Evaluate impact of system on program goals and performance standards.
<b>Operational Documentation</b>	Evaluate operational plans and processes.
<b>Operational Processes and Activity</b>	Evaluate implementation of the process activities including backup, disaster recovery and day-to-day operations to verify the processes are being followed.