PIC – Next Generation (PIC – NG) - Overview

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Industry Day - July 2017
Overview

• This morning we’ll talk about:
  • PIC today and why it needs to change
  • REAC vision and approach
  • Progress so far
  • Challenges
  • Next Steps

• This afternoon we’ll talk about:
  • Demonstration of current solutions
  • What else do we need for PIC?
  • How does VMS fit in?
IMS/PIC

• Inventory Management System - PIH Information Center
  Receives millions of data points from more than 4250 PHAs
  – Used by HUD to:
    • Calculate Operating Subsidy ($4.4b)/Capital Fund ($1.8b)
    • Validate Section 8 HAP ($18b) and Admin Fee ($2b)
    • Support program oversight for PHAS and SEMAP
    • Maintain inventory of developments, buildings and units
    • Maintain household and tenant demographics
  – One of HUD’s most used systems
    • ~4,250 HUD users
    • ~44,200 PHA users
    • ~10,000 users per week
    • ~60 software vendors supporting PHAs
    • ~10 million 50058 submissions
Rationale For Change

• IMS/PIC developed in 1999 – 2000
  – Developed in 2001 for Windows NT, no significant changes after 2007
  – 300+ outstanding enhancement requests
• Availability
  • 2016 - 10 days below 80% availability
  • Average 96% availability for the data center M-F, 7am-9pm
• Integration with PHA applications
  – Difficult/Impossible to integrate PIC information into the PHA’s application
  – Batched data and fatal errors causes heavy administrative burden
  – Many PHAs use multiple vendors applications to manage their development, often due to mixed-finance, rental assistance demonstration
Issues with IMS/PIC

• Accuracy of 50058 information
  – Multiple OIG audit findings for inaccuracy of information
  – 1.3 million of 10 million 50058 submissions rejected annually
  – Average error resolution: 1 hour
    • 1.3 million hours administrative burden
  – Significant lag between data input and data validation
  – No validation of data prior to submission
  – Correcting/voiding records significantly effects PHA accounting software
  – Not all tenants have a social security number
  – Significant risk of PII exposure
Vision

• Enterprise-ready, G2G and G2B solution which:
  – Improves quality, availability, timeliness, and delivery of information supporting HUD affordable housing programs
    • Fully cloud based – 24/7, no reliance on legacy data center
    • Micro services/APIs to enable full integration of IMS/PIC with PHA application and interagency collaboration
  – Flexible to support evolving program changes - Rental Reform, HOTMA, RAD, MTW Expansion, future deregulation
  – Reduce administrative burden for PHA and HUD staff
  – Integrate collection of affordable housing information

• Section 8 and 9 Tenant Information (50058, 50059)
• Abatement, FSS
• Demolition/Disposition of Public Housing properties
• Inventory of Public Housing units/buildings
• Operating Fund (52722/23)
• Request for Tenancy Approval (52517)
• UPCS-V Physical Condition
• Financial Statements, FDS
PIC-NG Approach

- **Stakeholder involvement**
  - More than 90% of PIC information comes from PHAs
  - PHA Vendors must update software
  - PIC-NG necessary to facilitate business process improvements and regulatory burden relief

- **Software development partnership between REAC and OCIO**
  - OCIO Infrastructure, Enterprise Architecture, and Information Security
  - REAC Federal software development team (35 FTEs)
  - Cloud infrastructure ~ $200K development ~$500K production per year
  - Layered architecture to prevent vendor software lock in

- **Development methodology**
  - AGILE- Incremental software delivery with increasing functionality
IMS/PIC Tomorrow

• Micro Services / API design
  – PHA users work exclusively in their own applications
    • Vendor software uses IMS/PIC APIs in the background
  – Real time interfaces significantly reduce time between data input and data validation
  – Industry standard, open-source software prevents vendor lock-in
  – Rules engines supports changing program needs

• Enhanced Business Intelligence
  – Ability to slice and dice, drill up and down information
  – Forecasting, risk analysis
  – Geocoding, mapping
  – Accurate information for accurate program funding
  – Export to Office tools, PDF, Word, Excel
PIC-NG Progress

• Software Development
  – USAC Web Service / API in production, CMA currently with OMB
  – HUD Tribal-VASH Portal nearing completion
  – Section 8 50058 processing
  – PII minimization (with PD&R, Housing, business partners, vendors)

• Stakeholder involvement and feedback
  – Monthly industry calls
  – Industry listening sessions
  – Joint development collaboration tools
  – Feedback on development and transition needs
PIC-NG Challenges

- Getting Cloud infrastructure
- Changes to infrastructure requirements
- PHA ability to transition
- Tribal Information
# PIC-NG Roadmap

<table>
<thead>
<tr>
<th>Business Functionality</th>
<th>Current State</th>
<th>Summer 2017</th>
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<th>Fall 2017</th>
<th>Spring 2018</th>
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<td>Capital Funding</td>
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PIC-NG Next Steps

• PHA testing
  – Expand web service APIs available for PHAs and software vendors
  – Digital certificate security
  – Roll out to all PHAs

• Tenant Verification
  – Integration with EIV

• ONAP VASH
  – Production deployment
  – Program roll-out communication to Tribal Housing Entities

• 50058
  – Data conversion - in progress
  – Enhanced ability to collect and validate
  – Ensure IMS/PIC and PHA information accurate and synchronized
PIC-NG Solution – USAC

What is Lifeline?

LIFELINE PROGRAM
Provides reduced rates for telecom services to eligible low-income consumers

Monthly discount on phone & broadband service

Subscribers prove eligibility through participation in qualifying program or demonstrating income at or below 135% of federal poverty guideline

Available in every state, territory, commonwealth & on Tribal lands

13 million U.S. households participate in the federal Lifeline program

ADD Lifeline Link
PIC-NG – Solutions in Progress
PIC-NG Solution- VASH

Live Demonstrations:

- **Tribal VASH:** [https://hudapps.hud.gov/picngdemo/web/#!/home](https://hudapps.hud.gov/picngdemo/web/#!/home)
  - **J Unit Test** In Eclipse: validation/src/test/java/gov/hud/pic/pic/submission/common/ITCommonSectionOne.java
  - **DROOLS:** In Eclipse: validation/src/main/resources/submission/common/CommonSectionOne.drl
  - **50058 submission:** [https://hudapps.hud.gov/picngdemo/web/#!/mtwFileUpload](https://hudapps.hud.gov/picngdemo/web/#!/mtwFileUpload)

- **Lifeline Program:**
  - **Unique IDs:** [https://hudapps.hud.gov/picngdemo/uid/uid](https://hudapps.hud.gov/picngdemo/uid/uid)
    - 1st Section (UID Request Lookup):
      - HPIC00 - Requester, can enter SSN and get UID back.
    - 2nd Section (UID Reverse Lookup):
      - HPIC01 - No mask, can enter UID and get full SSN back.
      - HPIC02 - Full mask, can enter UID and get masked SSN back.
      - HPIC03 - Partial mask, can enter UID and get partial masked SSN back.
PIC-NG Solution – Tribal VASH

- Expands HUD-VASH program to target Tribal members
- First cohesive effort to collect tenant data from Tribes
- Funded by grants
- Tool serves as a prototype for future FRS tool
  - Self-publishing API
  - Increased administrative functions
  - Field validation
  - Increased reporting capabilities

https://hudapps.hud.gov/picngdemo/web/#/home
PIC-NG Solution – 50058 Submission

UI → JSON Web Service

File Upload Web Service → Parsing Mapping

DB Save Submission

DB → Scheduler → Validation

Store Data

Store Errors
# PIC-NG Solution Form 52722/23

## FO Reports & Submissions / FO 52723/52722 Tool Submissions Summary - 2017

<table>
<thead>
<tr>
<th>Field Office</th>
<th>Tools Deployed</th>
<th># Submitted by FO</th>
<th>Exceptions</th>
<th>Missing Submissions</th>
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### 22/23 Link
PIC-NG – Other Solutions in Progress

FEMA
- Computer Matching Agreement between REAC and FEMA
- Disaster victims, FEMA can verify housing assistance in real time
- System to system using web services
- Digital certificate for authentication
- End to end encryption

EIV – Business Intelligence Tools: [MS Link HEIV01]

PHA Executive Compensation: [Exec Comp Link MOPHO2- PHA, MOPF04 – HUD Development]

CSSR Reports: [CSSR Link, HDCG00]
PIC-NG - Tomorrow

PHA User
Tribal User
HUD User
PHA System
Load Balancer
Reverse Proxy Server
Web Server
Web Services
Application Server
Authorization Service
Business Rules
Data Storage
PIC-NG – 50058 Submissions

• PIC-NG Version 1.0
  – No changes to the 50058
  – TRG for batch submissions does not change
  – Improvements can be made in the 50058 streaming process
  – TRG to cover all 50058 related web services
  – No plans to ‘end of life’ batch submissions
  – Synchronous validation

• PIC-A New Hope Version 2.0 (Ideas)
  – Improvements to 50058 data fields submitted
  – Phase out of batch processing
  – Relax fatal errors to absolute minimum
PIC-NG – 50058 Submissions

• Batch
  – Screen to upload 50058 files
  – Web Service to upload 50058 files
  – Multiple 50058s at a time
  – Convert file formats to JSON
  – Each 50058s extracted and processed by streaming web service

• Streaming
  – Web Service to upload single 50058 – synchronous
  – Initial format/consistency checks – asynchronous
  – Business rules checks
  – Database updates
PIC-NG – Unique Identifiers

• Household
  – Return a Household Identifier for a new admission

• Household Member
  – Return a random identifier unique to a SSN for each member
  – Are check digits needed

• Streaming allow submission of existing information or new identifiers?
PIC-NG – Void / Correction

• Void
  – Store information based on 50058 effective dates
  – Submit a 50058 to fill the ‘hole’
  – Assume prior 50058 carries forward
  – What happens if there is an error now in the subsequent 50058 information

• Correction
  – Allow just the field(s) corrected to be submitted
PIC-NG – Data Conversion

• Initial IMS/PIC to PIC-NG
  – Existing IMS/PIC information has ~ 15% errors
  – REAC will/is correcting known errors
  – Day one information will be taken from IMS/PIC

• On going
  – PHAs need a way to ensure HUD and PHA data in sync
  – By household, by building, by development
PIC-NG Discussion – TRG

• What is needed
  – JSON format – RAML for all Web Services
  – Rules from rules engine
  – Rules by action type
  – Security requirements
  – Submission identifier
  – Household Identifier
  – Household Member Identifier
  – Synchronous web services – how long is too long to wait
  – Submission status
  – Error messages by rule
  – Break existing rules into multiple atomic rules
PIC-NG Discussion – Processing time

• How much is too much?
PIC-NG – Layered Architecture

- Security
  - Authentication
  - Authorization
- Web
  - Presentation
  - Web Services
- Application
  - Business Rules
  - Workflows
- Data
  - Access
  - Storage
PIC-NG – Security Layer

• Authentication
  – Siteminder
    • Will be challenged first time when trying to access protected resource
    • Infrastructure team is working on enabling Digital Certificates

• Authorization
  – WASS with roles and actions for that PHA
    • PHA applications will have one role that allows access to all PIC-NG
    • PHA users, roles specific to their job
PIC-NG – Web Layer

• Presentation
  – Angular 2
    • Browser independent
    • Support for modern browsers not just IE
    • Support mobile devices
    • Uses same Web Services

• Web Services
  – JSON RESTful
    • Called directly from PHA applications
    • Called from presentation layer for users
    • All interaction is through Web Services
PIC-NG – Application Layer

• Business Rules
  – Rules engine, ability to share the rules
  – Database functions, called from rules engine
  – DROOLS

• Workflows
  – Ensure business processes have automated workflow
  – HUD and PHA users know the status of a process in the lifecycle
PIC-NG – Data Layer

- **Access**
  - Database Procedures and Functions

- **Storage**
  - Entity Attribute Value model
  - Temporal
    - Effective to and from (ability to maintain history)
    - Valid/ to and from (during what time period did we believe this information to be accurate)
Questions or Comments?
Please email PICNG_REAC@HUD.gov