System Development Methodology

Technical Requirements Document

Project Name: ProjectWise V8*i* Pilot Implementation

Project Profile#: 1001001

Agency Name: Department of Transportation

Revision: 1.0

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Intent of this Document

This Technical Requirements Document is a template that will capture the technical requirements necessary to support the deployment of business solution in the DOIT environment.

The requirements are listed across 10 categories: Architecture, Network, Server, Database, Desktop, Application Hosting, Security, Directory & Messaging, System Upgrades, and Integration/Interface Requirements.

The Architecture and Infrastructure Migration Requirements section captures any architecture or infrastructure requirements that are not already satisfied in the existing technical environment, but must be addressed as an upgrade to the existing technical environment in order for the solution to work as required.

If changes are proposed and/or required to any of the established baseline project delivery infrastructure once the project is in flight, it must be submitted formally through the DOIT change control process as defined in the project Change Management Process document.

The samples contained in this document are meant to convey the intent of the deliverable content and format.

Please complete the sections that are applicable to your solution – if a section is NOT APPLICABLE – please put N/A in the tables.

Sample data/content contained in this template is NOT REAL. It is only provided to help convey the intent of the deliverable.
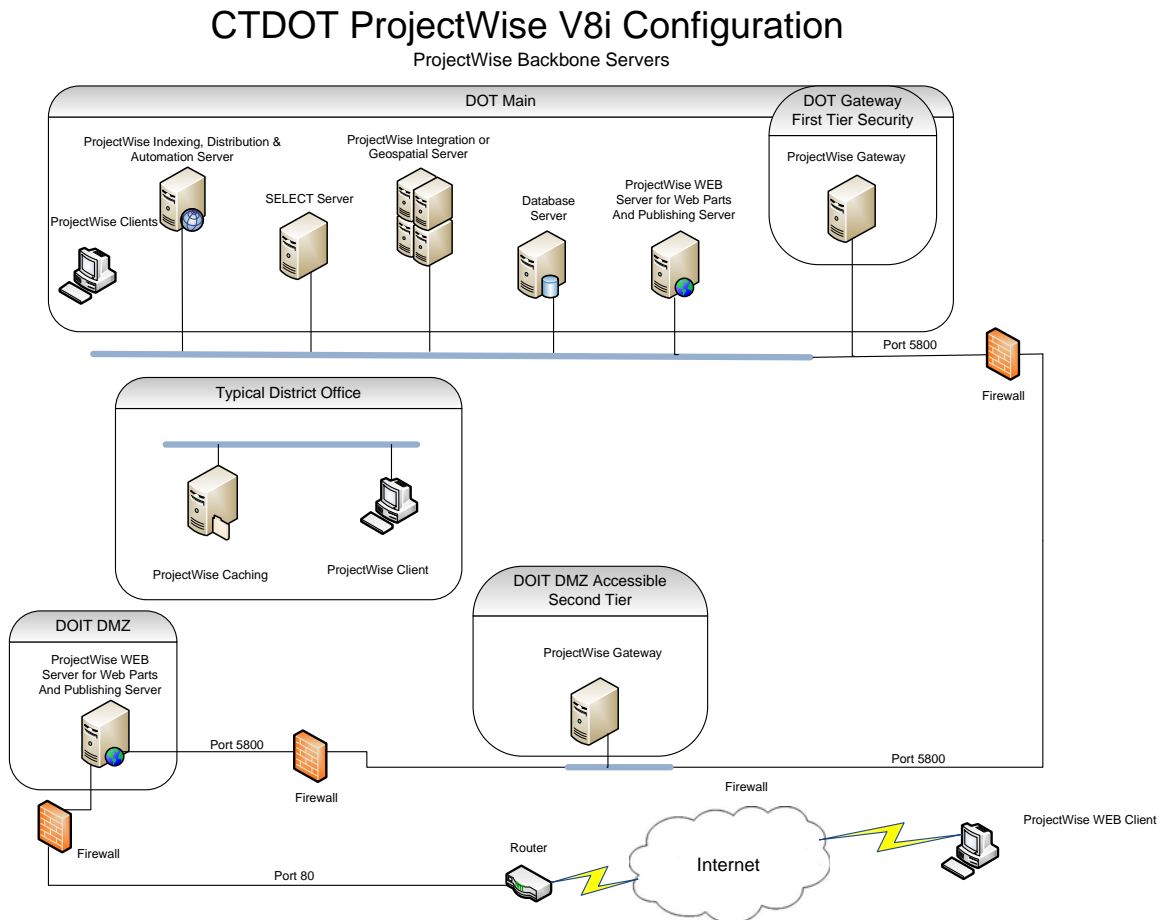
Architecture Requirements

Identify any architectural requirements that must be met in order for the solution to align with the existing/planned enterprise architecture. All architecture requirements should be assigned a unique requirement id, with a standard requirement prefix of "ARCH".

REQMT ID	Mandatory/ Optional	Requirement Description
ARCH1001	Mandatory	Must utilize 3 Tiered Architecture for application to operate in DOIT Application Hosting facilitate (e.g. a provide application networking diagram in this spec after this table). Diagram provided
ARCH1002	Mandatory	Must use Java vx.x or later for all new web application development. Java not required
ARCH1003	Mandatory	1. Describe the system architecture. (e.g., client-server vs timesharing) The architecture is client-server. The ProjectWise Clients communicate directly to the ProjectWise Servers. Only one server (ProjectWise Integration Server) communicates directly with the Oracle Database through ODBC. 2. Describe the network architecture. (e.g., fddi, fast ethernet, switched, etc.) The ProjectWise solution relies only on the underlying TCP/IP network and leverages all existing name resolution techniques (DNS, HOSTS file, etc) for communication between client and server modules. 3. Describe any other applications which might be competing for the re this configuration ProjectWise uses port 5800 to transfer data between servers.

B.1 Architecture Diagram

Please provide an architectural diagram of the solution that is defined in this functional requirements document. Please include all servers, networking, and applications in diagram.

CTDOT ProjectWise V8i Configuration

Network Requirements

Identify any architectural requirements that must be met in order for the solution to align with the existing/planned enterprise architecture. All network requirements should be assigned a unique requirement id, with a standard requirement prefix of "NET". Please complete this section if applicable to your solution.

REQMT ID	Mandatory/ Optional	Requirement Description
NET1001	Mandatory	Must define the External Networking Circuits needed for application if applicable (Speed, Bandwidth, Protocol). TCP/IP Port 5800 must be open between all client and server components.
NET1002	Mandatory	Must define the Networking Switches, Routers, VLans needed for application if applicable. N/A.
NET1003	Mandatory	Must define the Internal Networking functions needed for application if applicable. N/A.
NET1004	Mandatory	Do you require a CSS for load balancing? No

C.1 Network Architecture Diagram

Please provide an architectural diagram of the solution that is defined in this functional requirements document. Please include all servers, networking, and applications in diagram.

CTDOT ProjectWise V8i Configuration

ProjectWise Backbone Servers

DOT Main

ProjectWise Indexing, Distribution & Automation Server

ProjectWise Clients

SELECT Server

ProjectWise Integration or Geospatial Server

Database Server

ProjectWise WEB Server for Web Parts And Publishing Server

DOT Gateway First Tier Security

ProjectWise Gateway

Port 5800

Firewall

Typical District Office

ProjectWise Caching

ProjectWise Client

DOIT DMZ Accessible Second Tier

ProjectWise Gateway

DOIT DMZ

ProjectWise WEB Server for Web Parts And Publishing Server

Port 5800

Firewall

Port 5800

Firewall

Firewall

Router

Internet

ProjectWise WEB Client

Port 80

Server Requirements

Identify any architectural requirements that must be met in order for the solution to align with the existing/planned enterprise architecture. All server requirements should be assigned a unique requirement id, with a standard requirement prefix of "SER". Please complete this section if applicable to your solution.
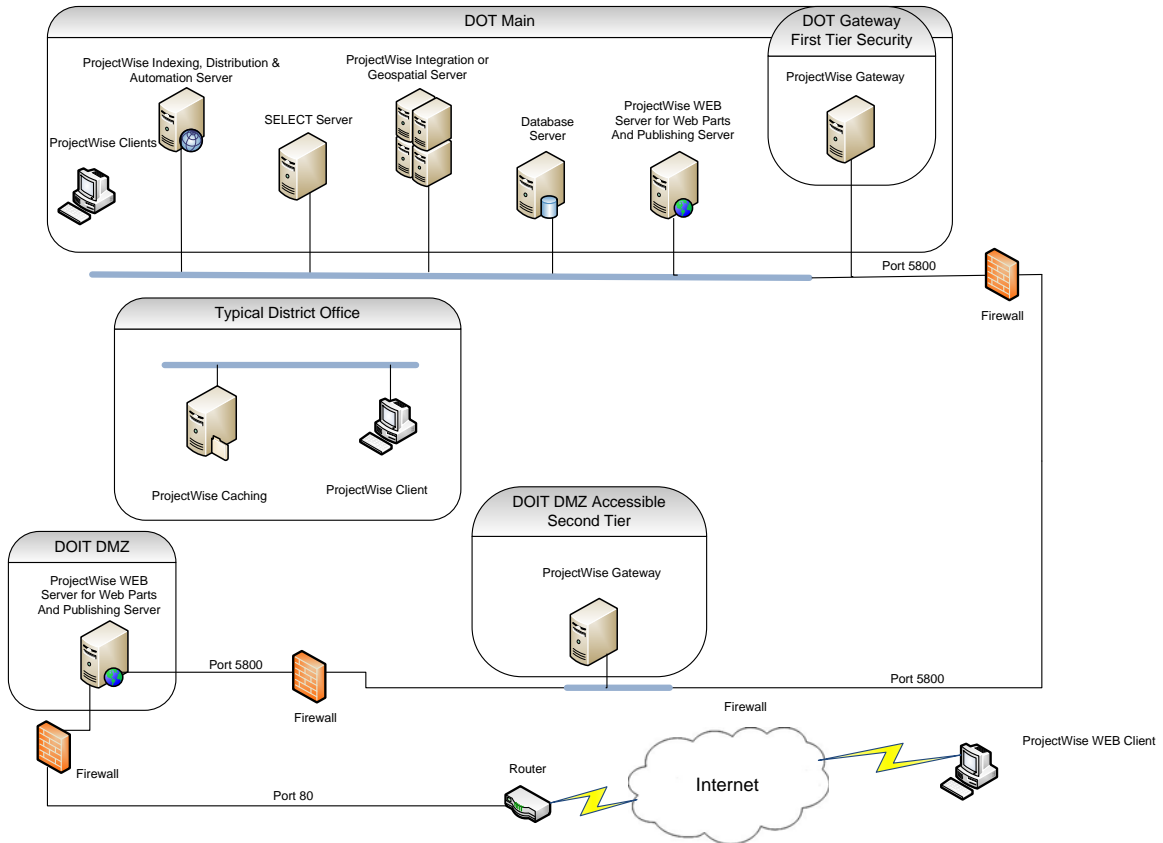
Existing Application Server Requirements

Please tell us about your server requirements for your existing application that you have running. If this is a new application – complete the next section only.

REQMT ID	Mandatory/ Optional	Requirement Description
SER1001	Mandatory	Unix/Mainframe/Wintel Server Requirements - Describe the hardware which is being used. (e.g., model of machine(s), qty. and speed of CPUs, amt. of RAM, Size and number of disks) for the Existing Application. If you are working with a vendor to upgrade this application – If your vendor has specified specific recommendations – please enter them here as requirements.
SER1002	Mandatory	Describe the transaction volumes/ratio for the Existing Application: Transaction load - online(OLTP):batch ratio e.g. 90:10: Peak Volume - OLTP e.g. 5000 transactions / hr: Peak Volume - Batch e.g. 5M records loaded in 3 hours: Reporting load - ad-hoc:canned-query ratio e.g. 80:20: Peak Volume - number of reports / hour:
SER1003	Mandatory	Does the Existing application have known scalability issues? e.g., Some modules process serially and/or issue explicit locking instructions.) No. ProjectWise scales well enough to meet the demands of global implementations serving thousands of users.
SER1004	Mandatory	Any additional information which would affect the server sizing on the Existing Application?
SER1005	Mandatory	Scalability Requirements for the Existing Application: How will the processing requirements grow over time? -If you will be increasing the number of users, please specify the rate and timeframe. (e.g., 15% increase in active concurrent users for each of the next three years.)

SER1006   Mandatory   How many concurrent active users are connected to the Existing Application System?

New Application Server Requirements

Please tell us about your server requirements for your new application that you are looking to bring into DOIT. Please complete this section only if this is a new application.

REQMT ID	Mandatory/ Optional	Requirement Description
SER1001	Mandatory	Unix/Mainframe/Wintel Server Requirements - Describe the hardware which is being used. (e.g., model of machine(s), qty. and speed of CPUs, amt. of RAM, Size and number of disks) for the New Application. If your vendor has specified specific technical recommendations – please enter them here as requirements. Wintel Pentium 3GHz, 4GB RAM, 1GB Free Disk space
SER1002	Mandatory	Describe the transaction volumes/ratio for the New Application: Transaction load - online(OLTP):batch ratio e.g. 90:10: Peak Volume - OLTP e.g. 5000 transactions / hr: Peak Volume - Batch e.g. 5M records loaded in 3 hours: Reporting load - ad-hoc:canned-query ratio e.g. 80:20: Peak Volume - number of reports / hour: N/A
SER1003	Mandatory	Does the New application have known scalability issues? e.g., Some modules process serially and/or issue explicit locking instructions.) No.
SER1004	Mandatory	Any additional information which would affect the server sizing on the New Application? No
SER1005	Mandatory	Scalability Requirements for the New Application: How will the processing requirements grow over time? As more users and more data are added to the system the load on the Database may increase. The one ProjectWise Integration Server will handle approximately 500 concurrent users. -If you will be increasing the number of users, please specify the rate and timeframe. (e.g., 15% increase in active concurrent users for each of the next three years.) We are in a Proof of Concept Phase at this time. Growth is TBD.

SER1006   Mandatory   How many concurrent active users are connected to the New Application system? Currently less than 20

Database Requirements

Identify any architectural requirements that must be met in order for the solution to align with the existing/planned enterprise architecture. All database requirements should be assigned a unique requirement id, with a standard requirement prefix of "DATA". Please complete this section if applicable to your solution.

REQMT ID	Mandatory/ Optional	Requirement Description
DATA1001	Optional	Describe the software versions to be sized. Solaris: ? Oracle: ? SQL: ?

Supported Databases for use with ProjectWise V8i Edition

Oracle®	Oracle®	Oracle®	Microsoft®	Microsoft®
9.2.0.5	10.2.0.3	11.1.0.6 (Enterprise Edition)	SQL Server 2000(SP 4 or later)	SQL Server 2005 SP2 Standard Edition
Oracle ODBC Driver 9.2.0.8 It is recommended to use the Oracle 10.2.0.3 driver whenever possible, even with a Oracle 9i server	Oracle ODBC Driver 10.2.0.3	Oracle ODBC Driver 11.1.0.6	ODBC Driver 2000.85.1022.00 Or ODBC Driver 2000.86.3959.00	ODBC Driver 2000.86.3959.00 Or ODBC Driver 2000.85.1022.00 Or SQL Native Client Database Driver (SNAC9) 2005.90.3042.00

-Which optimizer, if any, is being used? None

-Has Oracle Parallel Query been implemented? No

DATA1002	Mandatory	Describe the RDBMS deployment strategy

-Will this be a RAC (Real Application Clusters) deployment? Yes/No No

-if RAC, how many nodes?

-% available resource capacity desired should 1 node fail? (e.g., 50%, 60%,…,100%) N/A

DATA1003	Mandatory	Describe the logical volume methodology. (e.g., striping (interface factor), mirroring, raid-5 etc.) N/A

DATA1004   Mandatory   Describe what the application is doing e.g. what the transaction does?

The application runs SQL queries, inserts new records and updates existing ones. Tables and indexes are only created when the initial software setup is executed and a ProjectWise executable handles that.

DATA1005   Mandatory   Describe the transaction volumes/ratio:

Transaction load - online(OLTP):batch ratio e.g. 90:10: We do not use OLTP. (N/A)

Peak Volume - OLTP e.g. 5000 transactions / hr: We do not use OLTP. (N/A)

Peak Volume - Batch e.g. 5M records loaded in 3 hours: User dependent upon workflows

Reporting load - ad-hoc:canned-query ratio e.g. 80:20: (N/A) We do not have delivered reports

Peak Volume - number of reports / hour: (N/A) We do not have delivered reports. Peak Volume will be user dependent upon workflows

DATA1006   Mandatory   Is the application primarily update intensive?

Updates are part of the user workflows when data is changed but many transactions are based on select statements

DATA1007   Mandatory   Describe the size of the database

-gross volume: Varies depending on number of documents, users, configuration, etc. Some are several hundred MB.

-number of tables: We deliver 140 depending on the features installed and some additional tables are created to store information related to project and document attributes. Probably no more than 160 tables.

-the size of the most frequently accessed tables (rows and volume): This would probably be the document table or the associated environment attribute table. Size will vary depending on the number of documents. Some organizations have over one million records with no performance issues.

-the number of indexes per table: Some tables have indexes, some do not, they are created programmatically by the application

-the selectivity of each index (i.e., number of rows accessed per each non-value): Handled programmatically by the application

-number of compiled database objects: Handled programmatically by

| DATA1008 | Mandatory | Must utilize the data elements defined within the Enterprise Data Warehouse for all adds/updates to Agency profile data; no fundamental Agency profile data can be replicated in stand-alone databases. |

Desktop Requirements

In order to provide for infrastructure planning and implementation, identify all planned volumes, activity rates, connectivity sites, bandwidth requirements, storage requirements, and so on, for all infrastructure sites. All desktop requirements should be assigned a unique requirement id, with a standard requirement prefix of "DESK". Please complete this section if applicable to your solution.

SAMPLE

REQMT ID	Mandatory/ Optional	Requirement Description
DESK1	Mandatory	Must provide the following desktop/Laptops solutions on the following platform – give CPU, memory, and disk requirements - give total number (each)
DESK2	Mandatory	Must provide CRT l Monitors for all Desktops – give total number.
	Optional	Must provide Flat Panel Monitor for all Desk tops – give total number
DESK3	Mandatory	Must provide the following Operating System on the Desktops – give total number
DESK4	Mandatory	Must provide list of all applications to be loaded on desktops – give total number per application, software version and assignments
DESK5	Mandatory	Must provide proof of software licensing for all software to be loaded on Desktops/Laptops – give copies of certificates
DESK6	Mandatory	Must provide networked printer information – give brand, model, how old, and total number
DESK7	Mandatory	Must provide asset information for desktop, printers, laptops and other peripheral devices to be supported by Desktop Services – give serial number of desktop, laptop, monitor, networked printer with corresponding agency asset tag number.
DESK8	Mandatory	Must provide maintenance coverage for desktops/laptops and networked printers
DESK9	Mandatory	Must provide other peripheral device information (e.g., scanners, personal printers) – give brand, model, how old, total number of each

DESK10   Mandatory   Must provide location information – give main address, telephone, main contact information and total end-users at each site

Application Hosting Requirements

Identify any architectural requirements that must be met in order for the solution to align with the existing/planned enterprise architecture. All application hosting requirements should be assigned a unique requirement id, with a standard requirement prefix of "HOST". Please complete this section if applicable to your solution. N/A

REQMT ID	Mandatory/ Optional	Requirement Description
HOST1001	Mandatory	Must supply UserID and Password for Testing/Troubleshooting basic functions?
HOST1002	Mandatory	Must Supply Test Scripts for Functionalitity Testing & Regression Testing?
HOST1003	Mandatory	Must Supply Test Scripts for Performance Testing?
HOST1004	Mandatory	Do you Support .Net and Java Standards?
HOST1005	Mandatory	Must the Application have a Disaster Recovery Plan – If DOIT Environment fails – what is your expectation for disaster recovery of this application – how quick does the application need to be up for business processing of transactions?
HOST1006	Mandatory	Must the Application have load balancing for handling heavy transaction loading?
HOST1007	Mandatory	Must the servers and databases have high availability for acess?

Security Requirements

Identify any architectural requirements that must be met in order for the solution to align with the existing/planned enterprise architecture. All architecture requirements should be assigned a unique requirement id, with a standard requirement prefix of "SAFE". **These are requirements are Mandatory for any solution**.

REQMT ID	Mandatory/ Optional	Requirement Description
SAFE1001	Mandatory	Must define DNS & Firewall requirements and/or changes - if applicable. No DNS changes required. Port 5800 must be open for bidirectional traffic from the ProjectWise Web Server to the ProjectWise Integration Server and port 443 must be open externally from the ProjectWise Web Server to the Internet for secure web traffic. Including FQDNs, IP addresses, port numbers and directional flow. See diagram
SAFE1002	Mandatory	Must have DOIT Security Team do an application security review during solution architecture/design phase to assess initial compliance and risk associated with the application.
SAFE1003	Mandatory	Must have DOIT Security Team implement a vulnerability Assessment of the application, database, and infrastructure of the solution when the application arrives to be hosted on DOIT Staging environment.
SAFE1004	Mandatory	Must have DOIT Security Team implement a Full Risk Assessment of the application, database, and infrastructure of the solution when the application arrives to be hosted on DOIT Staging environment.
SAFE1005	Mandatory	Must have DOIT Security Do final Assessment of the application, database, and infrastructure of the solution when the application moves to DOIT production environment (especially if there are any significant changes from Staging environment).
SAFE1006	Mandatory	Must have the owner of the data sign off on any mitigated, accepted, or transferred risk associated with the system.

Directory & Messaging Requirements

Identify any architectural requirements that must be met in order for the solution to align with the existing/planned enterprise architecture. All architecture requirements should be assigned a unique requirement id, with a standard requirement prefix of "DIR". **These are requirements are Mandatory for any solution**.

REQMT ID	Mandatory/ Optional	Requirement Description
DIR1001	Mandatory	Must define Directory & Messaging requirements and/or changes - if applicable. The User Synchronization Service (running on the ProjectWise Integration Server) must be running as a user account with read access to the Active Directory.
DIR1002	Mandatory	Must have MS-Exchange Requirements (number of users, number of sites, size of mail.) N/A
DIR1003	Mandatory	Must have Mail polices – retention time, archive time, etc. N/A
DIR1004	Mandatory	If application sends email notifications must supply date to add to server, ip address, requester name and contact info, server name N/A

System Migration & Upgrade Requirements

Identify hardware and software upgrade requirements that must be addressed in order to meet the architecture and infrastructure requirements described above (in sections A and B). Please complete this section if applicable to your solution.

REQMT ID	Requirement Description	Migration Requirement
ARCH 1	Must utilize Service-Oriented Architecture (SOA) to facilitate routine, re-usable data retrieval, update, and creation (e.g. a common "read table x" service that will be called by multiple modules who would subscribe to such service).	**Not Applicable.** SOA requirements are satisfied with the existing architecture and infrastructure components.
ARCH 2	Must use Java vx.x or later for all new web application development.	**Not Applicable.** Java not required.
ARCH 3	Must utilize the data elements defined within the Enterprise Data Warehouse; no fundamental Agency profile data can be replicated in stand-alone databases.	**Not Applicable.** Data warehouse requirements are satisfied with the existing architecture and infrastructure components.
INFR 1	Must provide failover capability for all production application components and data bases.	**Not Applicable.** Failover requirements are satisfied with the existing architecture and infrastructure components.
INFR 2	Must provide clustered implementation of application components and databases on the client/server platform	**Not Applicable.** Clustering requirements are satisfied with the existing architecture and infrastructure components.
INFR 3	Must provide AIX version x.x as the server operating system.	**Not Applicable.** AIX not required.
INFR 4	Must allocate 200GB of memory on production AIX platform	**Not Applicable.** AIX not required.

Application/Data Interface Requirements

Identify all of the system-to-system interactions required to support the solution. All interface requirements should be assigned a unique requirement id, with a standard requirement prefix of "INTRF". Please complete this section if applicable to your solution.

SAMPLE

Reqmt ID	Mandatory/ Optional	From Application	To Application	Interaction
INTRF 1	Mandatory	App 1	Portal	Must provide real-time read only retrieval of App 1 data to Portal app via web service.
INTRF 2	Optional	App 2	Portal	Must provide real-time read only retrieval of App 2 data to Portal app via web service.
INTRF 3	Mandatory	New App	Claim	Must pass new claim data created in New App as update transaction to Claim app via web service.
INTRF 4	Mandatory	Claim	Billing	Must pass Claim cost data from Claim system to Billing system thru existing batch interface.
INTRF 5	Mandatory	Billing	App 3	Must pass new Billing data from Billing system as update transaction to App 3 app via web service.
INTRF 6	Mandatory	Billing	App 4	Must pass new Billing data from Billing system as update transaction to App 4 app via web service.
INTRF 7	Mandatory	Billing	New App	Must pass new Billing data from Billing system as update transaction to New App via web service.

Application User/Transactional Volume Requirements

The Agency development team needs to provide the DOIT team their applications user volumes and transaction volumes for the applications this document supports.

SAMPLE

Maximum Application Users (Worst Case)

Application	Max # Users (2008)	Max # Users (2009)	Max # Users (2010)	Max # Users (2011)
Application #1 (Internal Users)	100	500	2000	10,000
Application #1 (External Users)				

Maximum Concurrent Application Users

Application	Max # Concurrent Users (2008)	Max # Concurrent Users (2009)	Max # Concurrent Users (2010)	Max # Concurrent Users (2011)
Application #1 (Internal Users)	10	50	200	1000
Application #1				

(External Users)

Maximum Applications Transactions

Application	Max # Transactions (2008)	Max # Transactions (2009)	Max # Transactions (2010)	Max # Transactions (2011)
Application #1 (Transactions Inbound)	10	50	200	1000
Application #1 (Transactions Outbound)				

Requirements Signoff

The Agency and DOIT Team signoff on these functional requirements means that you accept these requirements at this time. Any changes to the project scope or additional requirements will require that a formal change be submitted to the DOIT Team.

Agency Signoffs:

Business Owner:

Name:	
Title:	
Date:	
Signature:	

Business Project Manager:

Name:	
Title:	
Date:	
Signature:	

Third-Party Vendor Owner:

Name:	
Title:	
Date:	
Signature:	

DOIT Signoffs:

DOIT Director:

Name:	
Title:	
Date:	
Signature:	

DOIT Project Manager:

Name:	
Title:	
Date:	
Signature:	

DOIT Security:

Name:	
Title:	
Date:	
Signature:	

DOIT Hosting Manager:

Name:	
Title:	
Date:	
Signature:	

Template Change Control

This area is used for document change control purposes only and should be deleted for actual project/program use.

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