Getting Started with the Central Data Exchange (CDX)

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What is CDX?

The Central Data Exchange (CDX) is the portal for entry for environmental data into EPA as well as the EPA's node on the Environmental Information Exchange Network (Exchange Network), which links EPA, the states, and other stakeholders over the Internet. Most of the development to date has focused on submitting information electronically, but the CDX can support paper, magnetic media and optical media submissions as well.

In brief, CDX provides the following services:

- Receives data, either in paper or electronic form
- Performs security and archiving functions
- Edits data and converts formats
- Distributes the data to EPA's and other agencies' appropriate systems
- Supports external users.

Why CDX?

EPA established CDX and electronic reporting in response to many internal and external requirements, including the following:

- The Government Paperwork Elimination Act of 1998 (GPEA) and other federal directives, legislation, and policies designed to implement electronic government (e-gov) across the federal government.
- Congressional directives to improve public access to data (especially for those with disabilities); improve data quality, and accountability.
- EPA's own re-inventing environmental information (REI) initiative to promote sharing information better and reducing the burden of reporting for all stakeholders and to increase the quality and timeliness of the data available.
- The realization that having one agency wide portal for exchanging information instead of hundreds of separate portals with their own infrastructure and procedures is more efficient and cost-effective for EPA and less burdensome on EPA partners and stakeholders.
- State initiatives for collecting data from their stakeholders electronically and for improving and standardizing exchanges with EPA.
- The public's rapidly increasing sophistication and expectation for government to implement electronic communications and business.
- Support Cross-Media Electronic Reporting Rule (CROMERR) compliance for EPA electronic data collections, including Data Archiving, Generation and Delivery of a Copy of Record, Electronic Signature, and Traceability in Data Transactions.

CDX Benefits

Benefits to EPA

The CDX benefits EPA in many ways, including

- eliminating redundant costs for maintaining hardware, software, and human resources to manage electronic reporting for individual programs;
- establishing a consistent policy and infrastructure for authenticating submissions, maintaining electronic records, and providing information security;
- increasing EPA's capability to restructure and distribute data between information recipients both in the agency and with external stakeholders;
- improving data quality by validating information in web forms and submitted files;
- being a catalyst for reengineering processes that automate and streamline reporting to benefit all stakeholders; and
- enabling EPA and its environmental information partners to independently modernize their legacy information systems.

By using CDX, EPA program offices are able to implement electronic reporting more quickly, economically, and easily than they could if they designed systems themselves. The use of CDX by EPA also ensures that it is operating in an environment that is readily acceptable to its user community because CDX is compliant with the Exchange Network specification for state nodes and with other submission processes for facilities and other stakeholders.

Benefits to Submitters

External stakeholders can benefit from many of the following CDX functions:

- *Single method and location for submitting all compliance reports*—A single point of entry will reduce confusion about where to submit compliance data and eliminate delays with submitting the data.
- *Consistent, familiar approach, "look and feel"*—CDX provides consistent points of contact, policies, and procedures no matter which EPA program or office the submitter is submitting the data to.
- *Quick confirmation receipt*—CDX can give the user electronic receipts or copies of record. EPA's stakeholders have repeatedly responded that they value immediate confirmation that their data have been received and the submission is complete.
- *Improve data quality*—CDX provides services to ensure that the data EPA receives from external sources is of high quality and contains minimal errors.
- *Ensure data security*—CDX provides a secure framework for confidential business information (CBI) data exchange
- *Reduce reporting costs*—Organizations can either buy commercial software or develop applications for recording compliance data electronically and automatically sending it to

CDX. In some cases, the software can be linked directly to automatic monitoring equipment, eliminating the need to collect, record, transmit, or file data manually.

- *Reduce paper costs*—Electronic reporting eliminates the need to record, reproduce, mail, store, and retrieve paper copies of compliance data and forms that facilities must produce and archive each year.
- *Improve public awareness of meeting environmental commitments*—Companies that meet or exceed their environmental commitments want this acknowledged through rapid processing and public dissemination of their compliance data by state and federal agencies. Electronic reporting helps ensure that data is accurate and timely. By receiving the reports electronically, EPA can process data faster and provide it to stakeholders in much less time.

Benefits to States

States are both recipients and submitters of environmental data. By investing in electronic reporting, fostering its growth among their reporting communities, and working with EPA, states can benefit as much as or more than EPA.

System-Wide Benefits

The ability of today's technologies to exchange, edit, combine, separate, reformat, and redistribute data offers tremendous power for streamlining and simplifying compliance reporting. These benefits don't exist with paper reporting or even with electronic reporting that separate programs and entities implement individually.

CDX Services and Architecture

The following short description of CDX functions describes its capabilities and options that program offices can use to support their flows.

Core CDX Business Services Overview

CDX provides a range of core business services for Web-based data flows and Exchange Network data flows:

CDX WEB BUSINESS SERVICES

- Support external (non-EPA) data submitter registration process (CDX includes an Open and Closed/Sponsored registration process as well as a delegated registration mechanism known as Registration Maintenance. The latter allows programs the ability to self-manage and maintain their own lists of registered submitters and their respective role assignments)
- Support external (non-EPA) data submitter authentication and authorization (CDX includes both authentication through user credentials and through third party authentication mechanisms such as the use of Public Key Infrastructure (PKI), where applicable)
- Perform data delivery/distribution to the EPA national systems
- Support development/hosting of Web-based data entry forms for data submission to EPA
- Support development/hosting of Web-based file upload functions for data submission to EPA
- Perform notification updates on the status of data submissions
- Provide digital signature/PKI data integrity services for linking data submissions to identities and preventing data tampering
- Provide data encryption support services for sensitive data
- Ensure quality of the submitted data through compliance with agreed upon data standards (e.g., XML schema validation)
- Perform data translation/transformation services (flat file/XML)

- Support Cross-Media Electronic Reporting Rule (CROMERR) compliance of all EPA electronic data collections, including:
  - Data Archiving (data are stored in an archive at various stages of processing from data receipt to final delivery to the EPA backend repository)
  - Generation and Delivery of a Copy of Record (CDX generates a Copy of Record for non-repudiation purposes)
  - Electronic Signature
  - Traceability in Data Transactions (CDX provides the capability to track, log and report the data transaction activities as the data is processed from receipt through final delivery to the backend repository)

CDX EXCHANGE NETWORK BUSINESS SERVICES

- Support external (non-EPA) data submitter registration process
- Support external (non-EPA) data submitter authentication
- Support submission of data to the EPA or other partners using a centralized access point and perform data delivery to EPA backend repositories as well as applicable partner recipients
- Ensure quality of the submitted data through compliance with agreed upon data standards (XML schema validation) and the provision of business rule validation checks (Schematron)
- Perform data translations/transformations of exchanged data
- Support retrieval and publishing of data on a pre-scheduled or ad-hoc basis with either the EPA or with other stakeholders

CDX CUSTOMER SUPPORT SERVICES

- Provide Hotline/Technical support
- Support customer service tracking and reporting
- Provide user's guides, manuals, and handbooks
- Training and outreach on CDX
- Perform periodic customer surveys
- Collect client support performance metrics

EPA can tailor the functions to meet unique requirements that are mandated. CDX offers both structure and flexibility that will meet the needs of all environmental stakeholders.

CDX Core Services Catalog

The following is a list of the core services that CDX offers with brief descriptions of each service.

IT Services

Identity/Access Management Services			
Name of Service	**Web**	**Node**	**Service Description**
Open Registration	✓		Allows an EPA stakeholder to register on CDX, for a particular data flow, without any prior identity-proofing or systematic control from the EPA Integrated Process Team (IPT) or EPA Application Manager.
Pre-Registration	✓		Closed to public access. Requires the user to be approved in advance by the EPA Application Manager in order to access a particular data flow. The CDX Help Desk provides a Customer Retrieval Key (CRK) to approved users for access to the application.
Dynamic Pre-Registration	✓		Like standard pre-registration, but users are sent an invitation letter from the EPA Application Manager that includes several items of information to be entered into the dataflow interface to generate a CRK behind the scenes. Eliminates the need for the Help Desk to manually supply the user's CRK.
Registration Maintenance	✓		Open registration process that permits the EPA Application Manager to manually approve user access requests.
Authentication	✓	✓	Oracle-based pin/password mechanisms for CDX Web; pin/password, key, certificate mechanisms via NAAS for Exchange Network.
Authorization/Policy Management	✓	✓	Provision for flow owners and the Help Desk to set and control user access policy (via CDX Lite Provisioner tool and CDX Help Desk for Web; NAAS for Exchange Network).
Reduced Sign-on	✓	✓	Provision for users to log into CDX and seamlessly move between CDX and back-end applications.
User Profile Management	✓	✓	Provision for users and the Help Desk to set/reset passwords and change other preference features.

Data Security/Integrity Services			
Name of Service	**Web**	**Node**	**Service Description**
Certificate Issuance	✓	✓	GSA ACES public digital certificates can be issued by CDX Web; Exchange Network uses private certificates to control Exchange Network access.
Certificate Validation	✓	✓	Interrogate certificate fields and certificate authorities to determine issuer, expiration dates, and revocation status in order to assure current validity of certificates.
Electronic Signature	✓	✓	Provides an eSignature capability, including validation of the eSignature after files are submitted, documentation of eSignature Chain of Custody, and tracking of the eSignature using a double hash process when a new user registers, changes their password, or resets their password.
Data Encryption	✓	✓	Use of AspEncrypt/Xencrypt and Java security toolkits to protect data from unauthorized access.
Digital Signatures/PKI	✓	✓	Provide digital signature mechanisms to legally associate submissions to user identities.
Key Management/XKMS		✓	Key management services are used to control the distribution and registration of public keys used in PKI solutions.

Data Submission/Exchange/Distribution Services			
Name of Service	**Web**	**Node**	**Service Description**
Web Forms/File Upload	✓	✓	Provision of XML-based web forms and file upload controls to facilitate user entry or selection of submission data.
Submit, Solicit, Query, Download Clients and Web Services		✓	Basic web services required to perform basic Exchange Network data collection services.
Scheduled Retrieval/Submission		✓	Use of schedule automation tools in order to perform data collection/retrieval at predefined intervals or on a predefined schedule.
Lotus Notes Replication	✓		Perform replication with existing EPA Notes databases to move submissions from CDX to legacy EPA applications.
FTP/Secure Copy	✓		Transfer files to and from directory structures/folders on remote computing platforms.
SQLNet	✓	✓	Perform direct insertion or queries against legacy Oracle databases.
HTTP/HTTPS Posts/Gets	✓		Use HTTP mechanisms to upload binary and text data to Web enabled servers and receive result sets. (Pay.gov)
Geospatial Data Exchange Z39.50 Support		✓	Enable retrieval of Geospatial data catalogs from external sources to allow for data aggregation and consolidation.

Data/Document Management

Name of Service	Web	Node	Service Description
Archiving/Copy of Record	✓	✓	CDX provides archiving of initial data submission files, translated/transformed versions, and associated signing/encryption items. CDX also archives result files, such as any data validation or QA results returned from the processing facility. Capabilities also include an Archive Retrieval Process that supports CROMERR.

Data Enhancement/Augmentation Services

Name of Service	Web	Node	Service Description
Data Enhancement/Augmentation	✓	✓	CDX has the capability to extract user or embedded data information in order to enhance submission routing, content and workflow.

Data Transformation/Translation Services

Name of Service	Web	Node	Service Description
File Translation Services	✓	✓	Translation of submission files from XML to Flat File formats or vice versa.
File Transformation Services	✓	✓	Processes for transforming XML documents into HTML, text, or other XML document types.
File Compression/Decompression	✓	✓	Submission files can be extracted form approved compression formats or compressed for reduction in data transmission size.

Data Validation Services

Name of Service	Web	Node	Service Description
XML Validation (Schema Conformance)	✓	✓	Interfaces for checking the validity, i.e., structural integrity and correctness, of XML document instances.
Schematron Validation (Business Rules	✓	✓	CDX uses Schematron services (an XML schema language) in order to validate the content of XML instance documents by checking extended business rules that schema can't validate.

Notifications/Messaging Services

Name of Service	Web	Node	Service Description
Subscription Notification Services			Provide e-mail communications to subscribers, such as the EnviroFlash air forecast e-mail alerts.
Transaction Status/Error Handling Notifications	✓	✓	Provide users and partner nodes with information on error conditions and current processing state of submissions and exchanges (e.g., Pending, Complete, In-Review, etc.).
E-mail Notifications	✓	✓	Send e-mails to the user in response to completion of processing events and system validation failures (out of band).
"My CDX" Inbox Notifications	✓	✓	Transaction messages can also be provided to the user via Portal-like Inbox functions.

Logging and Auditing Services			
Name of Service	**Web**	**Node**	**Service Description**
Transaction Logging	✓	✓	All archived file submissions are written to a transaction log, capturing the date/time of the submission, file name, and who uploaded it.
Auditing	✓	✓	Auditing for CDX-web file submissions occur via flat file logs; user data is audited using Oracle audit tables/triggers.

Database Extraction/Loading Services			
Name of Service	**Web**	**Node**	**Service Description**
Database Extraction /Insertion (CDX Mapper/Hibernate ORM Tools)			Tools that move data between XML and SQL formats.

Metrics Collection Services			
Name of Service	**Web**	**Node**	**Service Description**
Metrics Collection	✓		CDX provides automated mechanisms for collecting usage, performance, and summary information on CDX systems (Web Trends, Help Desk Reports).

Monitoring/Management Services			
Name of Service	**Web**	**Node**	**Service Description**
Service Availability Monitoring		✓	Capabilities exist to determine the active status of other Nodes on the Exchange Network (Node Ping).
Service Alerts	✓	✓	In the event of service interruption, CDX automatically notifies maintenance personnel and system partners to using tools such as Aspect J Tool (Node) and TechScheduler (Web).
Process and Resource Monitors	✓		CDX uses third party tools to monitor resource utilization and process activity.

Data Visualization/Presentation File Services			
Name of Service	**Web**	**Node**	**Service Description**
Mapping Interfaces		✓	Visual representation of textual or tabular data in a geospatial reference frame is supported.
Portable Document Format (.PDF) File Creation	✓	✓	Creation of Portable Document Format (.PDF) files from other formats or external sources are supported.
Excel/Comma Delimited Spreadsheet File Creation	✓	✓	Allow users to download reports in tab-delimited flat files or Excel spreadsheets.

Registry/Discovery Services			
Name of Service	**Web**	**Node**	**Service Description**
ENDS – Exchange Network Discovery Services		✓	Dynamically find and bind partner web services.
Universal Description, Discovery, and Integration		✓	CDX contains a registry used to publish service listings, discover each other, and define how the services or software applications interact.

Submission/Process Workflow Management Services			
Name of Service	**Web**	**Node**	**Service Description**
Submission Workflow Mgmt (Certification, Approval, etc.)	✓	✓	CDX supplies mechanisms for defining and controlling user data processing workflow, such as allowing files to be submitted by a 1st individual and then certified by a 2nd individual prior to transfer to backend systems.
Business Process Execution Language Engines (BPEL)		✓	XML-based Business Language is used to enable task-sharing for a distributed computing environment - even across multiple organizations. Simplifies and lowers costs of dataflow development and business process changes.
e-Gov Initiatives			
Name of Service	**Web**	**Node**	**Service Description**
Pay.gov	✓	✓	Payment system to permit online transactions such as the payment of license fees.
Grants.gov	✓	✓	Links grant recipients to the IGMS database for grant processing.
e-Authentication Gateway	✓	✓	Pilot in partnership with GSA to provide an identity management mechanism for identity credential re-use across computer systems within the federal government.

Technical Support Services

CDX Development Services			
Name of Service	**Web**	**Node**	**Service Description**
Solution Engineering	✓	✓	CDX provides IT engineering and design services to facilitate secure data collection and data exchange between partners and regulated entities.
Security Planning	✓	✓	Confidentiality and integrity of customer information and data is ensured through formal assessments of both design and infrastructure, and compliance with EPA and Federal Information Processing Standards.
Flow Development/Implementation Support	✓	✓	Skilled project managers and development staff are available to host applications using a wide range of development platforms and technologies; Java/JSP, J2EE, VB/ASP, C#/.Net, ColdFusion, Oracle, and Lotus Notes.
Implementation, Operations, and Maintenance	✓	✓	CDX supports round the clock operations and maintenance of data collection elements and infrastructure.

Client Support Services			
Name of Service	**Web**	**Node**	**Service Description**
Hotline Technical Support	✓	✓	Provide assistance to users in the initial establishment of accounts, program usage guidelines, and error troubleshooting.
Customer Service Tracking and Reporting	✓	✓	Customers are provided monthly reports of call volume, resolution rate for user-related call tickets, and incident profiling.
User Guides	✓	✓	Development of documentation containing instructions on appropriate use of the system.
Training and Outreach on the CDX System	✓	✓	Provide users and other stakeholders with information and insight on program offerings.
Customer Surveys	✓	✓	Collect customer satisfaction data via surveys or other feedback mechanisms.
Client Support Metrics	✓	✓	Provide customers with data on number of client registrations, data flow usage, number of submissions, etc.
Identity Proofing/Local Registry Authority (LRA)/Wet Ink Signature Reconciliation	✓	✓	Serves as a Local Registration Authority in order to provide user identity proofing services in support of digital signature key distribution.

Document/Reporting Center Services

Document/Reporting Center Services			
Name of Service	**Web**	**Node**	**Service Description**
Document Collection	✓	✓	Provide mechanisms for receipt of paper-based user submission data.
Data Entry/Data Capture	✓	✓	Manual entry of data into program systems or electronic scanning of paper-based products.
Paper & Diskette Processing	✓	✓	Receipt and cataloging of paper, magnetic media, and other materials and having proper procedures for withdrawal or resubmission.
Data Validation, Error Check, Reconciliation	✓	✓	Perform quality control activities for manual handling of submissions, including sending out user action notifications.
Data Filing/Storage	✓	✓	Maintaining document filing, indexing and tracking systems.
Digital Imaging	✓	✓	Convert printed records to raster-scanned digital images of original pages and perform quality review of the digitized images.

Responsible Organization

CDX is managed by EPA's Office of Environmental Information, Office of Information Collection (OIC).

For additional information or assistance please contact:

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Getting Started

This section describes the steps necessary for successfully implementing a new data flow through CDX. It focuses on electronic flows, but most of the steps apply equally to paper flows as well. It also describes how CDX operates and maintains data flows.

INITIAL PLANNING OF A CDX PROJECT

These initial steps occur prior to engaging the development contractor and will help with the planning and scoping of your project. This planning phase will help to ensure a well-scoped project and minimize delays due to unclear requirements.

Identify your CDX contact - CDX is managed in the Information Exchange Technology Branch (IETB) in the Office of Information Collection (OIC) under the Office of Environmental Information (OEI). Programs interested in using CDX should contact Charles Freeman, Chief of IETB, at 202-566-1694 or freeman.charles@epa.gov. A CDX project manager will be assigned to help the customer through the rest of the process.

Conduct an information sharing session – The CDX staff is dependent on the expertise of program offices to understand the specific business requirements, drivers, and limitations that will define your project. A preliminary meeting with the assigned OEI project manager will provide a general understanding of the data flow requirements, time frame for implementation and budget situation. This will establish a focus on the project scope.

Complete an initial questionnaire - CDX staff have developed a list of commonly asked questions that will assist in further understanding the customer's needs and set the stage for engaging the CDX contractor. Completing this questionnaire will help to define the requirements for the project and decrease the time spent by the contractor to define the scope of the project. Please see Appendix A for the CDX Requirements Questionnaire.

Determine the project's Cross-Media Electronic Reporting Regulation (CROMERR) applicability - All applicable electronic data flows are required to conform to the CROMERR standards by October 13, 2007, in order to accept or to continue accepting electronic reports. Applicable flows are defined as any electronic exchange where the authorization to collect the data is granted under Title 40 of the *Code of Federal Regulations* (CFR). Programs will need to determine whether their electronic data collections are subject to CROMERR and whether or not they are a priority data collection. The Information Exchange Partnership Branch (IEPB) can help to determine the data collection's CROMERR applicability. For more information, please contact David Schwarz (schwarz.david@epa.gov) or Evi Huffer (huffer.evi@epa.gov).

ADDING WORK TO THE CDX CONTRACT

These steps occur as a customer is ready to put work and funding on the CDX contract.

Develop a Statement of Work - A statement of work (SOW) is the document that describes, in detail, the work that the CDX contractor is expected to perform. The CDX contractor will respond to an SOW with a Subtask Area Plan (STAP). The Subtask area plan will include a statement of the contractor's understanding of the requirements, a cost estimate, a cost estimate and a schedule for completion. The CDX point of contact can assist in the development of the SOW. Generally the SOW includes the following information:

- Title of project
- Point(s) of contact
- Schedule and Period of Performance
- Background
- Description of tasks
- Deliverable(s)
- Risks and assumptions

The customer, in conjunction with their CDX project manager, will also need to develop an Independent Government Cost Estimate (IGCE) to estimate the cost of the project. The IGCE is for EPA reference only and is not given to the contractor.

Identify a source of funding - When an SOW is submitted, the CDX contractor will begin to create the STAP and incurring costs. Prior to this occurring, CDX customers will need to identify a minimum amount of funds to support the contractor's STAP and provide the necessary funding documents. The customer's CDX project manager will work with you to estimate the amount of funds initially needed. In general, the cost of developing a STAP has a range of $2,000-$4,000. At this time, the customer may put additional funding, as indicated by the IGCE, on the CDX contract to provide funding for the work after following the development of the STAP. When determining the funding amount to be sent over, please note that the CDX contract has two fees to be aware of: A General Services Agreement Millennia Contract Access Fee (CAF) and a Contract Financial Management Fee (CFM). The CAF fee is applied by GSA to allow OEI to access the Millennia Contract and is .75% of the total cost proposal. The CFM fee is applied to cover the IETB contractor overhead and is 7% of the total cost proposal. The CFM fee is applied first to the project work total. The CAF fee is applied to the total of the project work and the CFM fee.

In addition, since most CDX data flows interface with EPA's National Computing Center (NCC) managed by the Office of Technology Operations and Planning, additional costs may be incurred for applications and databases that you own in the NCC. If you do not have a contact for the NCC, your CDX contact will assist in finding one.

Submit your request – The CDX project manager will assist customers with submitting the SOW package to the CDX project officer. The CDX project officer will ensure that your request is formally submitted for response and in accordance with contractual rules. The package to be submitted should include:

- SOW
- CDX Questionnaire
- Requested response date to the SOW
- IGCE
- Any supporting documentation

At this point the CDX contractor will review your SOR and begin generating the STAP. The STAP provides EPA with the contractor's understanding of the scope of work and estimated schedule and cost to complete this work.

Get the right people involved – At this point, customers should identify the critical program, technical and legal staff in their office that will participate on the Integrated Project Team (IPT). IPTs are composed of the critical EPA and contractor staff that will work through requirements and make decisions throughout the development of the project. IPTs minimally consist of the customer, the CDX project manager, and the CDX contractor project manager. They often expand to include other important programmatic staff, and additional contractors that are working on the project. During the project, the IPTs meet regularly to discuss progress and provide feedback to the CDX contractor. The earlier the IPT is formally recognized the better.

In addition, the program office should involve external stakeholders early in the development of the project for several reasons: to obtain stakeholder support, obtain stakeholder insights into the data flow and potential enhancements, give stakeholders time to develop their applications, and to obtain testers

Work though any issues - Often some adjustments need to be made to the STAP either based on a misunderstanding or recent change in the requirements. The IPT should work through these changes so that the CDX contractor can make any revisions to the STAP.

Receipt of the STAP – The contractor will return the STAP within the specified timeframe. At this time, the customer, in conjunction with the CDX project manager, should review the STAP to ensure that the contractor understands the requirements. The customer should also review the contractor's cost estimate against the IGCE. Customers may negotiate the cost estimate if it does not meet their expectations based on the amount of work requested. At this point, the customer may accept, reject, or request a modification or new cost estimate. If the customer accepts the STAP, they should email the CDX project manager and project officer recommending approval of the STAP. The program office will be expected to provide full funding for the project, either incrementally or with a full commitment at the beginning of the project. As previously mentioned, the GSA and CFM fee apply. The following is an example of the cost of funding a project.

The total amount of the project work indicated from the returned STAP for Program A is $90,000. The CFM charge is 6,300 ($90,000*.07). The CAF charge is $722.25 ($96,300*.0075). The total amount that needs to be committed to the contract is 97,022.25. The following formula has been created to determine the overall project development costs: Total Funding Request (TFR) = Project Work (PW) * 1.078025

Begin Work - The CDX contractor will initiate a kick off meeting with the IPT. In this kick off, the IPT would also agree to other logistical items like acceptable methods of communication, date and time of regular meetings, and expectations of Team members.

CDX Project Lifecycle

Business Analysis and Requirements Determination

In this phase, the IPT will work together to thoroughly understand the program's business requirements. This will involve reviewing and validating the requirements listed in the SOW and the CDX questionnaire. The CDX contractor will develop questions to further understand and elucidate the intended scope of work. This end of this phase is marked by the production of a document known as the Systems Requirements Specification (SRS). This key document details the specific functions that CDX will provide the program office.

SYSTEM DESIGN

The next step is designing the system. The key output for this step is the System Design Document (SDS), which details the exact steps and methods that will be used for implementing the data flow. It presents the detailed design to implement the requirements defined in the Sub Task Area Plan (STAP) and Final System Requirements Specification (SRS), and often consists of charts and diagrams that portray the system. The SRS is usually divided into sections, such as project history, management approach, design overview, and detailed architecture and design.

The SDS is reviewed by the customer to evaluate the validity and completeness of the design, and to ensure that the data system owner and other contract personnel understand and agree on the design. Once the document is approved by the data system owner, it is placed under configuration control and becomes the development baseline.

DEVELOPMENT (PROGRAMMING)

Using the SDS as the baseline, the programming work begins. This work can range from simple to complex. The simplest flow would be to accept a data file (XML or flat file), archive it, and make it available for the program offices to pick up on the distribution server. Alternatively, CDX can give the program office such custom support as interim database support or highly sophisticated data transformations.

In general, CDX contract personnel will develop the programming for the new flows. In some instances, the program office may choose develop the application separately and port it to CDX for hosting. The designed application must conform to the CDX specifications and environment. The program office will need to develop the application using software and protocols consistent with CDX guidelines, so careful coordination must occur if a program office intends to use CDX to host an application.

During programming and subsequent testing (and sometimes at previous and subsequent stages) changes are often necessary. As design and implementation proceed, new requirements may emerge, or the environment may change. With the SDS under control of CDX Configuration Management (CM) staff, changes are documented by developers by submitting a system change request (CR) to CM staff. In addition, newly developed systems are rarely perfect, so errors must be identified and corrected. CR reports identify all of the errors and are generated as needed. When OIC and the program office staff decide on significant changes in the requirements that affect cost or schedule, the changes are documented in the CR system.

TESTING, VALIDATION, AND USER ACCEPTANCE

Testing occurs in phases. The scope of testing will reflect the size, complexity, and importance of the data flow. Typically, CDX technical staff conducts internal testing. They confirm that the test plan and RTM are consistent with latest requirements, the test plan is up-to-date, test data has been obtained, all test members have digital certificates (if needed), test scenarios are documented, test user accounts established, and the test schedule is feasible.

Types of Testing

- Unit Testing- Testing of individual component of the system and is performed by developers.
- System Testing-(black box) Testing the complete system. Test cases are generated based on software specification and is performed by independent testers.
- Subsystem Testing (Integration testing) Testing of interfaces between integrated components and is performed by independent testers.
- Acceptance Testing-Verifies that the system meets the initial objectives and user's exceptions. This is used to prove that the system works and is known as the Positive Testing and usually performed by the end-users.

Testing Documents

- Test Plan – a document describing the scope, approach, resources and

scheduled testing activity.

- Test Cases – the collection of inputs, expected results, environment and procedural requirement for a single test.
- Traceability Matrix-mapping test cases to requirements and use cases

Once testing is successfully completed, the program office staff accepts the system as operational. Defining acceptance criteria early in the project is helpful. When accepted, the system is finished and becomes available to external users.

MOVING TO PRODUCTION

CDX consists of a multi-tiered architecture that allows different stages of system development to occur without interfering with other projects or even different parts of the same project. The tiers include:

- *Development*—Programming begins in this environment.
- *Test*—When the application is deemed ready for testing by the program office staff and external testers, the application will be moved into the test environment.
- *Production*—After the application has been tested successfully and the client has accepted it, the application is moved to the production tier.
- *Demonstration*—Applications (usually when they are in test mode) can be isolated for short periods for critical meetings and demonstrations.

The procedure for moving a new data system into production includes confirming the scheduled deployment date, creating release notes, obtaining IPT Approval, conducting a Production Readiness Review (PRR), obtaining CDX Configuration Control Board (CCB) Approval, and the CDX Configuration Management staff performing the production deployment.

The move to production may be a critical step in terms of meeting agency commitments and often must be coordinated with other activities. Where possible, the program should allow adequate time for moving the application to final testing and for providing final documentation.

CDX Technical Support personnel generally start to become familiar with a data flow during the testing. They are employed to help with testing and documentation. The program office should provide whatever information is available about the data flow and the user population early in the process so CDX Technical Support personnel can give external users high-quality service.

SYSTEM ENHANCEMENTS

Once a new system goes into production and the requirements of the STAP have been fulfilled, changes outside the scope of the initial STAP will be considered system enhancements. Depending on the scope of system enhancements, they will typically follow the standard project Life Cycle. Common enhancements include the addition of functionality to a data flow or the integration of a new technology that helps an existing functionality run more efficiently. The customer will be responsible for costs associated with enhancements.

OPERATIONS AND MAINTENANCE

EPA collection efforts vary dramatically. Some require annual submissions by a given date, others are periodic (e.g., monthly), others are continuous. The volume of submissions also can vary dramatically. Collections can come from states, directly from facilities, or both.

The submittal requirements will directly affect the CDX approach and resources for maintaining the flow of data. The submittal requirements must be planned for at the first requirements gathering. The customer will be responsible for the operations and maintenance costs for their system.

PROJECT COORDINATION

Proper coordination of the project is critical to success. A typical project may involve the CDX staff, program office staff, external stakeholders, CDX support contractors, and possibly program office contractors. CDX staff and its contractors assign single points of contact to support each project. The program office should consider nominating a person who can commit the program office and has access to all required program office resources. OIC will work closely with the program office staff to manage the budget, schedule, progress, and functional or technical issues.

It is important to note that customers often serve as the Contracting Officer's Representative (COR), known in the CDX project as Sub-Task Area Contracting Officer's Representative (STARCOR), for their projects. This allows the customer to be able to directly control the work being performed by allowing them to provide technical direction to the contractor and review and approve monthly financial review statements (MFSR). In order to serve as a STARCOR, the individual must be COR certified.

PROJECT COSTS

Depending on the size and complexity of the flow design, costs for implementation and operations and maintenance can vary dramatically. The project also can be funded by a number of sources. OIC provides for CDX base funding, while system modernization funds and program office funding can be used for new systems. OIC staff will review estimated costs with the program office early in the design phase.

Appendix A: CDX Requirements Determination Checklist

Introduction

This checklist is designed to facilitate the gathering of requirements for prospective data systems that are interested in using the Central Data Exchange (CDX). It consists of common services that are provided by CDX as well as questions to scope the resources necessary for supporting a prospective data flow. The requirements checklist will be used as an integral part of creating a Subtask Area Plan (STAP) and cost estimates for the design and development of data systems.

BACKGROUND

1. Program Office point of contact:

2. Office and organization requesting CDX interface:

3. Name and acronym of Application/System in which CDX will interface:

4. Proposed CDX data flow name and acronym for CDX (if different from application name)

5. What is the purpose of the proposed CDX interface and application in relation to the Organization's overall mission?

6. Briefly describe the flow of data from the originator to all recipients.

7. How does the Program Office measure the success or effectiveness of this part of its business? (i.e., what are the key measures used to gauge the performance of the current application

8. What baseline data is available for the performance of the current application?

9. In order of priority, please rank the following five categories as they relate to your program and your expectation in implementing a CDX data flow

___ Cost (e.g., Cost/Submission, Total Cost to operate application)
___ Data Timeliness (how soon data is available to each stakeholder group)
___ Data Quality (how many errors are in data submissions)
___ Accessibility of Data (how broadly available data is to stakeholders)
___ Customer Satisfaction (from across each stakeholder group)

10. What is the desired timeframe for initial CDX interface implementation?

11. For what duration do you require this CDX collection process once implemented?

12. Have you identified all stakeholders and prepared a team charter for this project?

CROSS-MEDIA ELECTRONIC REPORTING RULE (CROMERR) REQUIREMENTS

1. Does the authority for the proposed electronic data collection come from regulation under Title 40 of the Code of Federal Regulations?

2. Has the authority to collect the information been delegated to any States, Tribes, or otherwise responsible parties?

3. Has the proposed data collection been listed as a Priority Report by the Office of Enforcement and Compliance Assurance (OECA)? For a list of Priority Reports look for appendix 1 to Part 3 in the CROMERR Rule. The final rule can be found at: www.epa.gov/exchangenetwork/cromerr/CROMERRfinalrule101305.pdf

4. Does the proposed data collection require a signature for submission under the Title 40 CFR Regulation?

5. What is the required retention length of the electronic submission? (Please reference the applicable NARA Schedule, if one exists for the data).

6. What is the frequency, likelihood or necessity of tying a specific submitter to the actual submission in a court of law? Are there civil or criminal penalties associated with violations of the regulation that covers the proposed data collection?

7. Please see the CROMERR checklist. After reviewing it, please select the requirements, as applicable, that you would like CDX to meet. The requirements not selected will need to be met by you as the program office. For example, some programs haven chosen to handle identity proofing or copy of record requirements.. When selecting the method for proving the identity and authenticating users, it is imperative that you consult with your OECA representatives to confirm the options selected.

REGISTRATION AND AUTHORIZATION OPTIONS

1. CDX offers three main types of registration options. Please select from below the option that best fits your needs. If none of the standard options seem applicable, CDX can employ a combination or other registration options.

    a. **Open registration**- The submitter self-registers on CDX any time without advance approvals required
        i. Generally used with low/no risk and low/no sensitivity data submissions or there is no contact information is available for users. It can used in combination with an additional identity proofing method such as Public Key Infrastructure (PKI) or a handwritten signature on an electronic signature agreement.
        ii. Less registration burden on EPA

    b. **Pre-registration**- A closed process where you will provide CDX staff electronically with the contact information for each user and the data are preloaded into CDX. The user is given an alphanumeric key via the phone or postal mail and uses it to register on CDX.
        i. Generally used with low/medium risk and low sensitivity data submissions

ii. Must provide the following information for each user
    1. full name
    2. business address
    3. business phone
    4. business email address
    5. TSSMS ID (if applicable)

c. **Dynamic Pre-Registration**- Similar to the pre-registration process. Instead of a key generated by CDX and sent to the user, the user enters in a piece of private information previously and mutually known by the user and CDX.
    i. Generally used for low/medium risk and low sensitivity data submissions
    ii. Program office already has contact information available electronically for all users

2. Authorization allows a user to access an application whereas registration allows for the creation of a CDX account. CDX has multiple methods of ensuring proper access to a data flow. Please review the standard options below and select the option that best fits your needs. If none of the standard options seem applicable, CDX can employ a combination or other Authorization Options.

a. Automatic Authorization
    i. Used in flows where the data is of a very low sensitivity or in pre-registration flows where there is a known relationship between the EPA and the user. The user, upon creating the account or using a CRK, is able to access the selected data flow.

b. Restricted Authorization-Sponsor Letter/Electronic signature Agreement
    i. Used in flows where an electronic signature is required or where a handwritten signature is used as a form of identity proofing. The user cannot access the data flow until EPA receives the required document and makes a determination to permit or deny the user access to a data flow.

c. Restricted Authorization-Digital Certificate Agreement
    i. Used in flows require stringent identity proofing and a digital signature. The user is not activated until they complete and return a digital signature agreement, are identity proofed, and receive a digital certificate which is stored on their machine.

3. Data Flow Registration Account Management
a. CDX provides two options for maintaining user accounts for a given data flow. Please select from below which of the options best fits your needs.

i. **CDX Help Desk Account Management**
    1. The CDX Helpdesk will act as the account manager for the data flow. All decisions regarding the activation or revocation of accounts or credentials must be communicated to the Help Desk

ii. **Program Account Management through the Registration Maintenance Account Manager (RMAM) System**
    1. The Program is delegated the responsibility for making authorization and revocation decisions for their data flow
    2. This requires obtaining a digital certificate for each person who will serve as an RMAM

SECURITY AND SENSITIVITY OF DATA

1. Does your data flow contain CBI, enforcement sensitive or other non-public data in which there are consequences if the data were released?

2. Based on NIST Guidelines, "Standards for Security Categorization of Federal Information and Information Systems", December 2003, categorize the data among low, medium (CBI) and high risk in terms of the following:

a. Availability (Low, Medium, High)
b. Integrity (Low, Medium, High)
c. Confidentiality (Low, Medium, High)

3. What program related procedures, such as those in existing SOPs and security plans, must be taken into consideration if confidential or sensitive data is involved as part of the submissions?

4. Provide contact information for the following individuals in your office (name, address, phone, email, EPA organization

    a. Information Management Officer

    b. Application Manager

    c. Application Security Plan Author

    d. Primary Organization Head (office director)

    e. Senior Information Resources Management Officer

    f. Authorizing Official

5. Was this project reviewed as part of the FY 2004 Federal Information Security Management Act review process (ASSERT)?

    a. If yes, were any weaknesses found?

6. Please Review the CDX Security Advisory in Appendix

CAPACITY, PERFORMANCE, AND AVAILABILITY

1. How many users expected at:
    a. initial roll out-
    b. one year-
    c. three years-
    d. five years-

2. Briefly describe a production roll out plan?

3. What is the expected turn around rate for availability (in the target system) of data submitted?

4. Identify any predictable peak submission periods including frequency, dates and number of users submitting

5. Identify any peak user registration periods including frequency, dates and number of users submitting

6. Provide any information you know about the amount and size of file or paper submissions coming into the Agency

a. Average file size-
b. Median file size-
c. File size range-
d. Number of files in a submission-
e. Number of submissions per user in a given time frame-
f. Zipped and unzipped measurements (if applicable)-

7. Is there an existing Continuity of Operations Plan for the target system?

8. What is your required up-time for CDX functions?

a. 100% or 24x7
b. 95% or 23.5x7
c. During normal working hours (9 to 5)
d. Other, specify

USER PROFILE

1. Provide a brief description of the CDX users.
   a. Who do they represent?
      i. EPA HQ
      ii. EPA Regional
      iii. State Governments
      iv. Local Governments
      v. Large corporations
      vi. Small companies
      vii. Citizens

   b. What is their knowledge level and capacity for IT and systems?
      i. Extensive knowledge and managing own networks and data systems locally comparable to the National System and high-range Internet bandwidth
      ii. Some knowledge with managed networks and applications locally and mid-range Internet bandwidth
      iii. Some knowledge with current computer desktops and mid-range Internet bandwidth
      iv. Basic or little knowledge of computers and the web (only) with mid-range to low-range Internet bandwidth

TARGET SYSTEM

1. Where is the target system, to which CDX will deliver data, physically located at (or where will it be if in development)?

   a. Inside EPA?
      i. The National Computer Center
         1. Please Reference the ADC

      ii. Other Location (please specify)

   b. Outside EPA?
      i. What are the address, city, and state?

2. Identify ports and protocols currently used to deliver and access data electronically

3. Does the system data comply with existing EPA data standards? If system is not built, do you intend to design data fields to comply with data standards? If you are unsure, please contact the data standards branch.

CDX APPLICATION INTERFACE

1. Briefly describe your current method of data submission

2. Please indicate your preferred design for your CDX Interface (high level options)
   a. Web forms
   b. Web forms and file upload
   c. Web file upload only
   d. Machine-to-machine with web services
   e. Node client
   f. CDX hosts a previously designed application
   g. Other (please specify)

PROGRAM OFFICE AND REGULATORY REQUIREMENTS AND TIMEFRAME

1. Do you have any drivers influencing the completion of an electronic submission process? Examples include regulatory or commitments made to stakeholders.

SYSTEM FILE FORMATS

1. What type of data/file formats do you accept?

2. What file naming conventions do you accept?

3. Do you require multiple file submissions at one time?

USER NOTIFICATIONS

1. Are there requirements to notify certain individuals on the progress of data transmissions? (note if you are a CROMERR system and require a signature, there is a requirement to notify users of completed submissions)

2. Should multiple individuals be notified?
   a. Submitter
   b. EPA Program staff
   c. EPA Systems staff
   d. State or other reviewing authority

3. Where in the submission process should the individuals be notified?
   a. E-mail notification of CDX receipt of data
   b. E-mail notification of CDX successful/unsuccessful translation of data (if applicable)
   c. E-mail notification of CDX delivery to target system
   d. E-mail notification of acknowledged receipt and load by target system

TESTING

1. How many people will participate in testing the CDX data flow?

2. Do you anticipate a phased approach to testing? How many phases?

3. How do you plan to engage your testers?
   a. testing on their own using a test plan and script
   b. formal demonstrations
   c. live usability testing
   d. Combination

4. When is the desired time frame and duration for testing?

NODE CONFIGURATION

1. Will this flow involve a component of the Environmental Information Exchange Network?

2. Will you be building a node as part of the planned work? If yes, please visit www.exchangenetwork.net for node configuration suggestions.

DATA WORK FLOW

1. Data Quality and Validation
    a. Do you require that data submitted be validated or checked for errors prior to an acceptance of the submissions?
    b. Approximately how many edit checks are required?
    c. Q/A Methods available:
        i. XML validation with schema
        ii. XML validation with extended rules
        iii. Web form pick lists
        iv. Web form 'optional vs. mandatory

2. Data Translation
    a. Do you require CDX to convert data and/or file formats before delivering to the target database?
        i. XML to flat file (comma delimited text)
        ii. XML to another format
        iii. Data manipulation

3. Review and Approval Processes
    a. Does the submission require an interim review/approval by more than one party before submission?
    b. Is the individual completing the submission also the person approving and submitting the data?

REPORTS AND OTHER OUTGOING DATA

1. Do you require reports to be delivered back to the user?
   a. Error reports from back end q/a process
   b. Data files from queries
   c. Copy of Record of submission (note: this is a CROMERR Requirement for all CROMERR flows)

2. What format(s) will these reports be provided (e.g XML, ascii, PDF)?

3. How do you want reports delivered to the user?
   a. My CDX In-box (SSL)
   b. Email
   c. FTP site
   d. Web site
   e. SSH
   f. Table insert to another application

4. What are the retention requirements for data that is returned to users?

DOCUMENTATION

1. What documentation would you like for your flow? Note: CDX automatically provides for the creation of a Security Plan Addendum and an Operations and Maintenance Manual at no charge.
   a. Systems Requirement Specification (SRS)-Highly Recommended. This document details the requirements from the SOR and is the baseline document for which the flow will be built
   b. System Design Document (SDD)-Highly Recommended. This document details the technical design of the data flow.
   c. Test Plan-Highly Recommended
      This document lists the test cases that the contractor and testers will use for testing the system
   d. User Manual-Recommended
      This document will be provided to the user to help navigate the data flow. In addition, it can be provided to the Help Desk to assist with user help requests.
   e. Software Release Notes- This document defines the operating parameters of the system when it is released to production

f. Interface Control Document (ICD)-
This document describes the interconnection between CDX and the backend system which will receive the data. This is generally necessary for more complex connections.

HELP DESK SUPPORT

CDX provides basic Help Desk Support in the four areas as part of the services offered to customers. This basal level of Help Desk Support includes the following:

- **a.** Assisting with Registration
- **b.** General User statistics
- **c.** Basic Flow Trouble Shooting (TIER 1 Support)
- **d.** Creation of Help Desk Tickets for referral to developers

1. Will you require any further Help Desk Support then what is provided in the basic services? Please realize that any flow specific reports, service outside of the basal level of support (TIER 2 and above), or other customizations are provided at the expense of the Program Office.

2. CDX can set up a dedicated Help Desk for specific data flows that will focus on assisting users for an individual data flow at the expense of the Program Office. This could be set up during peak periods for data flows with many reporters to assure more direct service. Would your flow be a candidate for a dedicated Help Desk?

Appendix B: Statement of Work Template

XX – XX Statement of Work

Project Title: *Insert Your Project Title here*

Period of Performance: *Identify start and end dates of the Period of Performance*

Points of Contact:

Contracting Officer	Lin Pinskey	(202) 564-4394
Task Order Contracting Officer's Representative (TOCOR)	Michael Hart	(202) 566-1696
Subtask Area COR (STARCOR)	*Insert Name*	(202) 566-1693
Alternate STARCOR	*Insert Name*	(202) 566-1626

1.0 Background

Insert background information on the project (e.g., Program office name, overview of the data flow, what is being reported, how often, existing reporting systems or databases, what is new about this data flow, expected end date, additional reference or background information)

2.0 Purpose

Identify the purpose of the project (e.g., support needed to successfully implement the XXX data flow though CDX).

3.0 Subtask Area Requirements

Subtask Activity 3.1 - Subtask Area Proposal Preparation

The contractor shall create a draft Subtask Area Work Technical and Cost Proposal Plan (STAP) within ten (10) business days, or the contractor shall request a delay and explain the rationale for the delay request. The STARCOR may approve the STAP as submitted, or the STARCOR, TOCOR, CO and the contractor shall participate in a teleconference call to discuss the STAP. The contractor shall identify, by Subtask Activity, all subcontractors it is planning to use on this SOW.

Subtask Activity 3.2 - Project Management

3.2.1 The contractor shall be responsible for managing costs within the budget parameters established by the approved STAP. The contractor's project manager, identified as the individual responsible for ensuring that the required quality levels and schedules in the approved STAP are maintained and schedule dates are met, shall be responsible for notifying the contractor's Program Manager, as soon as any real or potential problems are apparent or suspected.

3.2.2 The contractor shall participate in meetings for this Subtask Area, as directed by the STARCOR. The STARCOR will schedule and conduct meetings in concert with the contractor. In addition, the contractor shall be available to answer questions via e-mail, telephone, meetings, and Bi-Weeklies if required. The STARCOR may require knowledgeable members of the contractor's project team to attend meetings and the Bi-Weekly to respond to questions, as well.

3.2.3 The contractor shall immediately notify the STARCOR or Task Order Contracting Officer Representative (TOCOR) and Contracting Officer (CO): of all actual or potential problems that are or could potentially be encountered, when costs are over-running or under-running the approved budget and/or dates can not be met. The notification shall include an explanation for any deviations from the approved STAP. Notification shall be by 1) telephone and 2) either e-mail, Problem Notification Reports (PNRs), or both e-mail and PNR. The contractor shall raise any issues of concern or questions related to the tasks in this SOW to the CO, STARCOR and TOCOR.

3.2.4 Management reporting consists of preparing the content included in the Monthly Program Management Review (PMR) and the Monthly Financial Status Reports (MFSRs). The contractor's Project Manager shall also produce content for the Bi-Weekly Status Report, and shall be available to attend the Bi-Weekly Conference Call, if required, to address and respond to issues that have surfaced during the reporting period and answer any questions.

3.2.5 The contractor shall create a separate cost element associated with this SOW, if applicable, for operations and maintenance, systems engineering, and a development manager's labor charges, **but only if applicable**.

3.3 Subtask Activity 3 - *Provide Activity Name*

Note the following are examples of two general types of activities (1) Consulting Services and (2) Flow Development.

Consulting Services

The consulting includes but is not limited to the following activities:

Meet with other Support Teams. The contractor shall meet with other support teams, as directed in writing by the STARCOR, to provide current information on about, for example, the Environmental Information Exchange Network, Agency Service-Oriented

Architecture (SOA) initiatives, CDX standard services and processes, and/or to consult on requirements, architecture, and design in support of the data flow.

Review documentation. The contractor shall review available documentation (e.g., process/architecture diagrams, requirements, design) and provide comments on them to assist in defining requirements and design if the STARCOR provides the contractor written direction to do so. The contractor's review shall be aimed at ensuring that the solutions proposed by the various support teams are consistent with CDX business practices and architecture. The contractor's input and comments shall (1) recommend making best use of reusable CDX components; (2) identify specific CDX and Exchange Network standards and guidance items that have not been included but need to be used in these documents; and (3) identify requirements and design features needed to ensure adequate system security.

Perform analysis. The contractor shall perform, when provided written direction by the STARCOR, analysis of key infrastructure components (e.g., Universal Description Discovery and Integration services, the XML Gateway and web service orchestration using BPEL) to align and integrate CDX Web so that CDX Web will be able to utilize these technologies more appropriately and to identify optimal solutions for the data flows.

Demonstrate and implement potential solutions. The contractor shall assist in demonstrating potential software solutions for the data flow. The contractor's demonstration may include coordination with other support teams for providing code, installing and running these potential solutions in the data flow environment(s). If the STARCOR decides to use a particular software solution, the contractor shall prepare a Purchase Request (PR) to purchase the software and install the software once the STARCOR approves the PR.

Provide Documentation. At STARCOR's written direction, the contractor shall provide documentation for certain consultation activities. The documentation may include, but is not limited to, white papers outlining options and potential solutions, review comments on provided documents, presentation materials, etc.

Flow Development

Flow development activities include, but are not limited to, the following:

Document System Requirements. The contractor shall hold teleconferences and other follow-up communications with the STARCOR and program office representative to document the system requirements in a systems requirements specification.

Provide Basis of Estimate (optional). Based on the requirements, and for discussion purposes, the contractor shall prepare a brief Basis of Estimate (BOE) spreadsheet and submit it to the STARCORs. This is not a formal ROM. The contractor shall include in the BOE time for a minimum of one (1) teleconference between the contractor and EPA to review and clarify the contractor's BOE. Any discussion of hours or scope changes shall include the Contracting Officer.

Develop System Design. The contractor shall develop the system design specification (SDS) for the transmission of the dataflow through CDX. The contractor shall leverage as much as possible generic documentation that could be utilized for this flow (for Web / Node flows). ***Optional Note*** *For building CDX web applications, the CDX Lite –Registration Provisioning shall be utilized to establish the data flow.*

Develop/Modify Existing Code. The contractor shall develop the functionality listed in the SRS and the SDS and modify existing code or deploy new code as required.

Prepare a Test Plan and Prepare a Test Report. The contractor shall prepare a test plan to test the requirements identified for the specific data flow. The contractor shall prepare a test report that identifies what system changes the contractor completed during dataflow testing.

Prepare Draft Software Release Notes. The contractor shall update and revise software release notes one time for any contractor developed software. The contractor's notes shall reflect the final version of the software that is moved out of the staging and development environment and deployed to the production environment.

Provide Test and Production Readiness Review. The contractor shall first conduct a readiness review to ensure the dataflow is ready for testing in CDX PREPROD. At the conclusion of system testing and the contractor has made any required changes to the system that were identified during testing, the contractor shall conduct another readiness review to ensure the system is ready for deployment to production. The contractor shall complete all readiness checklists (as work products) during the readiness review and resolve any outstanding issues identified during the readiness review.

Unit/integration testing. After the dataflow development is completed, the contractor shall conduct unit and integration testing of the different components of the system in CDX. The contractor shall use test files of actual data that the program office will provide to the contractor.

User acceptance testing. The contractor shall provide support during end-to-end testing. The contractor's support shall include ensuring the specific dataflow and system is fully operational in the CDX PREPROD and shall monitor the system during this testing period.

Prepare Draft O&M Guide. The contractor shall prepare a draft dataflow O&M Guide using the O&M guide template. The contractor shall ensure that the operation staff provides input during the readiness review.

Coordinate CDX Security Plan Addendum. The contractor shall coordinate with CDX Security staff to ensure that the CDX security addendum is drafted by the Security staff once the program office identifies its requirements.

3.4 Subtask Activity 4 - *Provide Activity Name*

You can add other Tasks (consulting, data flow development, other)

3.5

etc.

4.0 Assumptions

The contractor shall include suggestions for where existing development, systems or processes can be leveraged or adapted to maximize cost savings, where feasible, to the Government.

5.0 Constraints

The contractor's Subtask Area Technical and Cost Proposal shall include the contractor's identified constraints/dependencies.

6.0 Risk Management/Mitigating Factors

The contractor's Subtask Area Technical and Cost Proposal shall include its identified "Risk Management/Mitigating Factors." *Include any identified risks if you have any.*

7.0 Deliverables

7.1 Table 2 lists the deliverables, due dates, and role. Table 3 lists the work products, due dates, and role.

Note: Anything a contractor provides to EPA is considered to be a Deliverable. Some contractors distinguish between a Formal Deliverable (with editing and formal review) and a Work Product (minimal editing, spell checked and grammatically correct). In general, Work Products can be generated for less cost and more quickly than formal deliverables. Formal deliverables are required for the STAP, Financial Reporting, and any product that may be provided to EPA management or the public (e.g., briefings).

Table 2. Formal Deliverables and Due Dates

Subtask Activity	Deliverable	Due Dates	Role
1	Subtask Area Technical and Cost Proposal Plan	Ten (10) business days after receipt of SOW	**Contractor**
2	Biweekly status and Monthly Financial Reports	Biweekly/Monthly	**Contractor**

Table 3. Work Product/Deliverables and Due Dates

Subtask Activity	Work Products	Dues Dates	Role
3	System Requirements Specification	*Insert date*	**Contractor**
	Provide BOE	*Insert date*	**Contractor**
	System Design Specification	*Insert date*	**Contractor**
	Test Plan	*Insert date*	**Contractor**
	Test Readiness Review	*Insert date*	**Contractor**
	Test Report/Completion	*Insert date*	**Contractor**
	Production Readiness Review	*Insert date*	**Contractor**
	Software Release Notes	*Insert date*	**Contractor**
	O&M Guide	*Insert date*	**Contractor**
	CDX Security Addendum	*Insert date*	**Contractor**

8.0 Acceptance Criteria

8.1 The acceptance criteria for each deliverable/work product are identified in Table 4. All work products must be written in grammatically correct English and shall be devoid of spelling and cut and paste errors.

Table 4. Deliverables, Work Products, and Acceptance Criteria

Subsidiary Task	Deliverable/Work Product	Criteria for Acceptance
2	Biweekly status and Monthly Financial Reports	**- Deliverable is submitted on the dates established by the EPA.**
3	System Requirements Specification	**- Work Product/deliverable captures requirements for the data flow.** **- Work Product/deliverable submission is within the time frame agreed to at the initiation of this SOW.**
	Basis of Estimate	**- Work Product/deliverable provides an indication of the effort needed for the data flow.** **- Work Product/deliverable submission is within the time frame agreed to at the initiation of this SOW.**
	System Design Specification	**- Work Product/deliverable identifies main design features to ensure implementation through CDX.** **- Work Product/deliverable submission is within the time frame agreed to at the initiation of this SOW.**
	Test Plan	**- Work Product/deliverable identifies test case for CDX part of the WQX data flow.** **- Work Product/deliverable submission is within the time frame agreed to at the initiation of this SOW.**
	Test Readiness Review	**- Work Product/deliverable provides adequate review to ensure readiness for testing.** **- Work Product submission is within the time frame agreed to at the initiation of this SOW.**
	Test Report	**- Work Product/deliverable identifies all changes completed during testing.** **- Contractor made all required changes and the implementation of the data flow is successful.** **- Work Product/deliverable submission is within the time frame agreed to at the**

		initiation of this SOW.
	Production Readiness Review	**- Work Product/deliverable provides adequate review to ensure readiness for production.** **- Work Product submission is within the time frame agreed to at the initiation of this SOW.**
	Software Release Notes	**- Work Product provides adequate documentation of production software.** **- Work Product submission is within the time frame agreed to at the initiation of this SOW.**
	O&M Guide	**- Work Product provides adequate documentation for O&M of production data flow.** **- Work Product submission is within the time frame agreed to at the initiation of this SOW.**
	CDX Security Addendum	**- Work Product provides adequate security documentation for the production data flow.** **- Work Product submission is within the time frame agreed to at the initiation of this SOW.**

9.0 GFP/GFI

10.0 Configuration Requirements-New Information Resources Management Policy Special Attachments-Applicable Schema/Schematron

Appendix C: CROMERR Checklist

CROMERR System Checklist	
Item	
Registration (e-signature cases only)	
1. Identity-proofing of registrant	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
1a. (priority reports only) Identity-proofing *before* accepting e-signatures	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

1b. (priority reports only) Identity-proofing method (See 1bi, 1bii, and 1b-alt)	
1bi. (priority reports only) Verification by attestation of disinterested individuals	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
1bii. (priority reports only) Information or objects of independent origin	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
1b-alt. (priority reports only) Subscriber agreement alternative	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

2. Determination of registrant's signing authority	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
3. Issuance (or registration) of a signing credential in a way that protects it from compromise	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
4. Electronic signature agreement	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
Signature Process (e-signature cases only)	
5. Binding of signatures to document content	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
6. Opportunity to review document content	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
7. Opportunity to review certification statements and warnings	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
Submission Process	
8. Transmission error checking and documentation	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
9. Opportunity to review copy of record (See 9a through 9c)	
9a. Notification that copy of record is available	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
9b. Creation of copy of record in a human-readable format	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
9c. Providing the copy of record	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
10. Procedures to address submitter/signatory repudiation of a copy of record	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
11. Procedures to flag accidental submissions	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
12. (e-signature cases only) Automatic acknowledgment of submission	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
Signature Validation (e-signature cases only)	
13. Credential validation (See 13a through 13c)	
13a. Determination that credential is authentic	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
13b. Determination of credential ownership	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
13c. Determination that credential is not compromised	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
14. Signatory authorization	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
15. Procedures to flag spurious credential use	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
16. Procedures to revoke/reject compromised credentials	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
17. Confirmation of signature binding to document content	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
Copy of Record	
18. Creation of copy of record (See 18a through 18e)	
18a. True and correct copy of document received	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

18b. Inclusion of electronic signatures	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
18c. Inclusion of date and time of receipt	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
18d. Inclusion of other information necessary to record meaning of document	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

18e. Ability to be viewed in human-readable format	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):
19. Timely availability of copy of record as needed	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):

CROMERR System Checklist	
20. Maintenance of copy of record	
	Business Practices:
	System Functions:
	Supporting Documentation (list attachments):