

State and Territorial Exchange of Vital Events
(STEVE)
System Integration Overview

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National Association for Public Health Statistics
and Information Systems (NAPHSIS)

System Integration Overview

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1. OVERVIEW

Inter-jurisdictional Exchange

Generally, jurisdictions send all birth, death, fetal death (stillbirth) and induced abortion records that occurred to non-residents to the jurisdiction of usual residence. Deaths are also sent to the jurisdiction of the decedent's birth, and for decedents less than one year of age, birth records are sent on request to the jurisdiction where the death occurred.

Most jurisdictions and several Canadian provinces have signed an Inter-jurisdictional Exchange (IJE) Agreement that specifies the terms and conditions under which vital events data may be exchanged and used. However, the enforcement of its terms and conditions is a manual process completely dependent on the vigilance of individual staff. Other formal agreements govern the exchange of data between jurisdictions and the National Center for Health Statistics (NCHS), the Social Security Administration (SSA), other agencies of the Centers for Disease Control and Prevention (CDC), and other internal and external organizations. Some or all of these organizations will become trading partners and users of the STEVE System.

The NAPHSIS Inter-jurisdictional Exchange Committee has developed standard record layouts for electronic exchange. However, most jurisdictions do not exchange records electronically at this time due to lack of resources and an efficient exchange platform. Instead, they may send copies, computer abstracts or line listings to each other. Pending Intelligence Reform Act regulations will require jurisdictions to match birth and death records beyond current practices, which will impact inter-jurisdictional exchange procedures. Additionally, the threat of natural or man-made disasters mandates a way to report deaths nationally on a timelier basis. Therefore, the need for an improved electronic exchange platform is both important and immediate.

STEVE

STEVE is a PHIN-compliant, secure messaging system currently under development by NAPHSIS that will allow jurisdictions to electronically trade the vital event information they are currently sharing. STEVE will be installed at each participating jurisdiction within its secure firewall. Each jurisdiction will be allowed to configure the data exchange and use rules to meet its own regulatory requirements and business practices. The detailed rules governing the exchange and use of the data will be embedded in a specialized, configurable software application. Jurisdictions may also use STEVE to send data to other approved trading partners, such as NCHS, and to authorized public health agencies and programs such as immunization, newborn screening, and birth defects.

STEVE will accept files in the standard IJE format. The receipt of a file will trigger STEVE to validate and configure the data for message creation and transport according to the exchange and use rules in the system's logic. The files will then be encrypted and sent as point-to-point message transmissions over PHINMS to each trading partner. The underlying vital record data will not be stored or retained in STEVE after the message is created, and messages will remain encrypted throughout transmission to the receiving jurisdiction. Part of the STEVE software consists of a Transformation Module (TM), that is located at the jurisdiction, and a Controller Module (CM), that will be hosted by a NAPHSIS contractor. Each TM will maintain a complete audit trail of all transformation and transmission activity that will be accessible only to its jurisdiction and to the central CM.

Receiving jurisdictions will be able to configure multiple mailboxes on STEVE for internal state agencies and programs, such as newborn hearing screening, birth defects, cancer registries, child support enforcement, voter registration, and other programs with which they have an official sharing relationship. These mailboxes may be used to distribute internal records as well as inter-jurisdictional records, thereby eliminating the need to extract and distribute multiple data sets for programmatic use.

The Controller Module will pick up transmission activity from each trading partner and will centralize the transactional data for reporting and administration purposes. The CM will be hosted by NAPHSIS via a third party vendor, and will be used to track system performance, monitor activity, maintain trading partner master file information, and generate administrative and management reports. Because messages will be exchanged directly between jurisdictions, the Controller Module will not operate as a hub/router.

Pilot Phase

NAPHSIS awarded the contract for development of the STEVE System to Systems Made Simple (SMS) of Syracuse, NY in January 2008. Development began in February and will be completed in December 2008. In January 2009, a pilot phase involving the implementation of two geographic clusters will begin: Kansas, Nebraska and South Dakota will constitute the Midwestern cluster; and New Hampshire and Massachusetts will form the northeast cluster. The pilot phase is expected to last until March 2009. We expect to receive valuable information on the installation process and the ease of use of STEVE from the pilot phase, and will incorporate lessons learned into the application prior to opening STEVE for general trading partner participation.

Trading Partner Community

Expansion of the trading partner community will take place over a 2-3 year period, but is expected to include all 57 vital records jurisdictions, NCHS and selected additional partners. NCHS is in the process of re-engineering its statistical systems in North Carolina, and cannot link to STEVE until this re-engineering project is completed in the April-May 2009 timeframe. STEVE will provide the capability to produce printable records and/or data files that can be exchanged with other jurisdictions and NCHS prior to their joining the trading partner community.

Costs

We will offer both a self-install version and an on-site installation of STEVE. The price for a self-installation is \$2500 and a full installation costs \$7,000, payable to NAPHSIS. NAPHSIS will provide funding to trading partners, as available, to subsidize installation costs. In addition, there will be an annual maintenance fee payable to NAPHSIS of \$3,000 for the first year and \$2,000 for each following year until the current contract with the CM hosting vendor ends in 2013. At that time, we will advise the trading partners of any annual fee changes.

Becoming a Trading Partner

STEVE can be installed and used whether your vital records are resident in a mainframe, client/server or web-based systems platform. You do not need to have completed re-engineering to participate in STEVE.

If you are interested in becoming a STEVE trading partner, please contact Bill Bolton, STEVE Implementation Manager, at wbolton@naphsis.org to request an information package. Or, you may contact Leesa Shem-Tov at NAPHSIS at 301/563-6001 for additional information.

2. STEVE SYSTEM INSTALLATION CHECKLIST

Prerequisite: The State Registrar, Director of a jurisdiction's Health Statistics agency or state Inter-Jurisdictional Exchange manager has contacted the STEVE project management staff within NAPHSIS to indicate the jurisdiction's desire to implement STEVE. Alternatively, NAPHSIS staff have sought and obtained the jurisdiction's permission to implement STEVE.

The second activity that will take place after this initial contact is the scheduling of a "Kickoff Meeting". This meeting is scheduled with the NAPHSIS project staff, and will include all parties that will be involved in the STEVE software installation at the jurisdictional level. Attendees will include representatives from the Vital Records and/or Health Statistics offices, the jurisdiction's IT management staff (including the Network Operations, Developers and DBA groups) and any software vendor that might be involved in development or hosting a jurisdiction's vital records data acquisition and reporting software. This Kickoff Meeting will also include NAPHSIS project staff and STEVE software developer staff. The intent of the Kickoff is to discuss any preparation steps and requirements that need to be instituted by the jurisdiction as well as to obtain a commitment from the jurisdiction to become a STEVE Trading Partner.

In order to be able to install STEVE, a series of requirements need to be met, and they make up a STEVE System Installation Checklist. This checklist is broken into the following three sections based on business requirements that need to be put into place, as well as IT requirements that need to be met. The third section is provided to help the installers on the day of installation. The jurisdiction may choose to provide a self-install, or they may choose to request that Systems Made Simple perform the installation. Either way, the third section will aid the installers on the day of installation.

The jurisdiction shall identify one individual that will be responsible for overseeing the coordination of both sections.

Section 1: Business Requirement Checklist

Requirement	Detail	Time Frame
Reaffirm the Ability and the Extent to which a Jurisdiction can Share Data	<ul style="list-style-type: none"> Review the IJE Agreement and made any modifications in programmatic data usage in preparation for becoming a STEVE trading partner Review applicable state statutes, rules and policies in preparation for the configuration of data use and exchange rules as "filters" of the TM If determined necessary, obtain a sign off from Departmental administrators and/or legal staff 	<ul style="list-style-type: none"> As soon as possible after kickoff
Establish the Commitment of the Jurisdiction and NAPHSIS Resources	<ul style="list-style-type: none"> Review and sign the STEVE MOU 	<ul style="list-style-type: none"> As soon as possible after kickoff
Prepare IJE files	<ul style="list-style-type: none"> Develop a strategy to bring on all types of IJE files Map internal vital record file layouts to the standard IJE 	<ul style="list-style-type: none"> As soon as possible after kickoff

	<p>file layouts posted on the NAPHSIS website for each file type: natality, mortality, roster, fetal death and ITOPs. (Help is available from volunteers on IJE Committee)</p> <ul style="list-style-type: none"> • Specify expected monthly or yearly record volume of each file type • Prepare test data for each file type (@ 5 records each; use STEVE test environment to establish the validity of methods to prepare test data) • No need to prepare separate NCHS file formats for transmission 	
Develop Extraction Strategy	<ul style="list-style-type: none"> • Develop automated procedures to extract, transform and load the IJE formatted files • Determined whether IJE files will be uploaded and downloaded into the TM using manual or automated procedures • Specify how often your IJE files will be moved into and out of STEVE (e.g. nightly batch, monthly, online, etc.) 	<ul style="list-style-type: none"> • As soon as possible – even preceding kickoff (May need to engage contracted software vendor or in partnership with jurisdiction’s IT group)
Conduct pre-production testing (optional)	<ul style="list-style-type: none"> • Vendor’s test environment • Vendor will provide testing guidelines and instructions • NAPHSIS will provide worksheets to guide test file configuration (filters#, system parameters, etc.) • Filters configured for test environment may be moved to another test environment and to the production environment • Document test results • Notify vendor when pre-production test results are satisfactory 	Coordinate with vendor
Attend Training	<ul style="list-style-type: none"> • NAPHSIS will provide documentation and training materials once you schedule your TM implementation 	<ul style="list-style-type: none"> • As coordinated with your trading partner group

	<ul style="list-style-type: none"> • NAPHSIS will provide worksheets to guide configuration of the TM • Webcasts to demonstrate STEVE and provide user training will be scheduled for your assigned trading partner group • Review system and user documentation • Attend web training to be provided by NAPHSIS 	
Develop Ongoing Maintenance Strategy	<ul style="list-style-type: none"> • Jurisdiction to establish a mechanism to budget for ongoing TM support 	After successful installation
Go Live	<ul style="list-style-type: none"> • Vendor will provide operations & maintenance manual • Vendor will activate you as a trading partner on the system • Help desk support available 	After successful production test

Section 2: Information Technology Requirement Checklist

Requirement	Detail	Time Frame
Identify resources/ tech support personnel	<ul style="list-style-type: none"> • Provide technical contact(s) for system issues • Networking and database staff for pre-install and install activities • TM Administrator and TM Operator role assignments for system initialization (set up) and operation 	<ul style="list-style-type: none"> • Identify network and DB contacts 1 month prior to install • Identify technical contacts and assign administrator and operator roles for TM 10 days prior to testing
Acquire Certificates/Keys: 1. SSL certificate and private key. 3. NCHS SDN certificate. Refer to: Figure 2: STEVE System Diagram – Circles “A” and “B”	<ul style="list-style-type: none"> • SSL certificate/key can be purchased for encryption or use an internally generated SSL certificate. • State can use current SDN certificate to talk to NCHS • Initialization requires pkcs12 format of keystore (RSA_1024) • SMS will provide encryption and SSL keys for its test environment 	<ul style="list-style-type: none"> • If using own test environment, must have certs and keys available by test start date • If using SMS test environment, must have certs and keys by install date • 2-3 days to acquire NCHS certificate for communicating with PHINMS; request online
Acquire or identify database	<ul style="list-style-type: none"> • SQL Server 2000 +, Oracle 9i+, possibly MYSQL 	<ul style="list-style-type: none"> • If using existing software, by time of testing or installation

	<ul style="list-style-type: none"> • Shared or standalone 	<ul style="list-style-type: none"> • If ordering, based on state procurement requirements
<p>Acquire or identify proxy</p> <p>Refer to: Figure 2: STEVE System Diagram with Proxy – Circle “C”</p>	<ul style="list-style-type: none"> • Purchased in 2004 or later • 1GB RAM • Can use existing proxy server 	<p>This is optional and should provide for SSL Tunneling.</p>
<p>Acquire or identify application server *</p> <p>Refer to: Figure 2: STEVE System Diagram – Circle “D”</p>	<ul style="list-style-type: none"> • 4GB RAM minimum; 8 GB preferred • ≥ 2.6G Hz with dual + processors • RAID 5 • Minimum 50GB core space • Shared or standalone • Shared file system • Includes full application server; does not install within existing application servers • PHIN is built into installation • Windows or Unix 	<p>Same as above</p>
<p>Acquire or identify database Server *</p> <p>Refer to: Figure 2: STEVE System Diagram – Circle “E”</p>	<ul style="list-style-type: none"> • 4GB RAM minimum • 2.6G Hz with dual processors • RAID 5 • Minimum 100GB core space 	<p>Same as above</p>
<p>Determine Test Environment</p>	<ul style="list-style-type: none"> • All trading partners will have access to vendor’s test environment or can set up own • If setting up own test environment; should be identical to production environment; should have SSL • May be able to leverage EVVE test environment 	<p>At kickoff meeting</p>
<p>Identify supported Internet browser</p> <p>Refer to: Figure 2: STEVE System Diagram – Circle “F”</p>	<ul style="list-style-type: none"> • Specify browser version to vendor 	<p>At kickoff meeting</p>
<p>Install and test TM</p>	<ul style="list-style-type: none"> • On-site or remote installation support by vendor (option of jurisdiction) • Move filters set up previously in test 	<ul style="list-style-type: none"> • Schedule with vendor • Plan on 6 weeks+ for total preparation • Total prep time dependent on whether buying new or using

	environment to production and complete initialization <ul style="list-style-type: none"> • Test production environment • Vendor support available • Notify vendor when system is ready to go live 	existing HW/SW <ul style="list-style-type: none"> • Actual installation takes 2-3 days
Go Live	<ul style="list-style-type: none"> • Vendor will provide operations & maintenance manual • Vendor will activate you as a trading partner on the system • Help desk support available 	After successful production test

* SMS will provide jurisdictions with a sizing tool to estimate disk space requirements.

Filters will be configured by each jurisdictions to control the data content of exchanged records.

Section 3: Day of Installation – Information Technology Checklist

Requirement	Detail
Global configuration and identification of URLs	<ul style="list-style-type: none"> • Registered URL (usually on the SSL certificate to be used): _____ • Reverse Proxy Configuration (none IIS apache other (please specify): _____
<p>Firewall/Networking Configurations: These parameters may be determined during the installation. However, many locations have time restrictions on modification of firewall rules which can hinder a short timeframe installation. Most of these variables must be determined ahead of time and the firewall rules put in place prior to installation.</p>	<ul style="list-style-type: none"> • PHINMS SSL Port (must be unique on that server): 8443 (Note: Firewall must be configured to receive requests on this port from any IP Address) • Web Site SSL Port (must be unique on server): 443 (Note: This address does not need to be externally accessible (can be intranet only), although it is recommended to allow SMS support access to the site for Pilot. To allow SMS external access configure 204.27.207.* for access to this port through firewall.) • Application Server With Web Proxy: <ul style="list-style-type: none"> ○ PHINMS AJP Port (if using proxy): 18009 ○ STEVE Web AJP Port (if using proxy): 18010 ○ Application Server must be setup to receive AJP traffic from the Web Server for two AJP ports. • Application Server Without Web proxy: <ul style="list-style-type: none"> ○ Application Server must be setup to receive HTTPS traffic on the two designated SSL ports listed above. • Application Server Outbound Traffic: • Note: Application Server must be able to send out to any Internet IP/Port combination.
Database Connectivity: Before STEVE can be installed on the application	<ul style="list-style-type: none"> • Database Type (oracle sql server mySQL): _____

<p>server, the database must be setup and running. This is generally the first task an installer performs while onsite, but if the following information is known ahead of time it can help to speed the installation process</p>	<ul style="list-style-type: none"> • Database Version: _____ • Database Server Name: _____ • Database Listen Port: _____ • Database Name (if pre-installed): _____ • Database User (if pre-installed): _____ • Database User Password (if pre-installed): _____
<p>SSL Encryption: PHINMS network traffic is encrypted using the SSL certificate, which must be imported into the PHINMS keystore during application initialization.</p>	<ul style="list-style-type: none"> • SSL key in .pfx format (provided at time of installation) • SSL key Keystore Password: _____
<p>PHINMS Encryption: This information is about the PHINMS SDN and is provided by the CDC after registering for a PHINMS SDN.</p>	<ul style="list-style-type: none"> • PHINMS Registrant Encryption key (SDN)in .pfx format (provided at time of installation) • PHINMS Registrant Encryption keystore Password: _____ • PHINMS Registrant Party ID: _____ • PHINMS Registrant Organization: _____ • PHINMS Registrant Name: _____ • PHINMS Registrant Email: _____

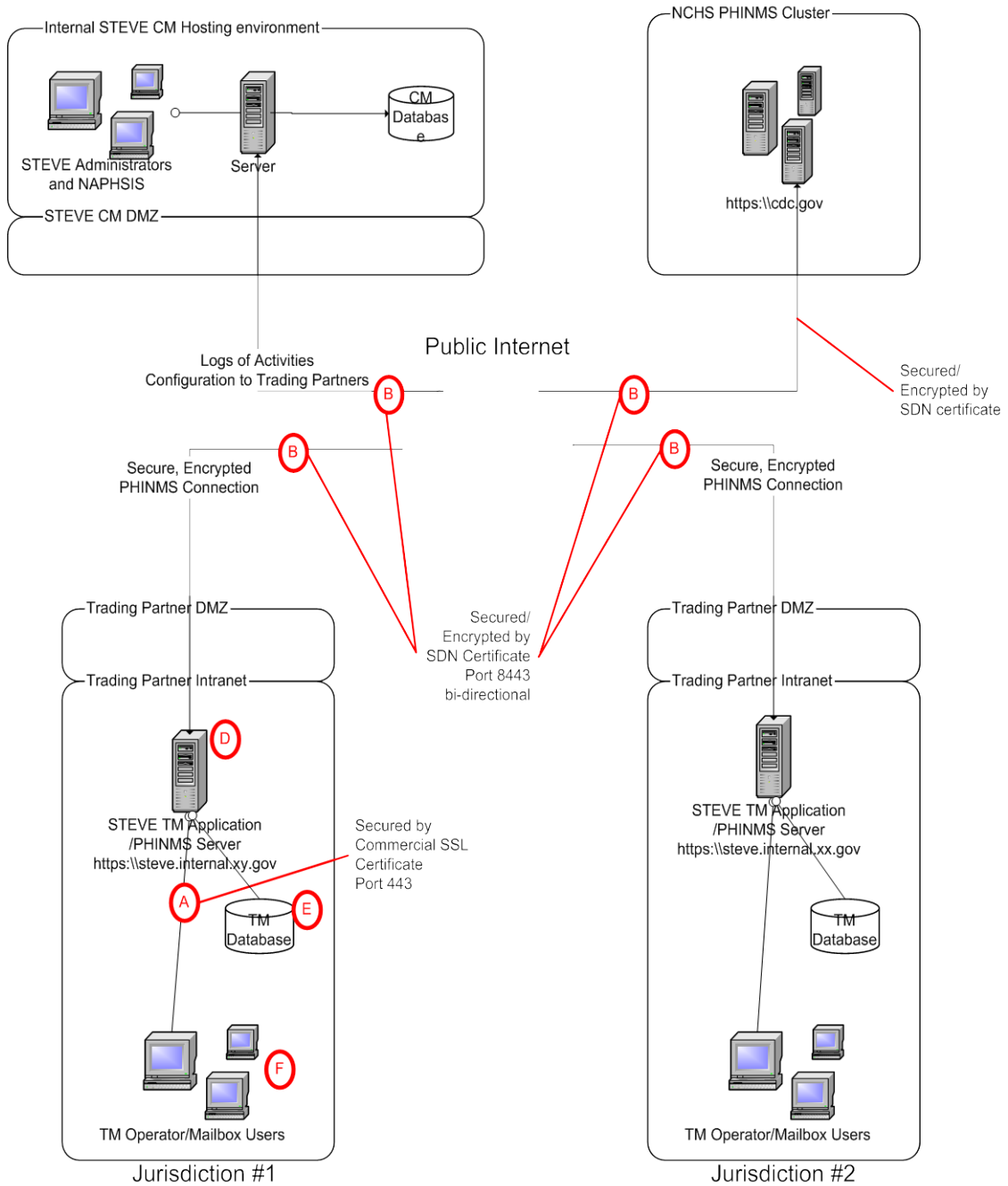


Figure 1: STEVE System Diagram

This diagram describes a typical STEVE installed environment. The STEVE server may also be placed in the DMZ as long as a secure driver is used to the database.

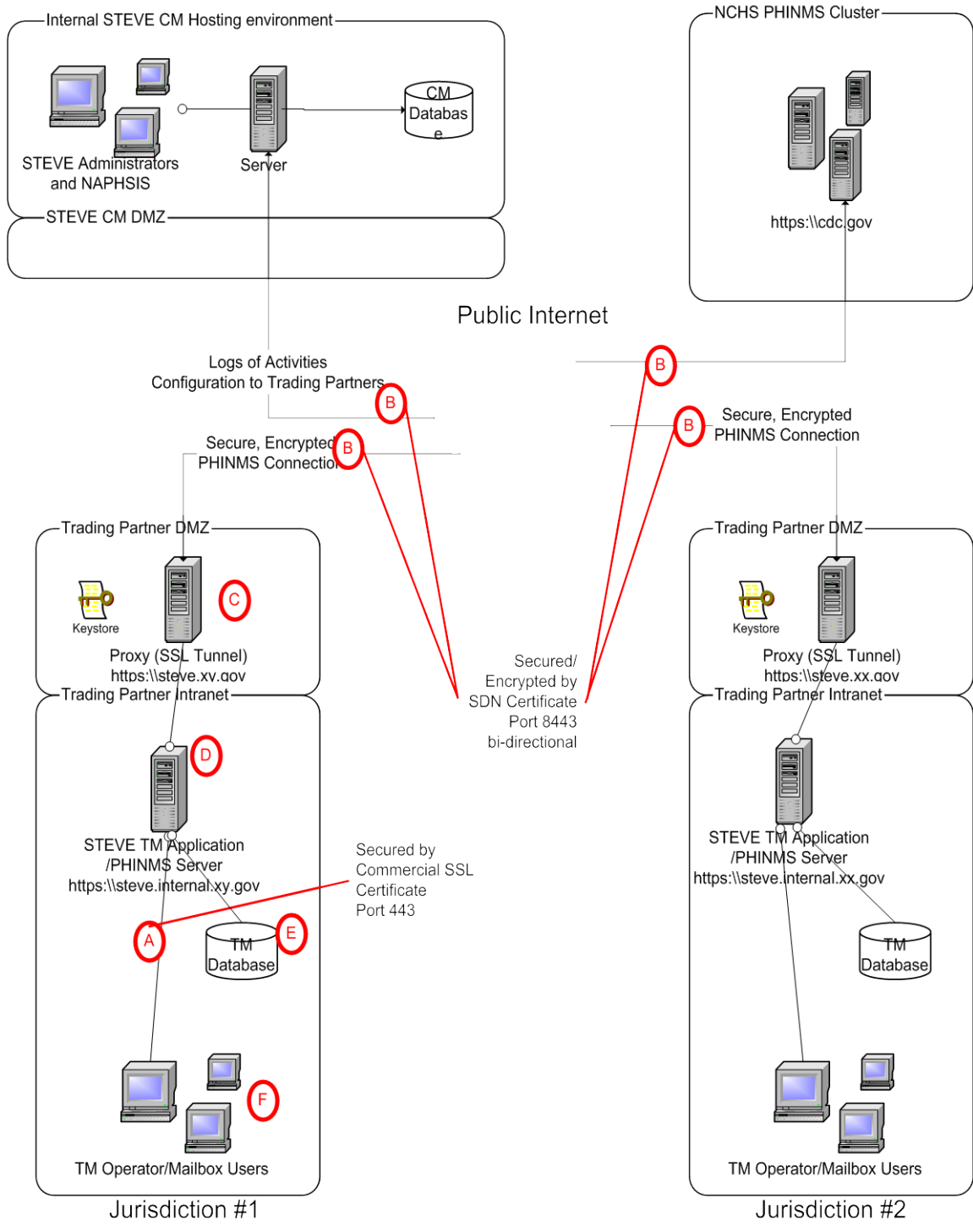


Figure 2: STEVE System Diagram with Proxy

This diagram describes a typical STEVE installed environment with a proxy server. The STEVE server may also be placed in the DMZ as long as a secure driver is used to the database.

3. STEVE CONCEPT OF OPERATIONS

A small group of vital records jurisdictions who have already signed the IJE Agreement will be invited to become the start-up community of STEVE trading partners. These trading partners will have previously been polled to determine their willingness and capabilities to support the hardware, software and network requirements for STEVE, as identified by the selected vendor.

Each trading partner will host a Transformation Module (TM), one of two primary components of the system. The vendor will host the STEVE Controller Module (CM), the central repository for trading partner information; system performance and message transmission tracking; and the maintenance of master file settings and parameters. The communication between TMs and between TM and CM will be via point-to-point message transmission. The functional and technical specifications for the system are described in Sections 3 and 4 of the RFP.

Trading partners will be provided with check lists and training from NAPHSIS to guide their preparation for STEVE, which must begin several months in advance of the TM installation. Jurisdictions must map their internal vital record file layouts to the standard IJE file layouts that will be the required input file format in STEVE. They must determine whether IJE files will be loaded into and back out of STEVE using manual or automated procedures¹. Each jurisdiction must review its own statutes and policies in preparation for the configuration of data use and exchange rules as “filters” of the TM. Trading partners must set up mailboxes for the distribution of received records to all recipients. And, trading partners must develop a strategy for the configuration of hardware and networks to accommodate installation of the TM.

Each trading partner in the start-up community will be supported by the vendor in the deployment phase. The TM may be self-installed or installed by the vendor, depending on the preferences and technical resources of each trading partner. The vendor will provide online user help and will guide the installation and initial configuration of the TM. The TM will receive initial settings and parameters from the CM that will allow it to establish its jurisdiction as a trading partner; identify and assign system permission to its user community; and configure its TM to its own specifications. TM settings and configurations necessary to maintaining a fully synchronized system will automatically be sent to the CM from each TM and added to the Trading Partner Master File. Necessary master file settings will be published back to the trading partner community.

As each trading partner completes configuration of its TM, it will begin sending test messages. The vendor will assist in the testing process and will fine tune the message exchange process until it is approved to go into production. The vendor will maintain a separate test environment accessible to all trading partners throughout the system lifecycle. Trading partners will be encouraged to maintain separate test and production environments for the complete system life cycle, as described in Section 4.

Once the start-up community is in production, the partners will begin exchanging vital events on a routine basis. IJE source files will be loaded into the TM. The TM will apply pre-configured filters with field-level permissions to each record and will create secure message transmissions for each destination. When a trading partner receives a transmission, its TM will decrypt and open the message, read the destination, and load the record(s) into a designated mailbox. Vital records exchanged between jurisdictions will then be mapped from IJE format back to the resident file format and added to the jurisdiction’s primary data repository. The jurisdiction will either distribute the contents of mailboxes to its other programs and agencies or allow them user access to the

¹ Development of automated procedures will be at the option of each trading partner and must be accomplished with their own resources. This is not a requirement of the STEVE vendor.

mailbox for the retrieval of exchange records. For other future trading partners, such as NCHS, there is expected to be only a singular mailbox for their receipt of records.

All TM and CM settings and parameters will be configurable. All master file settings and parameters will be configurable *only* by a CM administrator. Each TM's settings and parameters will be configurable and accessible *only* by its TM administrator. Each TM will maintain a complete audit trail and will allow its administrator to track and monitor TM activity and performance. Metadata from messaging transactions will be automatically pushed out by the TM to the CM. The CM will become the metadata repository, and the CM administrator will conduct centralized performance monitoring and transaction activity monitoring.

New trading partners will be added to the STEVE community on a scheduled basis and will undergo the preparation described above. As each new trading partner is added to the master file maintained in the CM, the CM will publish updated master file information to all trading partners.

It is anticipated that NCHS will join the trading partner community soon after the establishment of the start-up community. The CM master files will be reconfigured to accommodate NCHS exchange requirements, including the addition of message and file types as needed. Other trading partners will be added in the future, as approved.

NAPHSIS and the Inter-jurisdictional Exchange Committee will retain the right to accept, suspend or remove trading partners from the STEVE community according to formal procedures to be established by the time of system deployment.

For additional information, contact Leesa Shem-Tov, STEVE Project Manager at lshemtov@naphsis.org.

4. SUPPORTED IJE MESSAGE FORMATS

IJE File Format

STEVE supports the file formats developed by the NAPHSIS Inter-jurisdictional Exchange Committee. Natality, mortality, and fetal death layouts are extensions of the respective NCHS standard file layouts for VSCP reporting. The Committee has defined the following files for inter-jurisdictional exchange, which were revised in October 2008 for the STEVE System:

- 2003 Natality
- Pre-2003 Natality
- Mortality
- Roster (short-form death notification to jurisdiction of birth)
- Fetal Death
- Induced Termination of Pregnancy (ITOP)

The most current versions of the IJE file formats are accessed by clicking on the "IJE/STEVE Record Layout" link that is posted on the "Electronic Systems" page of the NAPSHIS website (<http://www.naphsis.org/index.asp?bid=980>). STEVE will also support the exchange of binary files.

Minimum IJE File Validation Rules for STEVE

Item	Nat	Mort	Roster	Fetal	ITOP
IJE file length	x	x	x	x	x
NCHS data set has:					
File number required, non zero	x	x		x	
Sending state is valid	x	x	x	x	X
Residence state is valid	x	x		x	X
Birth state is valid			x		
Year of event is valid	x	x		x	x

5. POINTS OF CONTACT

Readiness and Preparation

NAPHSIS is responsible for recruiting and preparing trading partners to join the STEVE community. Contact the STEVE Implementation Manager as soon as you want to inquire about becoming a STEVE trading partner. You will be provided with documentation to help you understand the hardware, software and procedural requirements for joining STEVE. You will also be scheduled for one or more teleconferences to discuss readiness and preparation steps.

Please contact:

William (Bill) Bolton, STEVE Implementation Manager

wbolton@naphsis.org

603/238-2995

or

Leesa Shem-Tov, STEVE Project Manager

lshemtov@naphsis.org

301/563-6001, extension 2

Installation

The jurisdiction will be directly involved with vendor personnel during the installation and integration process. Systems Made Simple (SMS) contact information is:

Ezra Oyer (Technical) – 315-455-3200 x15, ezra.oyer@systemsmadesimple.com

John Reeher (Technical) – 315-455-3200x19, john.reeher@systemsmadesimple.com

Angelo Emmi (Help Desk) – 315-455-3200x14, angelo.emmi@systemsmadesimple.com

Chris Hysick (Network) - 315-455-3200 x18, chris.hysick@systemsmadesimple.com

NAPHSIS does not have a problem with Agency talking directly to SMS as long as the discussions are technical in nature, and not contract-scope related. NAPHSIS would like to be involved even with the technical discussions if possible and would like to be copied on emails accordingly.

Help Desk Support

After STEVE is in production, you must contact the Service Desk for all questions and problems. Live help desk support is available from 8 am to 5 pm across all time zones, Monday through Friday. VitalChek is the provider of help desk services and is subcontracted to SMS. VitalChek will open a ticket for each call they receive from a trading partner. If VitalChek personnel are not able to resolve the problem or question, they will refer the ticket to SMS for resolution. Depending on the nature of the call, you may receive a response from either, or both, parties.

Please contact:

STEVE Service Desk

1.866.703.0773

STEVEservice@vitalchek.com

Availability: 8am - 8pm EST M-F