FLEX ANALYTICS
FIND, ANALYZE, ACT

Optensity

Multimedia Analytical Workflows

The world is awash in BIG DATA and analytical tools are essential to making sense of that data. Yet most analytical tools are stand-alone, single threaded applications that don't easily integrate with other essential components. Projects that hope to integrate these applications are often complex, ill-defined and expensive. Flex Analytics provides analytical software from many vendors and has partnered with Optensity to provide a "platform" that allows the end-users to easily weave heterogeneous software packages into complex workflows with limited or no programming required.

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Synopsis

Most integration projects involve professional software developers who gather requirements and integrate third party packages using commonly available software development languages such as Java, PHP and Python. In order to reduce development and integration costs of software-intensive systems, customers increasingly desire software re-use, in a composable form, to meet emerging requirements. Unfortunately, the demand to integrate analytical resources ALWAYS outweighs the available resources (i.e. money, people, and time) to properly develop robust and usable integrated solutions. Once developed, most custom integration projects are NOT reusable and only are applicable to the specific business use case they were originally targeted to solve. A new approach is required if consumers of analytical and other software technologies are going to meet their business requirements in the twenty first century.

Optensity's AppSymphony is a new class of integration software designed to let end-users integrate analytical software themselves without having to employ software developers to do the integration. It provides sophisticated building blocks that the end-users themselves can weave together to build complex and comprehensive workflows that incorporate the many different analytical tools and data sources that might be available on the corporate intranet, public internet or via a cloud based computing environment. Though sophisticated enough to be used by software engineers, data scientists and software developers, the technology is really designed to allow the "non-programmer" analyst or information worker "do it themselves" in terms of analytical component and data integration.

Flex Analytics LLC provides multimedia analytical tools to government and industry. Its offerings span analytical tools including image and video search, speech analytics, machine translation, cross-lingual query and biometrics. These tools are designed to manage and process "BIG DATA" in order to generate metadata or data transformations making content easier to analyze and access. As a provider of heterogeneous analytical tools from multiple unrelated technology partners, Flex Analytics has partnered with Optensity to allow customers to create "self-service" analytical workflows and "BIG DATA" processing toolsets. Three specific use-cases described in this paper outline potential concepts of operations about how AppSymphony might be deployed in a third party environment.

Flex Analytics Overview

As software VAR, Flex Analytics is concerned with helping its customers process multimedia analytical content collected from image, video, audio, biometrics and other types of sensors. The "BIG DATA" collected from these sensors must be transformed, correlated, analyzed and stored so that only important and relevant information bubbles to the top. Each of the Flex Analytics' technology partners provides a state of the art application in their focus area, including a comprehensive application programing interface used to integrate their technology with other software packages as part of a greater analytical solution. Most of these APIs are REST based web services allowing the features and functions of the analytical tools to be accessed programmatically using a broad range of integration tools and development approaches. Typically, multiple analytical tools must be loosely coupled so that information can flow from one system to the next in order to process all the data components

appropriately with the right tools. Figure 1 below shows a typical workflow that might be configured from several of the technologies sold by Flex Analytics.

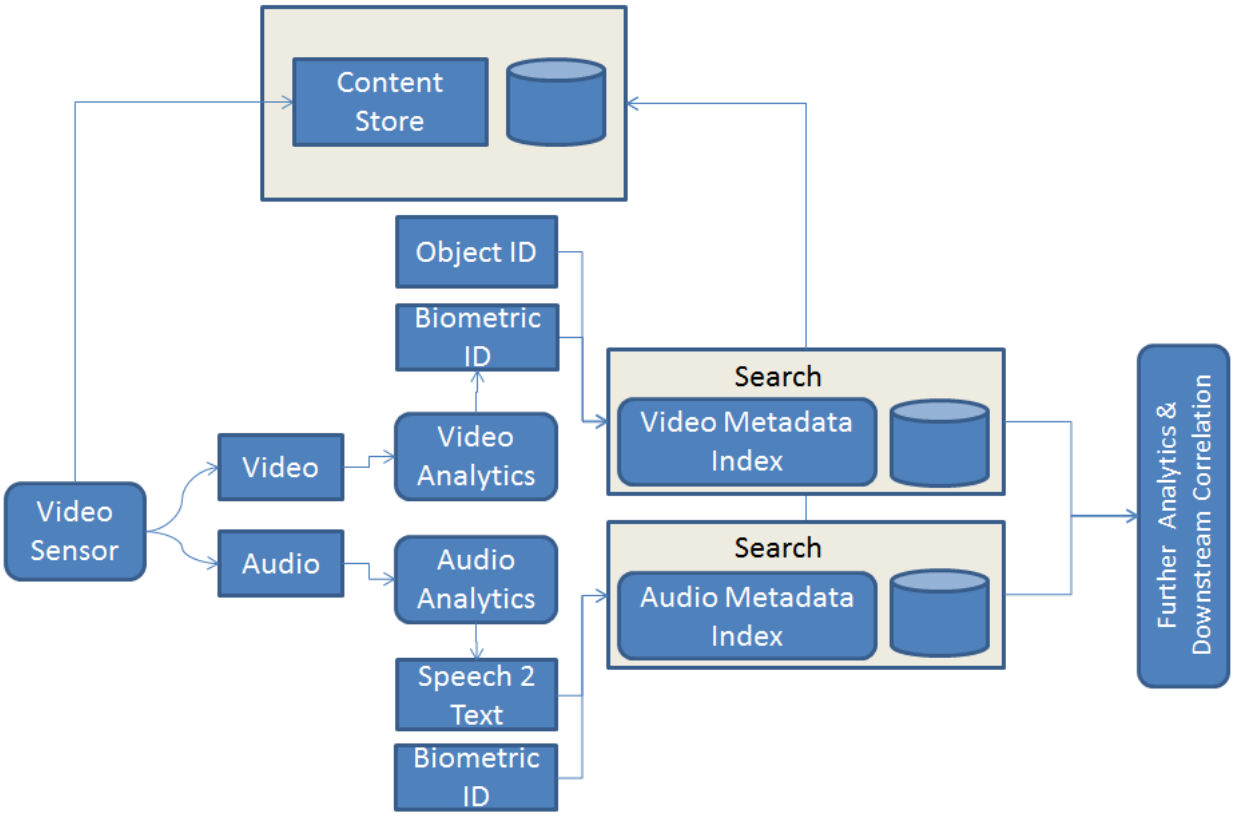

Figure 1 - Typical Analytical Workflow

Old vs. New Approach

In a traditional integration approach the integration activity shown in Figure 1 above would require a project in the source organizations information technology department. Resources would be assigned to the project, a project manager would manage the process and a business analyst would identify requirements and codify the workflows. Then developers would iteratively build the "glue code" to integrate the system typically in an agile fashion that would ultimately interconnect the different data sources and analytical tools. The whole process would require a half a dozen people and many weeks or months of time just to integrate these components, data and build the required workflows.

Instead, Flex Analytics encourages its customers to use AppSymphony. End-users whose requirements drive the integrated solution are involved from the start. A business analyst helps the end-user collect and understand business requirements and document desired workflow business processes. But once the desired concept is understood the end-users themselves weave together AppSymphony components to a) interface with the target applications b) data sources and c) business processes in order to build re-usable, flexible workflows that they've designed and implemented.

Figure 2 shows an example of an AppSymphony application that logs into a target analytical package, and processes content from multiple data sources using a third-party analytical package. The integration with the third-party software package along with data retrieval and the overall processing sequence is wrapped into a single, reusable AppSymphony component (piXlogic Processor).

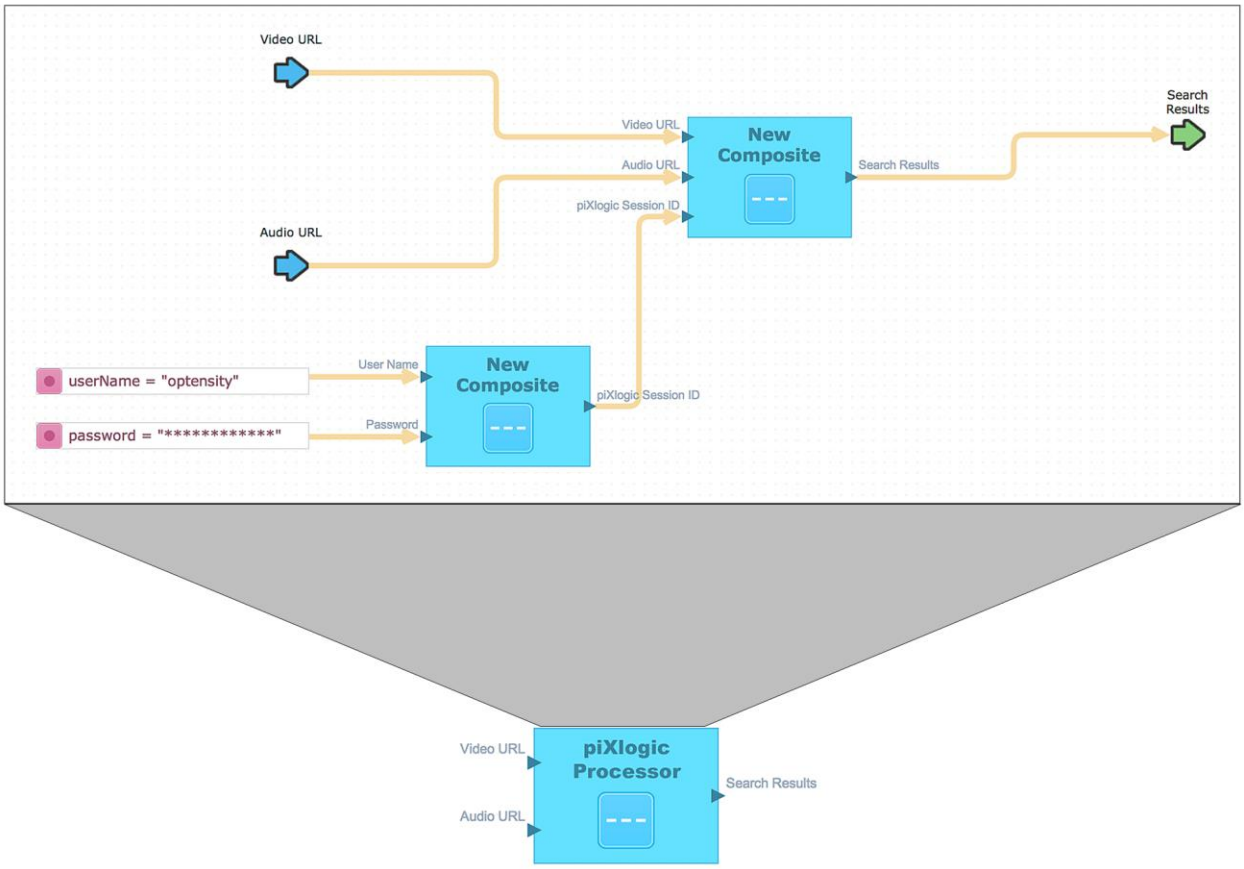

Figure 2 – Custom AppSymphony Analytic Component

Once the reusable component has been created, it can be used across any number of AppSymphony applications, as seen in Figure 3. Using this approach, users can build libraries of commonly used capabilities that can be leveraged in the future to quickly and easily compose new applications for emerging business goals.

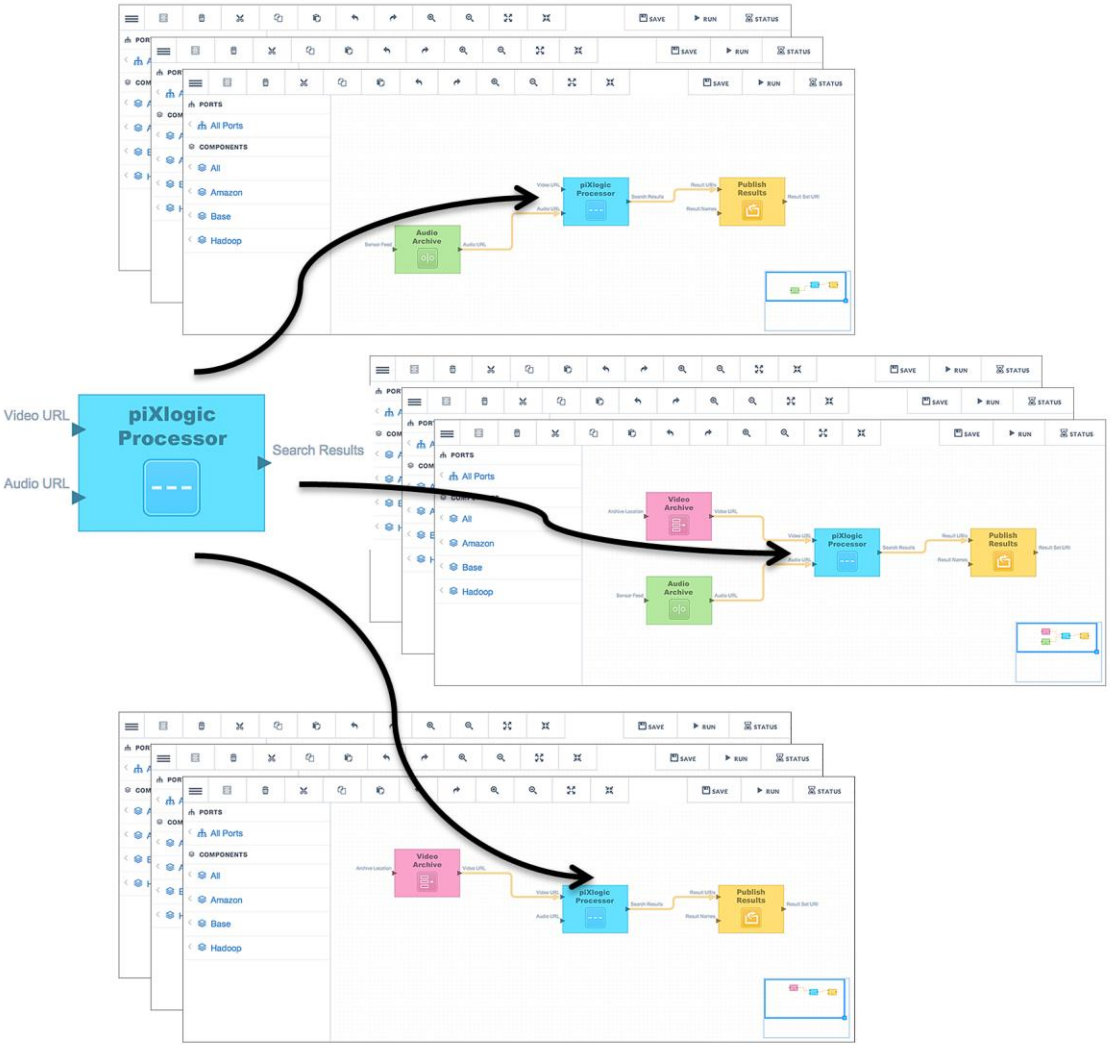

Figure 3 – The AppSymphony Pixlogic Component in Multiple Analytic Workflows to create new Applications

The application composition is carried out through an intuitive visual composition interface, also shown in Figure 3. The training to use this interface to build complex workflows can be delivered over the course of a single day. Further, AppSymphony can be used by teams of users in a highly collaborative fashion, as it allows users to share workflows between one another to dramatically increase productivity and application sophistication.

Use Cases

I) Two Factor Biometric Integration

Flex Analytics is working with piXlogic Inc. a provider of image and video analytics and search software and Nuance Inc. a provider of audio analytics software. Both vendors provide technology that offers biometric identification capabilities. The concept of operations behind this project is to capture both facial and voice identification data and provide two factor biometric identification capabilities.

In this use case, video of the target person of interest is captured clearly showing a face and recording a voice. AppSymphony streams the video data to the piXserve image and video search platform where it is analyzed, indexed and compared to an existing corpus of facial biometric data. At the same time, AppSymphony streams the audio component of the video data to the Nuance voice biometric module where it is analyzed, indexed and compared to an existing corpus of voice biometric data. Both packages respond with either a negative or positive match and the generated metadata is then correlated and compared to ensure that the visual and auditory biometrics have provided a concrete match for the target individual.

The end user analyst is able then able to "self-serve" by creating new workflows from these available components. For example in this case, the analyst has components representing streams of video data from different locations, the piXserv platform, the Nuance model, and different existing corpuses of data. The analyst can choose between the locations of collected data streams and then move that representative component onto the canvas. Perhaps, at a later point, a new corpus of data in another data store becomes published as a component. The analyst may choose to add this corpus for additional verification or replace the old corpus in the workflow.

II) Integration of Aircraft Systems

Flex Analytics is working with Strategic Security Air Inc. a manufacturer of intelligence, surveillance and reconnaissance (ISR) aircraft, to integrate a range of avionics, sensors and analytical software for processing image, video and audio content onboard an aircraft. Using a range of sensors, the aircraft collects electro optical, radar, lidar, infrared, chemical, temperature and other ISR information. On board analytical software analyze, index and correlate that information so that image and video objects of interest, visual analysis and automated reporting can be carried out on board the aircraft without human intervention from pilot or ground crew.

In this use case, AppSymphony is used to marshal data collected from the various sensors, provide the workflow from the sensors through the analytical software to generate metadata and to direct the raw and processed data and metadata to onboard aircraft content storage. The process is integrated within the flight control software called Ballista by DreamHammer which manages the entire flight mission in an automated fashion guiding the aircraft from way point to way point, activating sensor collection packages and activities and overall mission control.

Rather than building custom hand-coded modules, AppSymphony provides reusable and reliable software components that can be quickly and easily composed together to provide automated and highly reliable mission analytics. The entire system operates from a single high-performance computer, engineered to turn the ISR aircraft into a flying datacenter.

III) Cloud Based Analytical Tools

Flex Analytics is working with Liquid Information Inc., in order to build an in the cloud data analytics platform that can be sold by the seat. It incorporates analytical packages including: text, geospatial, image and video, speech, natural language processing with private and open source data content. The

underlying analytical packages come from many vendors including piXlogic, Nuance, LinquaSys, Hylighter, Attivio, ESRI and others.

Underlying this analytics platform is the AppSymphony server, which ties all data packages and data sources together into an integrated solution. AppSymphony integrates each of the analytical data sources, analytical packages and provides pre-defined workflows that the end-user can select in order to analyze their selected content. It provides the ability to incorporate data from open or private data sources, providing timeline analysis, keyword search, cross-lingual query, natural language interfacing and more.

Summary

Flex Analytics provides its customers a range of multimedia analytical tools including image and video analysis and search, audio analytics, natural language processing, biometrics and more. Many of its customers require multiple solutions which means more than one analytic must be integrated together in order to build the desired solution. Optensity, Flex Analytics' analytical integration partner, provides a technology that allows end-users to rapidly, reliably and re-usably integrate different analytical packages together in a seamless fashion. It provides a means for customers to capitalize on their ownership of multiple heterogeneous unrelated applications by obviating the need for custom, complex, one-off integration projects. Flex Analytics is involved in developing solutions for multiple customers and partners including activities to integrate different technology packages for biometrics identification, onboard ISR aircraft analytics and for sale by the seat cloud based analytical offerings. All of these solutions rely on the rapid and reliable integration capabilities of Optensity's AppSymphony.