

STATE OF CONNECTICUT
State Innovation Model
Health Information Technology (HIT) Council
Answers to Questions for Zato

The HIT Design Group has identified the set of questions listed below to better understand the Zato solution capabilities and determine its suitability for the SIM HIT Solution. These questions will be addressed as part of the Zato presentation to the HIT Council on April 17th. A short written answer is summarized below after each question. After the meeting on April 17, if there is an interest in a deeper and more detailed technical discussion with Q&A around these answers, Zato would be happy to arrange for a face-to-face technical exchange within the greater Hartford area for this purpose.

1. In the [video](#) explanation of the system, the speaker stated that the solution "overlays systems." Please explain what that means in general, and give at least one specific example relevant to our initiative.

The Zato Health Interoperability Platform software reads data that are stored within an EHR application, other database application, file system application, or Website, each of which is a data silo, and creates normalized indexes of the data that are maintained by each application. The indexes are stored within and processed on 'edge servers' located within the same data center. Application data can then be processed and reports generated on the edge servers in flexible ways, with the heavy processing load carried on the edge servers and minimal load placed on the production servers that are busy processing transactions and serving the data collection function of each application on the production equipment. Because all indexes on all edge servers can cooperatively federate processing tasks in parallel, subject to security constraints, this capability allows an authorized user to query, retrieve, extract, navigate, analyze, discover, and report across application data silos in parallel with high productivity to achieve flexible global views across the data silos from a single user interface, as if all of the data from all of the application silos had been copied and aggregated physically for centralized processing in a single consolidated data center. Because the edge servers carry the processing load and there is no significant additional loading of the production application and equipment or networks, this capability is ideal for secure information sharing environments such as Health Information Exchanges. A more specific example would be to help the state to view MU data in a standardized way across its providers by having their source data or their EHR output data normalized to a form that would make it easier for the state to make comparisons and easier for the Provider to submit required reports in a standardized way, versus the situation today in which MU data are reported in diverse formats, requiring personnel to attempt to manually put the data into some useful standardized form. This ability to more efficiently and effectively 'overlay' and re-use existing data to generate additional useful views and reports can be demonstrated with the use of the paid up state-wide license

2. In the same video, the speaker states that the solution, "does not move the data from the EHR." Please explain in greater detail what that means and how it applies to our solution requirements.

Until now, the only data interoperability that has been achievable is by physical data aggregation to a central processing space. With cooperative federation, the data and the indexes stay where they are already located, maintained, and protected. Parallel processing and network based information fusion across edge server indexes enable the creation of secure 'virtual data warehouses.' This capability extends data reach without the need of an additional data center or the risk of making copies of sensitive data sets. A user can span normalized indexes of more than one EHR or other application at the same time to improve productivity and exploit associations across application data sets. Output in reports can be linked back to source medical records for efficient verification and auditing.

3. There are access restrictions to some data (e.g. Medicaid). Can the Zato edge server technology access all data sources?

The edge server technology uses highly secure user role based discretionary access control with a combination of early binding and late binding of the security attributes and constraints for the users and the data. The organization responsible for security of a data set controls access to the data by all authorized users. The security is exercised at the same location where the data are stored. All data transmissions over networks are encrypted end-to-end.

4. The SIM HIT design needs to take into account that individual providers have varying levels of technology. How can we prepare for the spectrum of technologies, including none?

Edge servers normalize the representation of data that are stored in diverse formats in different applications (data silos). Data can be aggregated at different levels flexibly. The Zato Health technical team has considerable experience with processing and reporting across the data of many diverse systems of many different organizations at the same time.

5. How does the SIM HIT design address the gap/overlap factor? (for providers that don't have EHRs and patients who see multiple providers)

Normalizing the data separates the data from the application. Data interoperability is achieved when common tools and reports can process the normalized data in parallel from a unified interface. Accessing data productively and effectively across application repositories in different data centers of different organizations is a particular strength of the cooperative federation technology underlying the Zato Interoperability Platform.

6. Please provide additional information on Zato's capabilities for collecting and aggregating data.

While the Zato Health software can create entry forms for collecting data, the software is typically not used for data collection, but rather, for virtual data aggregation and cooperative federated analysis across data that are collected and stored by existing diverse applications. The Zato software is designed for and excels at virtual data aggregation across data silos.

7. How does an individual provider or ACO benefit from having the edge server and software?

The following benefits can be realized by ACOs and other providers:

- Data interoperability across applications on servers, clusters, clouds, mainframes
- Affordable and flexible delivery of standardized, comparable clinical data reports
- Cost effective verification of reports and accountability with automated auditing
- Improved discoverability from extended data reach for clinical or research uses
- Measurable productivity gains: unified views from single user action
- Measuring improvements in quality of care, outcomes, cost effectiveness
- Enabling new clinical applications spanning clinical and genomic data
- Greater leveraging of existing data and information system investments with the flexibility use of freely distributed reports

- Creation of secure Healthcare Information Sharing Environments (HISE) for Health Information Exchange
8. If the Zato solution is selected, will it act as an aggregating tool exclusively or will there be additional capabilities built into the software? For example, the Zato demonstration video alludes to a built in capability to calculate and report CMMI standards.

Zato provides a number of options, depending on the functionality of the EHR in any given outpatient site and the requirements of the state agency. These options below are summarized in the order of verifiability and ease of validating and auditing. Option (a) for example uses whatever numbers are provided from whatever systems are in place with no reliability or consistency of the numbers and no easy electronic way to verify or audit the numbers. The successive options below provide increasing levels of electronic data verification and auditing from data that are in many cases already collected and available. These options actually make the reports valuable tools for comparisons and learning and improving efficient and effective health care delivery. It is anticipated that the payers will increasingly mandate the more verifiable and useful reporting approaches and tie them increasingly to incentive payment programs based on verifiable reported performance.

- a) Zato software is able to normalize and virtually aggregate the numerator and the denominator output by different EHRs for each measure along with numerators and denominators from other non-EHR applications across many sources, and produce reports for more useful, less manually intensive and expensive analysis of the electronic data. This option requires the least expense and effort.
- b) If the EHR is able to export the factors required to calculate the numerators and denominators (e.g., Hg A1C, blood pressure, age, etc.) via HL7 feeds, Zato can normalize those data, calculate adherence to CMMI standards, and aggregate the results for reporting and analysis. Zato has the additional flexibility to ‘feed’ the normalized data to a calculation and reporting tool like PopHealth or other calculating/reporting tool via Zato’s API for consistency, and comparison of reporting and analysis results.
- c) If the EHR is able to also export the text rich descriptive data from the clinical encounter, Zato is able to use natural language processing to extract and normalize the required data and calculate adherence to the standards using Zato’s medically trained open source rules engine.
- d) Instead of standardizing on the output of the EHR, Zato can index the database of each EHR, extract the data required for reporting and analysis, and link the normalized reporting results electronically to the specific attributes and values in the source medical records, which justify the reporting values. The data that can be extracted and indexed include structured data described in (b) and data with valuable medical descriptive text described in (c).

Each of the above options involves different cost and effort on the part of Zato and on the part of the individual offices and clinics. In addition, each of these options requires different functionality on the part of each EHR in question. Finally, each of these options offers different levels of access to views of the clinical encounter and analysis of the aggregate data. Calculating and reporting against the indexes is the easier part after extraction and aggregation, and Zato can do so flexibly with a rich suite of operators locally or across sites with batch reporting after the virtual aggregating (centralized or federated indexing) is done. Zato also has a mature and well developed NLP capability that has been tested and implemented in multiple medical applications. The choice for any of the above options may be specific to each of the clinics or medical offices, depending on the factors noted above. With incentive payments moving quickly to become the majority of the payments in the days to come, there is no avoiding the ability to generate more verifiable and reliable standardized reporting results. The collective costs associated with

each provider paying each EHR to produce data in new customized reports, which is not interoperable with the data in other expensive reports will not be sustainable for long. By normalizing the data collected and stored within many instances of many different EHRs, payers like State Medicaid payers can effect improved healthcare delivery to higher standards with meaningful verification and use of the reported data. Zato views the application reports more like open source software like PopHealth – to be developed in standardized ways and distributed free of licensing costs to be re-used for standardized reporting to payers.

9. Will we need to create and how will we create a database and warehouse as the complexity of the data collection and reporting/analytics increase in years 2-5?

Zato engineers have implemented cooperative federated analysis for highly complex and ultra-secure data warehouses and virtual data warehouses using data from scores of US intelligence and defense organizations, with scores of data sources, thousands of users, many billions of records, and a quarter million user actions executed daily, resulting in public testimonials for improved outcomes, productivity, and cost effectiveness. Zato engineers have implemented even larger virtual data warehouses in test beds to demonstrate combined security, functionality, efficiency, consistency, and ease of verifiability in pilots and test beds for organizations like the Department of Homeland Security and MITRE. In years 2-5, collection systems will still be diverse and interoperability increasingly needed. This approach represents a proven alternative to create databases and warehouses of this complexity and scale in years 2-5 will be as secure information sharing environments with normalization of data and cooperative federated analysis across diverse application data repositories, data centers, and clouds using freely distributed reporting applications, with increasing benefits from more useful and verifiable reporting results locally and globally. This approach will support hybrid clouds and cross-cloud analysis. The approach can be implemented incrementally, measured and evaluated incrementally, and expanded incrementally.

10. Could Zato measure improvement and public health 20/20 indicators? If so, then how?

Yes. Zato can, given at a minimum transactional data feeds (e.g. HL7, CDA, CCD) of clinical notes and labs, extract the atomic elements and calculate report values that are based on clinical data. The ability to create normalized indexes representing the data repositories of EHRs and other clinical and lab systems would enable this capability to be fully verifiable electronically and economically. Further, Zato can cast threads into publicly accessible sources of generally accepted medical knowledge and extract environmental data that is needed for non-clinical report values.

11. Could Zato be used to calculate meaningful usage?

Yes, meaningful use measures are examples of the reporting capabilities described in detail above. To be meaningful, the reported data must be verifiable. A reasonable approach might be to select several sites for a pilot implementation and evaluation.

12. If Zato has programs to produce FQHC standards, can they demonstrate how those programs are used?

Zato has not directly addressed FQHC requirements, but does include demonstrable components for both ACO reporting (GPRO-EZ) and ICD-9, CPT-4, and DRG coding for billing (CodeGreen). Additionally, eligibility for certain benefits (e.g. “new patient” status) under FQHC can require a knowledge of the patient’s care at other facilities. Zato’s edge processing approach is designed for standardized reporting

across diverse application data sets (data silos) for improvement by each individual agency or organization.

13. Where has Zato been installed?

Some of the Sites Where Zato's edge processing software has been installed for production, demonstration, or testing include:

Baystate Health (Springfield, MA)
Berkshire Life (Springfield)
Connecticut DSS (BEST data center)
Dept of Defense (Defense Cyber Crimes Center, multiple DOD agencies)
Dept of Homeland Security (multiple agencies, divisions and locations)
Elsevier (Netherlands)
FBI (multiple divisions and locations)
IBM IZPower appliance, PowerGene Architecture (multiple IBM locations)
Netezza (Massachusetts)
Pfizer Inc. (New York)
Raytheon (Dulles VA)
SOCA (UK)