

Commonwealth of Kentucky

Cabinet for Health and Family Services

Office of Application Technology Services



Quality Health Information

White Paper

TABLE OF CONTENTS

Section 1	Purpose	1
Section 2	Executive Summary	1
Section 3	Components of Quality Health Information	3
Section 3.1	Portals	3
Section 3.1.1	Citizen Portal.....	3
Section 3.1.2	Partner Portal.....	4
Section 3.1.3	Worker Portal	4
Section 3.2	Electronic Medical Records Interfaces	4
Section 4	Common Technical Services	4
Section 4.1	Document Management Services	4
Section 4.2	Business Rules Engine	5
Section 4.3	Enterprise Service Bus.....	5
Section 4.4	Enterprise Single Sign-On.....	5
Section 4.5	Master Data Management.....	5
Section 4.6	Data Fraud Analytics Framework	6
Section 4.7	Notification Fulfillment Services.....	6
Section 4.8	State Integration Hub Platform	6
Section 4.9	CHFS Data Analytics Platform	6
Section 5	Business Applications.....	7
Section 5.1	Kentucky Health Information Exchange	7
Section 5.2	Kentucky Department for Public Health Systems	7
Section 5.3	Support Programs	8
Section 5.3.1	Child Care Assistance Program.....	8
Section 5.3.3	Kentucky All Schedule Prescription Electronic Reporting	8
Section 5.4	Integrated Eligibility and Enrollment System	9
Section 5.5	Medicaid Management Information System (Modernization Effort Underway to Implement New MEMS)	9

Section 1 Purpose

The Commonwealth established the Quality Health Information (QHI) Framework initiative for implementation of technology tools and connectivity standards that establish improved interoperability between health and human service systems. The QHI initiative is a continuous effort, since 2013, to facilitate the implementation of technology standards and approaches for the development of an interoperable, scalable, and easily adaptable cross-sector technology framework.

Section 2 Executive Summary

Most legacy systems were implemented on independent platforms creating individual monolithic architectures. Communication between systems was difficult as was aggregation and correlation of data within the enterprise. With the QHI initiative, the Commonwealth has embraced federal and other national initiatives such as Federal Enterprise Architecture Framework (FEAF), Medicaid Information Technology Architecture (MITA), and Office of the National Coordinator (ONC) to improve collaboration, integration, and the overall architecture as we transition existing systems to align with the QHI. This approach has promoted interoperability, reusability, and shared information throughout the enterprise as well as across organizational boundaries. This white paper describes the information and technical architecture of the Commonwealth's QHI.

The Commonwealth views the QHI as a house built on a solid foundation of a sharable technical services and a common Enterprise Service Bus (ESB) with various applications as pillars. (See figure 1.0.)

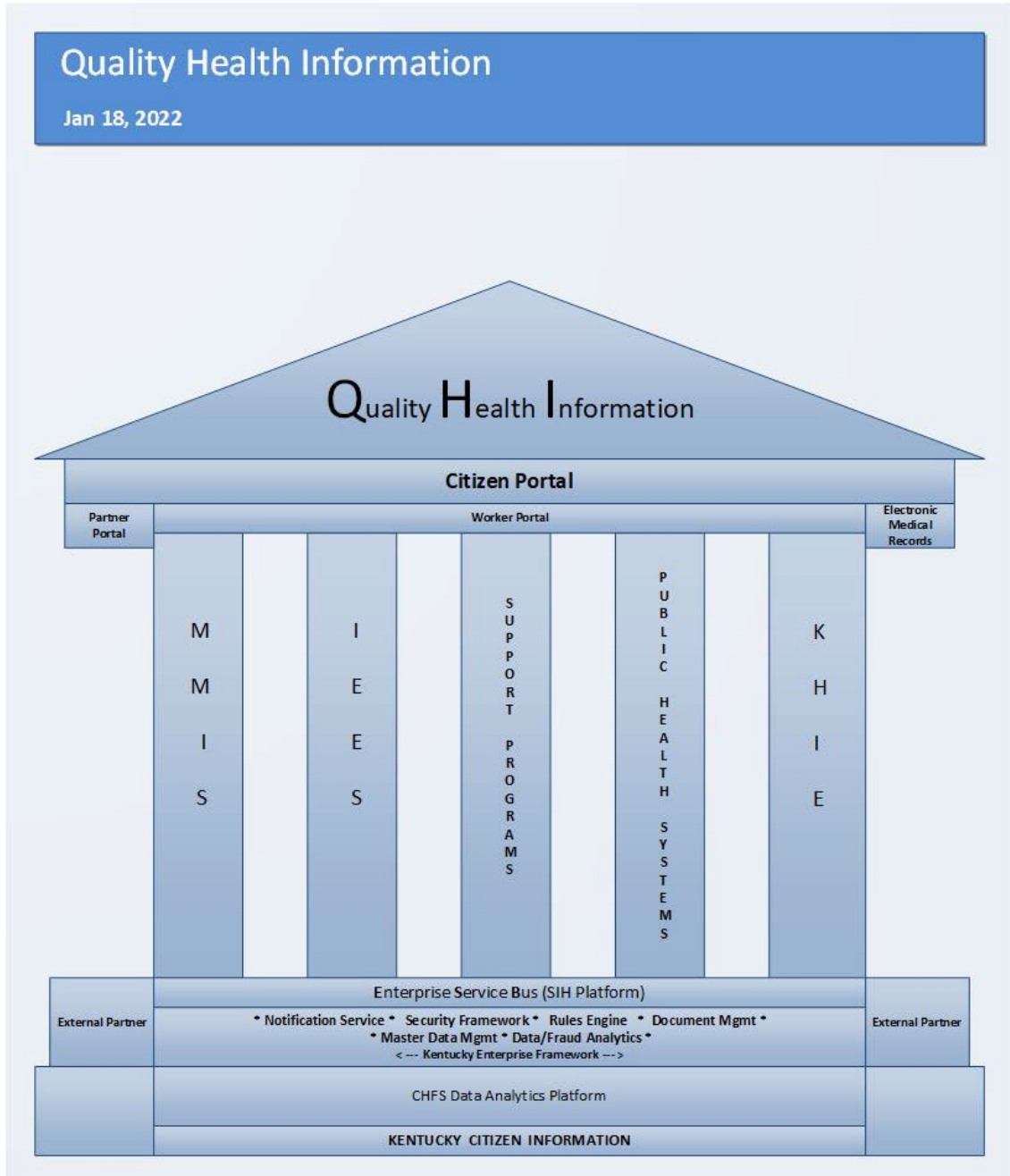


Figure 1.0 Quality Health Information

Section 3 Components of Quality Health Information

The QHI rests upon a Service-Oriented Architecture (SOA) foundation that uses an ESB, translation, and orchestration-enabling technologies to create meaningful business processes from reusable technical services. There are also business rules engine (BRE), Enterprise Single Sign-On (SSO), Enterprise Master Client Index (MCI) (also known as Master Data Management [MDM]), analytics, security framework, and other highly leveraged capabilities envisioned as the foundation of QHI. This extends the life of existing systems establishing a componentized, orchestrated approach for use in their replacement. SOA also makes greater use of planned capabilities. The challenge is to decrease complexity and increase utility of the overall processing architecture so that providers, members, workers, and other stakeholders can all share a 21st century user experience.

The pillars represent major systems that produce considerable value in terms of both service provision and data collection. These systems are typically outsourced and have their own user interfaces, reporting capabilities, and other functions. These systems can also be the source of a “silo effect” because the funding, contracting, and ultimate system delivery are conventionally separate projects. In other words, these systems are generally regarded individually rather than as one portfolio; therefore, gaps ensue. The Commonwealth’s QHI solves this problem with a solid foundation of integration as well as an attractive user façade. These “façades” are the various portals.

The Citizen, Partner, and Worker Portals (WP) solve the problem of users needing to access multiple systems to accomplish a task by providing user services that can access all. In summary, the QHI solves the silo problem while still providing project, funding, and contract separation without which the entire enterprise would be at risk.

Section 3.1 Portals

Users access components of QHI via Web Portals and Web interfaces. Users are associated with one of several broad categories known as 1) Citizens, 2) Partners, or 3) Workers. The Cabinet for Health and Family Services (CHFS) embraced Microsoft and Salesforce technologies to build its web interfaces.

Section 3.1.1 Citizen Portal

The purpose of the Citizen Portal is to provide access via single sign-on, allowing Commonwealth citizens to view their information regarding benefits and services received from the CHFS as well as general information. The Citizen Portal also provides citizens the ability to apply for and view the status of their benefits, report changes, etc. The Citizen Portal went live in October 2013 and has been continuously enhanced to allow citizens to view their claims, encounters, and other information.

Section 3.1.2 Partner Portal

The purpose of the Partner Portal is to provide access via single sign-on for Kentucky providers and eventually other CHFS partners to enroll and request/provide services. The CHFS Partner Portal provides access via single sign-on for Medicaid provider enrollment, disenrollment, information inquiry, information management, communication, grievance and appeals, and outreach. The Partner Portal is subject to continuous enhancement to provide additional features.

Section 3.1.3 Worker Portal

The Worker Portal (WP) is a component of the Integrated Eligibility and Enrollment System (IEES) that is a work-focused case management system. WP is primarily used by the Department for Community Based Services (DCBS), Division of Family Support (DFS), to determine eligibility for Medicaid, Supplemental Nutrition Assistance Program (SNAP), Kentucky Transitional Assistance Program (KTAP), State Supplementation, and the Child Care Assistance Program (CCAP). The WP provides enhanced customer service, improved worker productivity, and improved management opportunities. The WP is accessible by caseworkers only.

Section 3.2 Electronic Medical Records Interfaces

The CHFS vision is to build a foundation for connectivity for all electronic medical records (EMR) to facilitate the exchange of health information between exchange participants. The QHI foundation will provide this connectivity to exchange information with the Kentucky Health Information Exchange (KHIE). The QHI foundation will enable EMR vendors to incorporate into physicians' practice workflow access to all applicable Kentucky state applications and reporting services. For example, a physician could potentially retrieve a report directly from the State's Prescription Monitoring Program system through an external partner interface without leaving their EMR.

Section 4 Common Technical Services

Kentucky's approach to QHI construction is first to build its foundation with a sharable technical services platform. The following technical services are available for the enterprise applications.

Section 4.1 Document Management Services

Kentucky uses the Microsoft SharePoint server platform to support Document Management Services (DMS). The Commonwealth is in the process of modernizing these capabilities on AWS to align with our long-term cloud strategy, while also building out Intelligent Document Processing capabilities that strengthen automation, accuracy, and operational efficiency. DMS provides components to process and store all

electronic documents as well as index the documents for faster retrieval. The DMS currently stores approximately 365,000,000 documents, which is increasing at a rate of nearly 35,000,000 documents annually.

Section 4.2 Business Rules Engine

Kentucky uses Corticon's BRE to maintain complex business rules required for IEES, and other systems in QHI. CHFS uses Corticon BRE because of its ability to build, test, and deploy complex rules using its studio and its performance. Corticon also fits SOA infrastructure by deploying as a web service. CHFS considers the Corticon solution as scalable and having high availability.

Section 4.3 Enterprise Service Bus

Kentucky has fully transitioned from our legacy Microsoft BizTalk Server 2020 ESB implementation to a modern, cloud native integration architecture built on Azure Integration Services (AIS) that provides the enterprise integration framework for orchestrating, transforming, and routing messages across platforms. The modernized QHI ESB platform enables scalable, serverless, flexible, maintainable, and future-ready integration patterns.

Section 4.4 Enterprise Single Sign-On

The Kentucky Online Gateway (KOG/KYID) provides SSO, user provisioning, and authorization services for all Kentucky applications. Every component of QHI invokes KOG services prior to executing a user request for Workers and Citizens. KOG/KYID integrates and synchronizes with the Commonwealth's existing Active Directory through Enterprise Identity Management (EIM) as well as the Commonwealth's mainframe security on the Z/OS. KOG/KYID is built using the following technologies: Microsoft .Net 4.7.1 Framework and .NET Core 8.0, SQL Server 2022, KYID Azure Services, Active Directory, Identity as a Service Provider (IDaaS) (currently Ping/ForgeRock) and Remote Identity Proofing Solution (by LexisNexis and Experian). Kentucky constantly reviews current security trends, features / functionalities it supports and may update the platform in future.

Section 4.5 Master Data Management

Kentucky has implemented a Virtual Master Data Registry (CHFS' MDM) using IBM InfoSphere MDM Standard Edition tool to establish Master Client Index (MCI) record with a consolidated view of citizen records for all clients receiving services by comparing client records from various systems maintained by CHFS. IBM's Initiate Master Data service is a comprehensive platform that enables rapid implementation of the enterprise-wide master. It also delivers high-volume matching and linking through high-performance data processing and scalable database structures. The Virtual Master

Data registry maintains associated applications for each MCI in its repository allowing easy correlation.

Section 4.6 Data Fraud Analytics Framework

Kentucky is currently exploring options to provide a robust data fraud analytics framework.

Section 4.7 Notification Fulfillment Services

Kentucky uses Opentext solution, formally HP Exstream, for customer communication services to deliver notices, messages, and documents through this shared services platform. Kentucky is using this platform to deliver all communications on-demand or via batch, through multiple channels such as Short Message Service (SMS), web, email etc., on the eligibility and enrollment system, and using it for other applications in the future.

Section 4.8 State Integration Hub Platform

Kentucky has completed the modernization of the State Integration Hub (SIH), transitioning from the legacy BizTalk 2020–based State Data Hub (SDH) to a standards-based, MITA-aligned, service-oriented integration platform. The SIH now provides a cloud-native communication broker that enables secure, reliable data exchange and interoperability across internal and external systems.

Built on Azure Integration Services (AIS), the SIH is actively used by all Cabinet applications to support their business integration needs, including IEES, which leverages the platform to exchange eligibility-related information through both synchronous and asynchronous patterns.

The SIH platform shall support architectures like queuing, service orchestration, web services, etc. In addition, it shall also provide services to support Secured File Transfer Protocol (SFTP), notifications, alerts, etc. All new interfaces shall utilize the SIH platform for all exchange of information with Commonwealth-hosted, Vendor-hosted, and other partner systems.

Section 4.9 CHFS Data Analytics Platform

The Commonwealth desires to move forward with establishing an analytics platform for the Cabinet to provide a more complete understanding of Kentuckians' health status and health care utilizations. This will allow the Commonwealth to play a significant role in implementing a comprehensive approach to health outcomes for all Kentuckians.

The platform will be a flexible and more comprehensive platform in a cloud environment for big data analytics with capabilities to support, data mining, data analytics such as

statistical analysis, generative/predictive analytics, and storing data within a data lake in various structural forms (structured, unstructured data, and semi-structured). The data analytics platform will allow the Commonwealth to consolidate and manage data from CHFS-owned and -managed applications as well as data from partners (internal and external). CHFS manages all Health and Human Services-related applications, such as Medicaid Eligibility, Medicaid Claims, SNAP, Temporary Assistance for Needy Families (TANF), and CCAP; and Public Health-related applications, such as Health Information Exchanges; and other Cabinet programs, such as Child Welfare, Child Support, Department of Behavioral Health, and Developmental and Intellectual Disabilities (DBHDID).

Section 5 Business Applications

Section 5.1 Kentucky Health Information Exchange

The KHIE is a fully functional health information exchange engaged with multiple small, medium, and large providers of healthcare data for improving the quality and safety of healthcare in Kentucky. To accommodate the diversity of data sources in the health information exchange space, the KHIE has implemented a broad set of technologies to collect and consolidate clinical and claims-based data that are made available to exchange participants through web-based technology or direct consumption. In addition, the KHIE supports the collection of healthcare data for secondary use such as the population of registries and public health surveillance systems. Exchange participants can share and retrieve data via peer-to-peer Virtual Private Network (VPN) using HL7 messaging or by Continuity of Care Document (CCD)-based web services exchange. Many participants are utilizing a combination of methods.

The interoperability between KHIE and exchange participants (hospitals and provider practices) is built on standard Integrating the Healthcare Enterprise (IHE) profiles. The KHIE implemented Direct Exchange services in 2014, as defined by ONC, to facilitate communication between health providers as well as between a provider and the KHIE. The Direct Exchange services are Direct Trust Accredited, as recommended by the ONC. KHIE currently has more than 500 users on Direct.

Section 5.2 Kentucky Department for Public Health Systems

The mission of the Kentucky Department for Public Health (KDPH) is to promote and protect the health and safety of Kentuckians. KDPH provides policy and program governance for systems supporting local health departments, communicable disease control, disease and injury surveillance, enforcement of public health regulations, public health education, risk identification and reduction, policy development, and responses to disasters. A number of the programs use a National Electronic Disease Surveillance

System (NEDSS) Base System (NBS) implementation (i.e., to manage disease investigations and report infectious diseases to the Centers for Disease Control [CDC]), and external partner systems will use the ESB to interoperate with the Kentucky NBS. The Kentucky Immunization Registry (KY IR) is vendor-hosted, and it is envisioned that registry data will be accessible through the Citizen Portal. The KHIE is currently exchanging data with the KY IR and NEDSS, as well as CDC/BioSense for syndromic surveillance reporting. The University of Kentucky operates the Kentucky Cancer Registry. The Kentucky State Lab performs many important procedures for providers across the Commonwealth. The State Lab systems store lab result data, clinical documents, and other related documents.

Section 5.3 Support Programs

CHFS maintains a number of application systems to support other health and family services programs. These application systems have their own platforms using mainframe, client/server, and web services. Efforts are underway to modernize these systems as appropriate to utilize the QHI framework.

Section 5.3.1 Child Care Assistance Program

CCAP is Kentucky's subsidy program that helps families pay for and obtain childcare. The Division of Child Care is responsible for all childcare provider support and DFS assists clients in applying for the program. The Division of Child Care coordinates subsidy payments to providers, CCAP provider fraud reduction, and registered providers. The Kentucky Integrated Child Care System (KICCS) supports childcare provider management including payments. IEES supports childcare eligibility and enrollment.

Section 5.3.2 Division of Protection and Permanency

The DCBS Division of Protection & Permanency (P&P) coordinates the state's child and adult welfare and violence prevention efforts. The Workers Information System (TWIST) is the Commonwealth of Kentucky's automated case management system designed to support P&P caseworkers.

Section 5.3.3 Kentucky All Schedule Prescription Electronic Reporting

The Kentucky All Schedule Prescription Electronic Reporting (KASPER) system tracks controlled substance prescriptions dispensed within the Commonwealth. A KASPER report shows all scheduled prescriptions for an individual over a specified period, the prescriber, and the dispenser.

Section 5.4 Integrated Eligibility and Enrollment System

Kentucky uses an IEES solution to support multiple health and human service (HHS) programs and multiple access channels, such as self-service portal (SSP). HHS programs include Medicaid, Qualified Health Plans (QHP), Advance Premium Tax Credit (APTC), Cost Sharing Reduction (CSR), Supplemental Nutrition Assistance Program (SNAP), Transitional Assistance for Needy Families (TANF), Child Care Assistance Program (CCAP), and the Women, Infants, and Children (WIC) Pre-application.

The core IEES uses Microsoft technologies and is hosted at the Commonwealth's data center. IEES also supports functions such as notifications, scheduling, document management, business rules management, and associated business processes required to launch and continuously operate an efficient and effective Eligibility and Enrollment (E&E) System. CHFS also developed kynect Benefits Application, kynect Resources – Community Portal, kynect Ability, kynect Support Portal, and kynect Resources – Staff Portal on the Salesforce Government Cloud Plus environment.

The self-service portals are mobile-responsive and built using human-centered design principles, enabling users to understand and complete processes with fewer errors, which has been critical during the Public Health Emergency (PHE).

- kynect Benefits provides an integrated eligibility and enrollment opportunity
- kynect Resources compiles and presents the most relevant community-based resources related to the users' needs/entered criteria. Referrals are received and updated by Community Based Organizations. The data is then used to identify resource deserts and high-need areas.
- kynect Ability provides SNAP Employment and Training participants to track work participation activities and complete transportation requests.
- kynect Health Coverage provides individuals/households the ability to apply for QHPs and public health insurance programs.

Section 5.5 Medicaid Management Information System (Modernization Effort Underway to Implement New MEMS)

The Kentucky Medicaid Management Information System (MMIS) is a claims processing and retrieval system. The current MMIS is hosted and maintained by Gainwell Technologies, LLC (formerly DXC). MMIS is a customized, rule-based, HPE interchange system. It supports both Fee-for-Service (FFS) reimbursement as well as Managed Care programs.

MMIS is hosted on a combination of UNIX and Windows environments. The UNIX environment is comprised of HP servers, with Intel Itanium processors, operating on a Hewlett Packard UniX (HPUX) 11.31 platform.

Medicaid modernization remains a high priority for Kentucky. Kentucky's near-future vision is to implement Medicaid Enterprise Management Solution (MEMS) as a web-based, flexible and modular, real-time MMIS solution that aligns with MITA and QHI frameworks. This effort will meet the needs of not only Kentucky's Medicaid program but also the expectations of the Center for Medicare and Medicaid Services (CMS). Kentucky's vision is to implement the MMIS Modules formerly known as Medicaid Administrative Service Organization (MASO) and Encounters Management Module (EMM), which are currently known as Medicaid Claims Administrative and Financial Solution (MCAFS); and the Medicaid Decision Support System [DSS]/Data Warehouse [DW]. The DSS/DW will be implemented as part of this modernization effort.

Appendix A: Acronyms and Abbreviations

Acronym	Definition
ADFS	Active Directory Federated Services
APTC	Advance Premium Tax Credit (APTC)
BRE	Business Rules Engine
CCAP	Child Care Assistance Program
CCD	Continuity of Care Document
CDC	Centers for Disease Control
CHFS	Cabinet for Health and Family Services
CMS	Center for Medicare and Medicaid Services
CSE	Child Support Enforcement
CSR	Cost Sharing Reduction
DAP	Data Analytics Platform
DBH	Division of Behavioral Health
DBHDID	Department for Behavioral Health and Developmental and Intellectual Disabilities
DCBS	Department for Community Based Services
DFS	Division of Family Support
DID	Developmental and Intellectual Disabilities
DMS	Document Management Services
DSS	Decision Support System
DSS/DW	Decision Support System/Data Warehouse
DW	Data Warehouse
E&E	Eligibility and Enrollment – Citizen’s Portal
E&T	Education & Training
EIM	Enterprise Identity Management
EMM	Encounters Management Module
EMR	Electronic Medical Records
ESB	Enterprise Service Bus
FEAF	Federal Enterprise Architecture Framework
FFS	Fee for Service
HHS	Health and Human Service Programs
HPE	Hewlett Packard Enterprise
HPUX	Hewlett Packard UniX
IEES	Integrated Eligibility and Enrollment System
IHE	Integrating the Healthcare Enterprise
KASES	Kentucky Automated Support Enforcement System
KASPER	Kentucky All Schedule Prescription Electronic Reporting
KDPH	Kentucky Department for Public Health
KHIE	Kentucky Health Information Exchange
KICCS	Kentucky Integrated Child Care System

KOG	Kentucky Online Gateway
KTAP	Kentucky Transitional Assistance Program
KY IR	Kentucky Immunization Registry
MASO	Medicaid Administrative Service Organization
MCI	Master Client Index
MDM	Master Data Management
MEMS	Medicaid Enterprise Management Solution
MITA	Medicaid Information Technology Architecture
MCAFS	Medicaid Claims Administration and Financial Solution
MMIS	Medicaid Management Information System
MWMA	Medicaid Waiver Management Application
NBS	NEDSS Base System
NEDSS	National Electronic Disease Surveillance System
OATS	Office of Application Technology Services
ONC	Office of the National Coordinator
P&P	Division of Protection and Permanency
PHE	Public Health Emergency
QHI	Quality Health Information
QHP	Qualified Health Plans
SDH	State Data Hub
SFTP	Secure File Transfer Protocol
SIH	State Integration Hub
SMS	Short Message Service
SNAP	Supplemental Nutrition Assistance Program
SOA	Service Oriented Architecture
SSO	Single Sign-On
SSP	Self-Service Portal
TANF	Temporary Assistance for Needy Families
TWIST	The Workers Information System
VPN	Virtual Private Network
WIC	Women, Infants, and Children
WP	Worker Portal