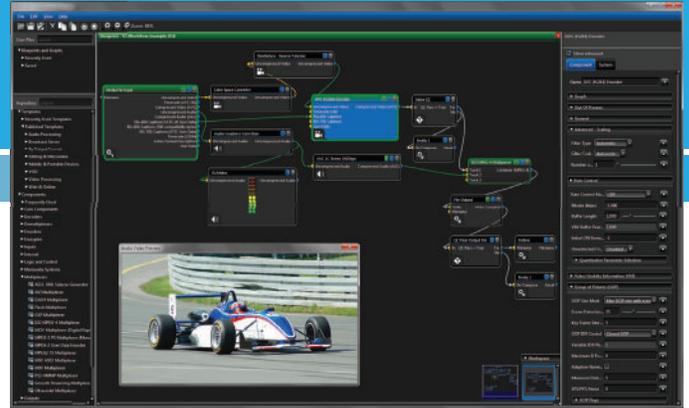


# Zenium™ Workflow Platform

## Technical Note



The media and entertainment landscape has changed dramatically over the last few years. Broadcasters, cable operators and studios are being forced by consumer demand to respond to a new and ever-changing media consumption paradigm. The economic pressures of the market are forcing companies to look for unique ways of solving problems both old and new, with a large focus on moving away from traditional solutions to a more forward-looking and flexible platform. Imagine Communications' Zenium is that platform. Zenium provides companies with the unique opportunity to easily custom-design their own workflows while providing them the operational efficiency, transparency and agility they require. By combining the ease-of-use with access to state-of-the-art technology from a wide base of technology vendors, integrators, and professional service providers, Zenium answers many of the questions that companies face today. In short, it allows companies to focus on their core business rather than the technology that supports it.

### What is Zenium?

Imagine Communications is introducing Zenium as the first true end-to-end workflow platform. The core pieces of the platform are a) a catalog where multiple vendors can collaborate to create a repository of technology; b) a visual workflow design tool where those technologies are easily integrated and tested without traditional development overhead; and c) an enterprise-class deployment and management server. These three core pieces combine to allow customers to design, deploy and manage their workflows on a platform that provides tremendous agility in solution design, is portable between compute environments and has more granular control over costs than solutions based on traditional technologies.

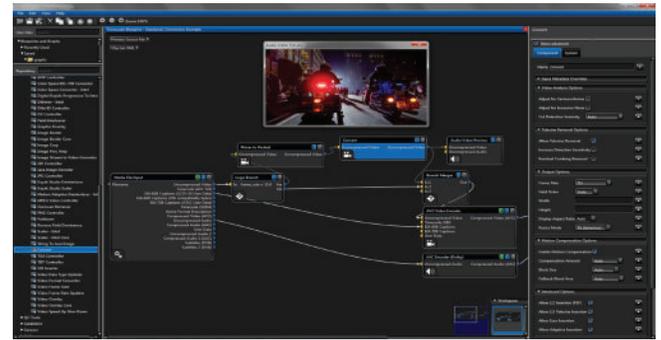
### The Ecosystem

The Zenium ecosystem is an open, vendor-driven community that combines the concept of an app store with a framework that allows the technologies within the catalog – even from different vendors – to work seamlessly together. The Zenium framework allows developers to focus on core technology, not how it will be used or integrated by the user. Each developer focuses on their contribution to the catalog, while the framework provides the glue that enables their contributions to integrate seamlessly without writing additional code. Each of these component technologies is discrete and managed in isolation, but by combining them into meta-components, customers can quickly build up solution sets or templates to solve complex problems without overwhelming the user with complexity.

### The Workflow Designer

The Zenium workflow designer is where operators, design engineers, systems integrators and architects can work in a visual environment to 'whiteboard' a solution based on components or templates that come from the technology store. Similar to Business Process Modeling tools, or even Visio, the operator sketches out a workflow by selecting technologies and connecting them into a streamlined functional process. Unlike traditional solutions, however, the workflow designer is 'live' and serves simultaneously as a proof-of-concept development environment, test center and publishing engine. The operator is able to

connect the workflow to live data, test the functionality and approve the designed workflow process prior to publishing, all without additional development cycles (no custom code). Once a process is approved, a blueprint for the process is published, moving it from proof-of-concept to testing and deployment within minutes. As the blueprint is published, standards-based web service interfaces are automatically created in a uniform and consistent manner, allowing all processes to be integrated easily and seamlessly regardless of the functionality they perform.



## Enterprise Management

The Zenium enterprise management server allows you to treat your entire infrastructure of compute resources as a blank slate. It enables the operator the ability to allocate resources (host computer systems) from a virtualized view, allowing schedules to be defined, resources provisioned and disaster recovery planned, all without actual deployment of software. Once the resources have been allocated, partitioned and scheduled according to business requirements, the Zenium server deploys the blueprint that describes the task or process that needs to be performed to the pre-installed Zenium agent on the otherwise blank target resource. The agent analyzes the blueprint for technology requirements, accesses the needed discrete components from the technology catalog and builds a new virtual application on the fly.

This JIT (Just in Time) deployment process allows workflows to be completely portable, as any system-specific dependencies can be resolved at the time of deployment – for instance, moving from a private datacenter to a public cloud might require changes to file system references or network IP addresses. These parameters are resolved at the time of deployment, ensuring compatibility with the target environment. The Zenium process management server also serves as a uniform interface for integration into existing business systems. Because the Zenium environment controls all aspects of the workflow, the processes themselves are presented through a unified API, providing for consistent job dispatch, monitoring, and reporting regardless of the task being performed. This vastly simplifies integration efforts since all processes – from encoding, transcoding and packaging, to simple file movement and proxy generation – are accomplished with the same API.

## The Zenium Differentiators

Zenium represents not only a new way to manage and deploy virtualized processes, it also encompasses everything from how software technology is written and developed to how it is deployed and managed at large scale. A few of the key differentiators have already been mentioned – such as the multi-vendor ecosystem, the workflow designer, the JIT virtual application creation, the flexibility of virtual application deployment, and the consistent integration API for managing all processes. However, a few others should be mentioned that set Zenium apart from other solutions.

**Zenium can be used to design almost any software process.** The only limitation is the size and depth of the catalog of technologies available. Similar to open source platforms, the more participation that exists in the Zenium platform, the larger the catalog becomes and the greater the opportunity for creating new processes. Zenium is considered an Open Access platform since it represents a new way for companies to openly collaborate to solve complex problems while preserving intellectual property.

**Zenium takes abstraction to an entirely new level.** The Virtual Machine (VM) revolution opened the doors for cloud portability of applications – but virtual machines fail to address the core issue of application maintenance, the tight coupling of applications to the underlying operating system, and the fundamental issue of managing high-volume, large-scale operations through the integration of separate applications. In the Zenium platform, all process are uniform, as they are constructed of individual component technologies that are built on the Zenium framework.

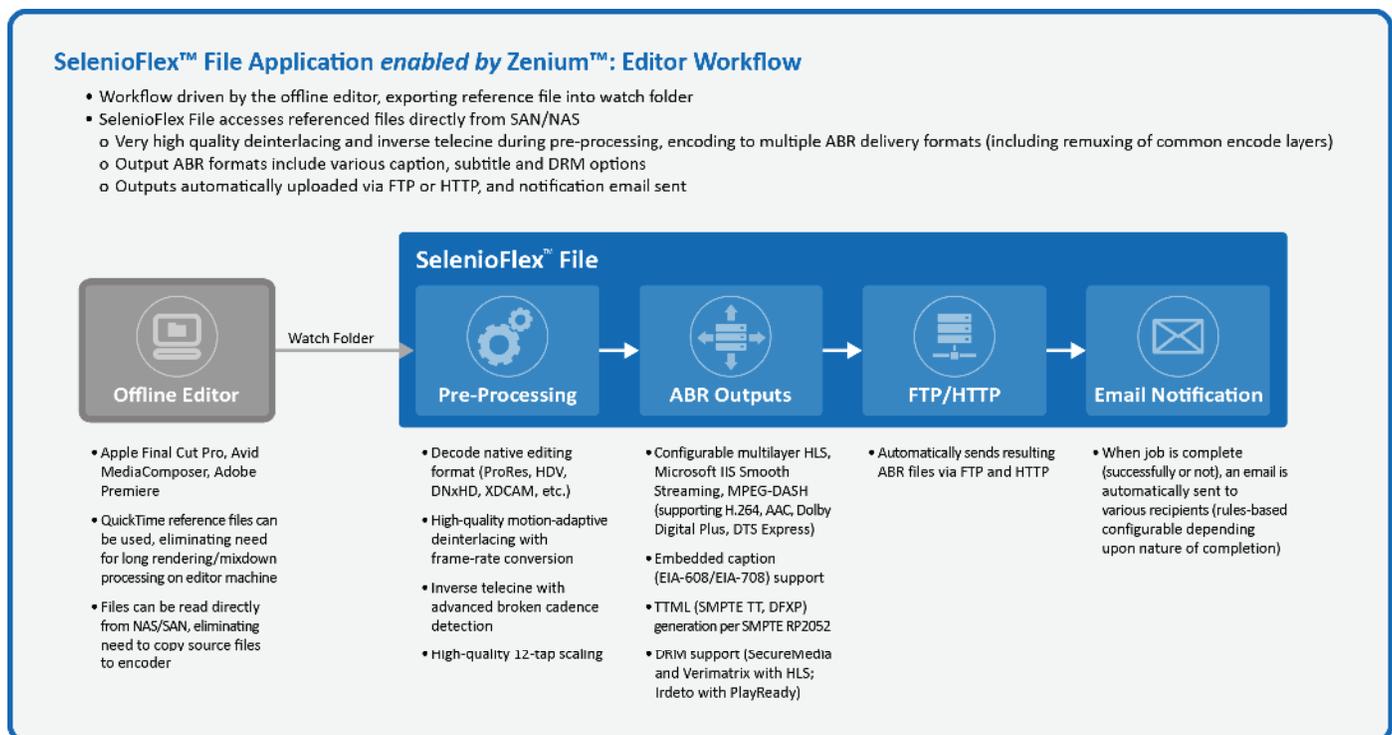
The true value of this building-block approach happens at the deployment level. Zenium processes live in their own virtual application environment. Each process is independent not only of the underlying operating system, but also of each other. This means that multiple processes can be run in the same OS instance. Each previously blank system is loaded with private, secure, virtualized appliances until the system reaches peak efficiency. Launching new instances happens in seconds, and communication between processes can happen locally in memory or over a network. Seamless communications (no adapters), on-demand scalability, and streamlined maintenance and provisioning are key benefits of the platform.

**Zenium leverages the JIT concept in multiple dimensions.** The JIT application deployment was just described, but there is another benefit to this approach. The JIT deployment technology leverages the same technology catalog utilized

during the workflow design stage. As the platform is building the JIT virtual appliance, it is doing so by referencing the contents of the Blueprint XML and checking the referenced technology against what is available in the technology catalog. If any technology is updated at any time, you can simply specify to the agent to run the latest version of the technology that is available, or a specific version if you want to roll back to an older technology. In other words, this requires no maintenance, no install/uninstall issues, no reboot and no new VM image. The operator simply tells the system which version of which technology to run on any given instance, and the system takes care of building the right virtual appliance. This dramatically reduces time to market with new technology – but it also reduces overhead and provides fine grain control over technology rollout. In effect, Zenium creates a supply chain for technology provisioning.

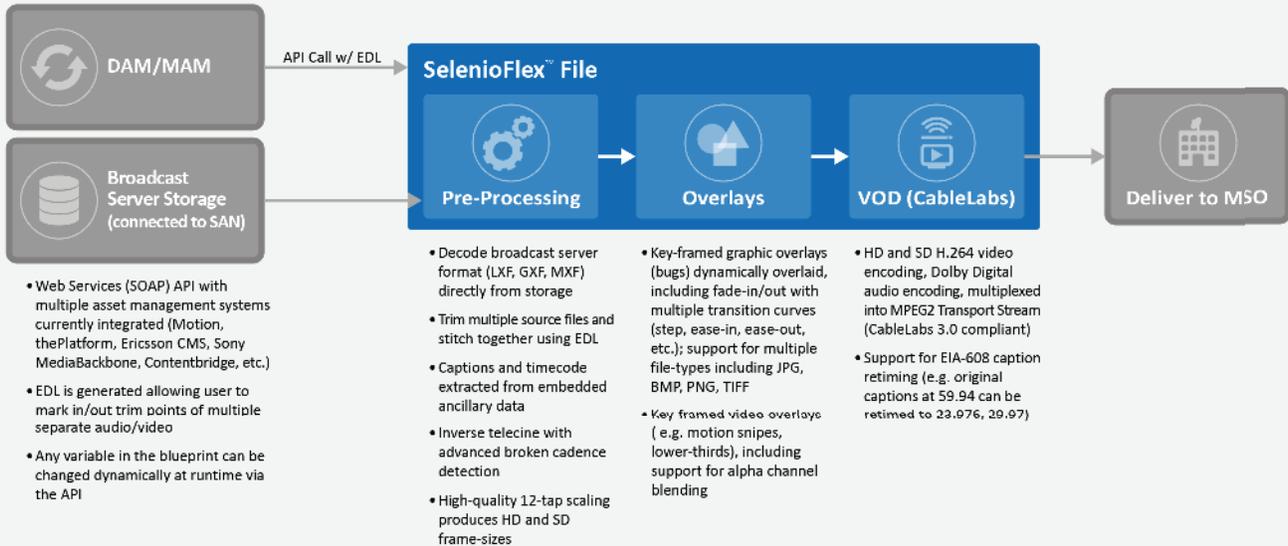
These are just a few of the Zenium differentiators, and really just the current set of highlights for a platform that represents a groundbreaking approach to process scale and flexibility in a cloud environment. With more than 60 years of development and many more ahead, the Zenium platform is a new approach to cloud computing. Integrating seamlessly through standards-based interfaces, it is the ideal platform for integration into today’s business systems.

## Application Examples



## SelenioFlex™ File Application *enabled by Zenium™*: VOD Workflow

- Workflow driven by asset management system via API integration
- Process creates edit decision list (EDL), incorporating lead-in, promos and main asset – all stored in SAN storage
- Various graphic and video overlays are key-framed at times specified via API
- Output is HD and SD Cablelabs files, including retimed captions



## SelenioFlex™ File Application *enabled by Zenium™*: Pass-Through Workflow

- Workflow driven by asset management system via API integration
- Media file (e.g., transport stream) is demultiplexed; video is passed-through untouched, audio transcoded into new format (e.g., Dolby Digital Plus)
- Separate caption file is referenced in API call, and encoded into compliant TTML outputs
- All resulting streams are muxed into Microsoft IIS Smooth Streaming output

