"Creating next-generation transport technologies that move the world's digital assets at maximum speed, regardless of file size, transfer distance and network conditions."

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About Aspera

Software technology company innovating new data transfer solutions

Based in Emeryville California

Founded in 2004, now part of IBM Software

Creators of the FASP® protocol
- Innovative, patented, highly efficient bulk data transport technology
- Unique and core to Aspera's high-performance file transfer software suite
- Outperforms software and hardware WAN acceleration solutions
- Ranked first in every WAN transfer throughput benchmark

Patents: FASP® Bulk Data and Dynamic Bandwidth Control issued in USA and many other countries

Markets Served: Media and Entertainment, Federal Government, Life Sciences, Healthcare, Oil & Gas, Cloud Computing, Software and Gaming, Financial Services, Legal/eDiscovery, Engineering, Technology, Telecommunications, Service Providers, Architecture and Design, Enterprise IT

Global 24x7 Support: Support and sales offices in Sophia-Antipolis, Singapore, Virginia US and Direct Sales and Sales Engineering throughout globe

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65th EMMY Awards

"… an industry game changer"

Trends

Big Data Explosion
- 90% of data today is file-based or unstructured
- Mix of file sizes - but larger files the norm with video growing fast

Diversity of IP Networks - Media, Bandwidth Rates, and Conditions
- Variable bandwidth rates (slow to super-fast)
- Bandwidth rates increasing - cost decreasing
- Network media remains diverse (terrestrial, satellite, wireless)
- Conditions vary - all networks prone to degradation over distance

Global Workflows - moving Big Data over WANs
- Teams are geographically dispersed
- Over distance, network conditions degrade
- Contemporary TCP acceleration solutions not designed for big data transfer and replication

Cloud Computing grows up
- Massive Growth: AWS S3 cloud storage (year end) ≥ 5 trillion objects1 (2010 YE = 262 billion)
- More choices: Microsoft Azure, Sony OpenStack, Google Cloud, HP Cloud
- No longer a niche: BGI (genomic sequencing), Netflix (transcoding), MTV (global video distribution), Sony Media Cloud Services (Production Workflows)

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Challenges with TCP and alternative technologies

Distance degrades conditions on all networks
- Latency (or Round Trip Times) increase
- Packet losses increase
- Fast networks just as prone to degradation

TCP performance degrades with distance
- Throughput bottleneck becomes more severe with
- Increased latency and packet loss

TCP does not scale with bandwidth
- TCP designed for low bandwidth
- Adding more bandwidth does not improve throughput

Alternative Technologies
- TCP-based - Network latency and packet loss must be low
- Modified TCP - improves TCP performance but insufficient for fast networks
- UDP traffic blasters - Inefficient and waste bandwidth
- Data caching - Inappropriate for many large file transfer workflows
- Data compression - Time consuming and impractical for certain file types
- CDNs & co-lo build outs - High overhead and expensive to scale
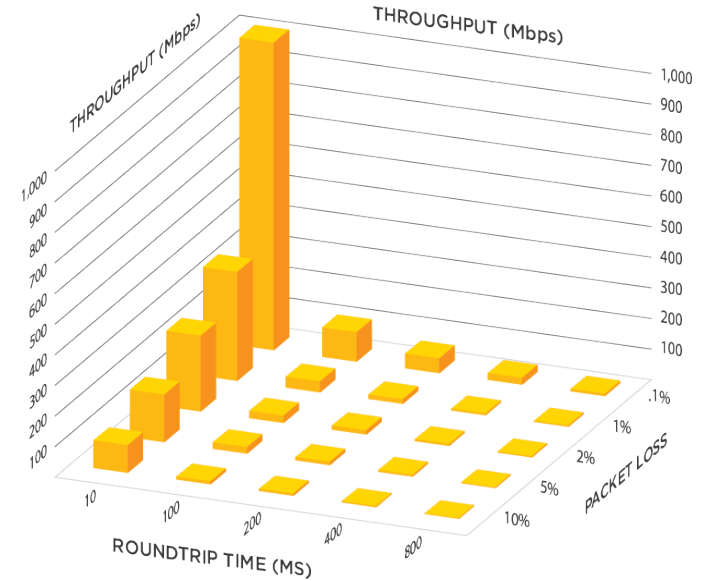
Fasp® — High-performance Data Transport

Maximum transfer speed
- Optimal end-to-end throughput efficiency
- Transfer performance scales with bandwidth independent of transfer distance and resilient to packet loss

Congestion Avoidance and Policy Control
- Automatic, full utilisation of available bandwidth
- On-the-fly prioritisation and bandwidth allocation

Uncompromising, security and reliability
- Secure, user/endpoint authentication
- AES-128 cryptography in transit and at-rest

Scalable management, monitoring and control
- Real-time progress, performance and bandwidth utilisation
- Detailed transfer history, logging, and manifest

Low Overhead
- Less than 0.1% overhead on 30% packet loss
- High performance with large files or large sets of small files

Resulting in
- Transfers up to thousands of times faster than FTP with precise and predictable transfer times
- Extreme scalability (concurrency and throughput)
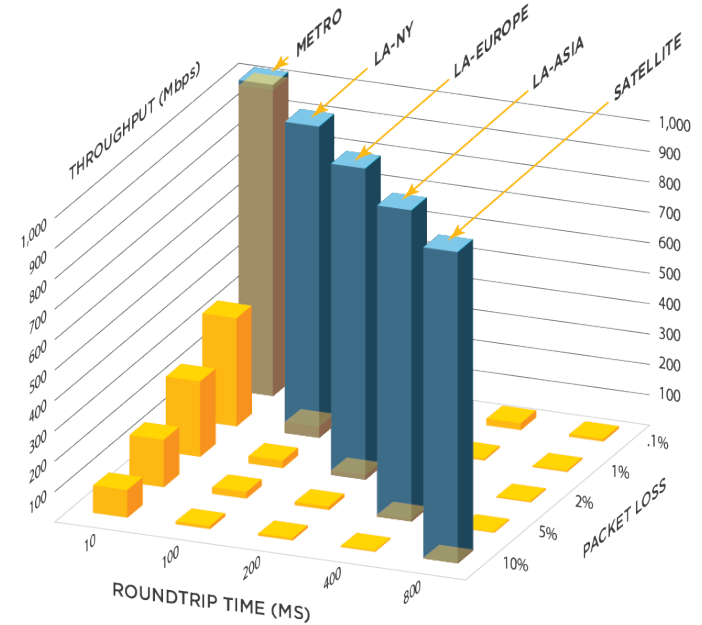
Fasp – Proven performance

Location Agnostic
- FASP transfer speeds don't degrade as transfer distances increase while FTP speeds do decrease

Predictable & Reliable
- Transfer times decrease linearly as bandwidth increases. FTP transfer times don't improve with bandwidth

Versatile
- Supports large files just as easily for large sets of small files

Moving a 10GB file	Across US	US – Europe	US – ASIA	
FTP	10 Mbps	10-20 Hrs	15-20 Hrs	Impractical
100 Mbps				
1 Gbps				
10 Gbps				
Aspera FASP®	10 Mbps	140 Min	140 Min	140 Min
100 Mbps	14 Min	14 Min	14 Min	
1 Gbps	1.4 Min	1.4 Min	1.4 Min	
10 Gbps	8.3 sec	8.3 sec	8.3 sec	

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Extraordinary bandwidth control
- Automatic, full utilisation of available bandwidth
- Protection of other network traffic with "fair" policy
- Allows "bursts" in TCP traffic and reclaims unused bandwidth as it becomes available

System-wide monitoring and reporting
- Real-time progress and performance analysis
- Real-time bandwidth utilisation
- Detailed transfer history, logging and manifest

Real-time prioritisation of transfers
- On-the-fly, per flow user and job prioritisation
- Concurrent transfers adjust bandwidth on the fly, allocating available bandwidth based on transfer priority
- Aggregate bandwidth consumption remains fair to other traffic
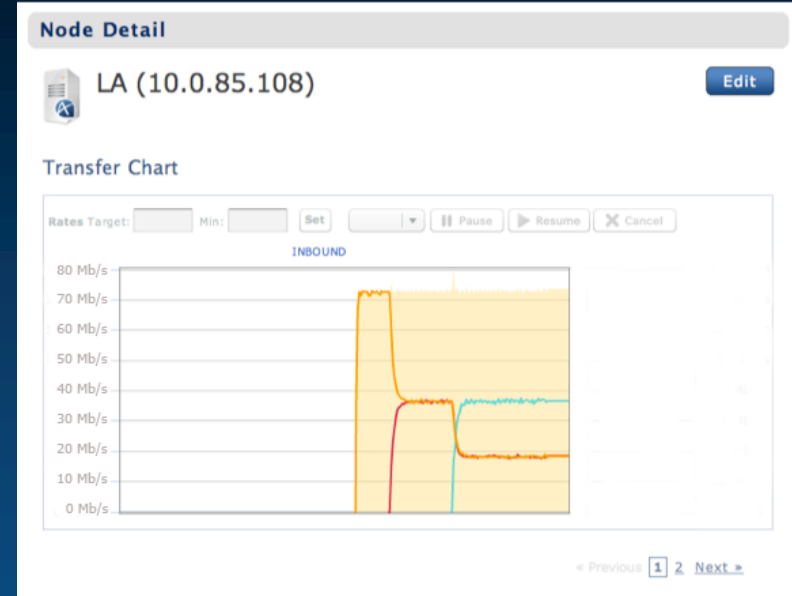
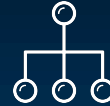# Products Overview

Aspera product portfolio

Transfer Clients

Web, Desktop, Email, Mobile, Embedded

Web applications

Distribution, sharing, collaboration and exchange

Management & automation

Transfer management, monitoring and automation

Synchronisation

Scalable, high-performance synchronisation and replication

Transfer Servers

amazon web services™   SOFTLAYER an IBM Company   Google   Microsoft Azure

Private On Premise

Public and Private Cloud

Hybrid

FASP® patented high-speed transport

Any data size, any distance, any network conditions

Any Infrastructure: Block, Object, On Premises, Cloud

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Perpetual Software License with annual support and maintenance
- Host license per server, point-on-point, and web application servers
- Based on aggregate bandwidth
- Add-ons for High-Availability

On Demand Subscription Service
- Monthly, Annual, Multi-year subscription services based on volume transferred
- Server On Demand, Application Platform On Demand, Shares On Demand, faspex On Demand
- Add-on options: Clients, Sync, Autoscale
- Available of SoftLayer, AWS, Azure, Google

Aspera Developer Network
- Subscription service to comprehensive SDK, tools, utilities, sample code

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Aspera Enterprise Server
Universal File Transfer Server
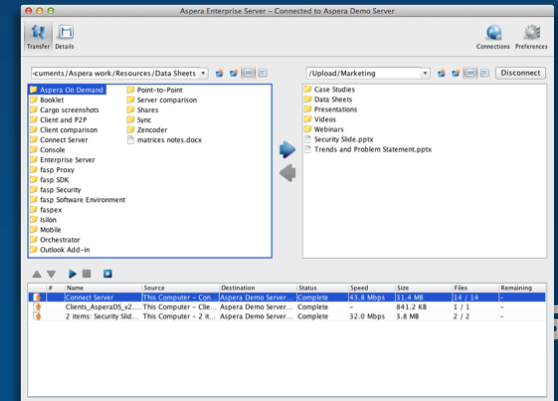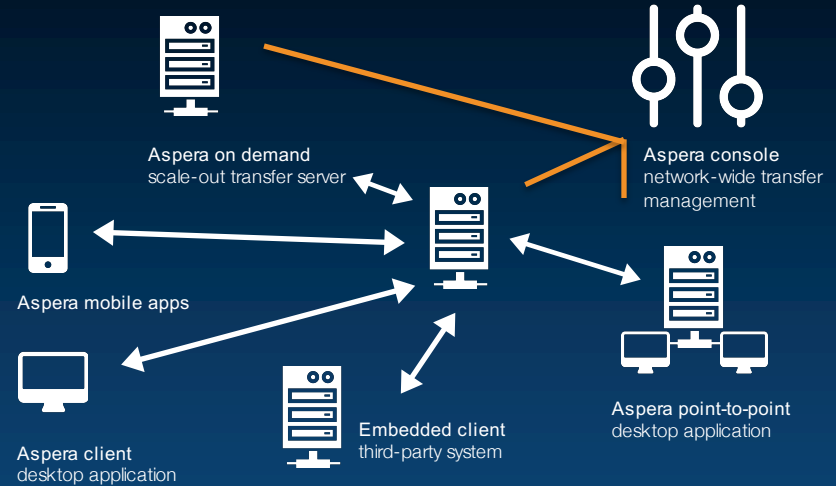
Key Features and Benefits
- Universal base transfer server
- High-speed FASP transport of large data sets
- Enterprise-wide high-volume content ingest and distribution
- Comprehensive automation and scheduling
- Advanced user and server management
- Complete monitoring and reporting
- High-availability configuration (active/active or active/passive)
- Deployable on premise or in the cloud (public, private, hybrid)

Applications and Use Cases
- Enterprise-wide file movement
- High-volume content ingest
- High-performance content distribution

Licensing and deployment
- Multi-tiered licensing based on bandwidth capacity
- Usage-based licensing with Aspera On Demand
- High-availability configuration (active/active or active/passive)
- Comprehensive platform support (Unix, Linux, Windows, Mac, Solaris, Isilon OneFS)
- Supports connections with Aspera Client, Point-to-Point and other Enterprise Servers

Aspera on demand
scale-out transfer server

Aspera console
network-wide transfer management

Aspera mobile apps

Aspera client
desktop application

Embedded client
third-party system

Aspera point-to-point
desktop application

Problems with current file sharing solutions

Data Size and Performance
- **Today's "Drive," "File Sync" and "File Sharing" services are <u>impractical for Big Data</u>**
- On global WANs (100 millisecond RTT / 1% packet loss+) standard TCP rates are <<10Mbps
- On difficult global WANs (300 millisecond RTT / 3% packet loss+) standard TCP rates are <<1 Mbps
- Large data sets (large files or large collections of files) cannot move
- Transfers and sync sessions are extremely slow and most often do not complete at all

Security
- Security for hosted solutions is dependent on security of the provider
- Access control is limited and integrity of file ownership is fragile
- Huge concerns over privacy, contractual obligations

Limited deployment options
- Typical SaaS offering don't support on premise or hybrid infrastructure
- Often a single Infrastructure solution

Limited sharing paradigm
- Users are typically locked into a single delivery option (Sync, Share, or Person-to-Person delivery)

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Aspera Drive
Content Sharing & Delivery

A new file sharing experience brings together the best of Aspera *faspex*, Shares, and Sync technologies into a single unified platform

Key Features

- Integrated secure desktop browsing from Windows Explorer and Mac Finder
- Browsing of remote Aspera servers content with Aspera Shares authentication
- Drag and drop to initiate high-speed transfer to and from remote shares
- Right click to send a *faspex* package and subscribe to automatically download *faspex* packages to the desktop
- Built on Aspera Sync technology for maximum speed to synchronise any network file system or local directory with other Drive users or remote servers
- Includes full access control, privacy and security of the FASP technology
- Email notice for new package availability or new content uploaded to a Share
- Mobile Drive apps for Android and iOS devices

Applications and Use cases

- Internal distribution of digital assets within the enterprise
- Collaboration enablement for distributed teams
- Extends person-to-person file delivery workflows
- Receive consolidated packages from multiple *faspex* servers in a single client
- Digital delivery & collaborative file transfer with external partners
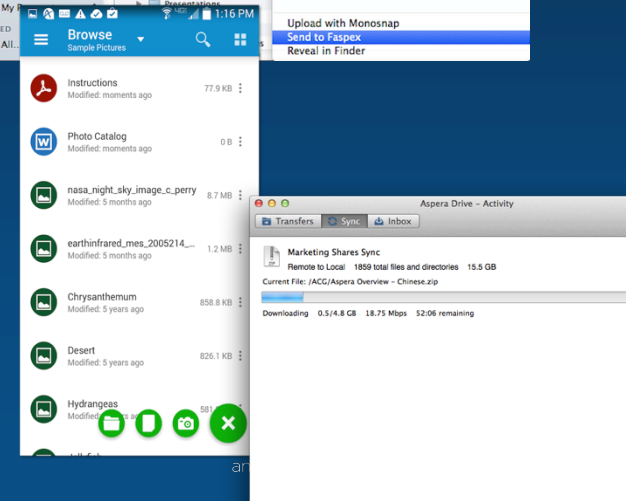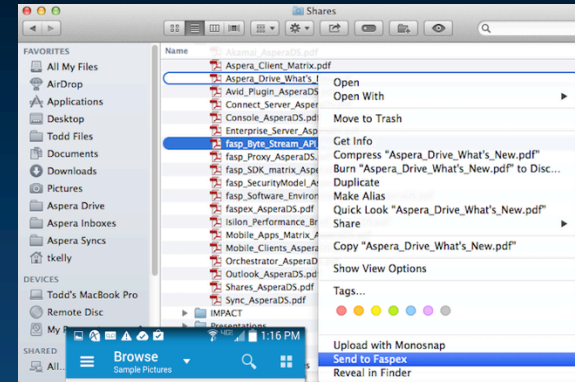
Aspera shares
Global High-Speed File Sharing

Key Features and Benefits

- Easy-to-use web application with secure access to a consolidated view of all shared content
- Supports direct drag-and-drop transfer between shares to "move" files between globally distributed locations
- Full integration of Shares user login and access control in the Aspera Client, Point-to-Point, and Enterprise Server
- Content can be deployed across enterprise servers, private, public and hybrid clouds (e.g., AWS, Azure, Google, SoftLayer)
- Powerful security model administered with SAML just in time provisioning and single management point to combine authorisation user management, and access control
- Search, filtering, and sorting capabilities make it easy to find individual files or folders in a very large content store.
- Shares are fully integrated as secure, access controlled receiving and publishing points with Aspera Drive and *faspex*.
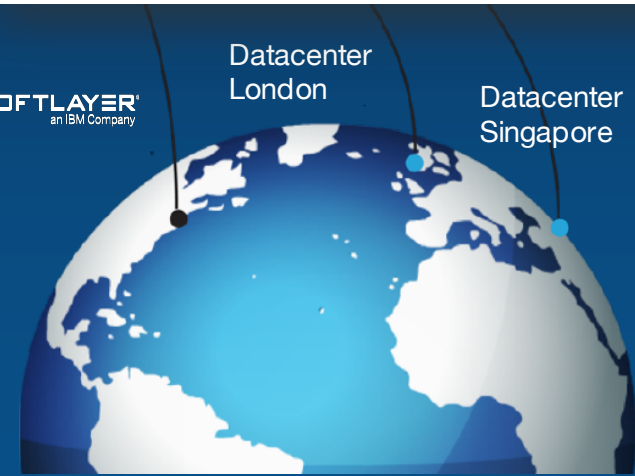
Applications and Use cases

- Internal distribution of digital assets within the enterprise
- Collaboration enablement for distributed teams
- Project team and third-party content or data gathering
- Global browser-based distribution of data
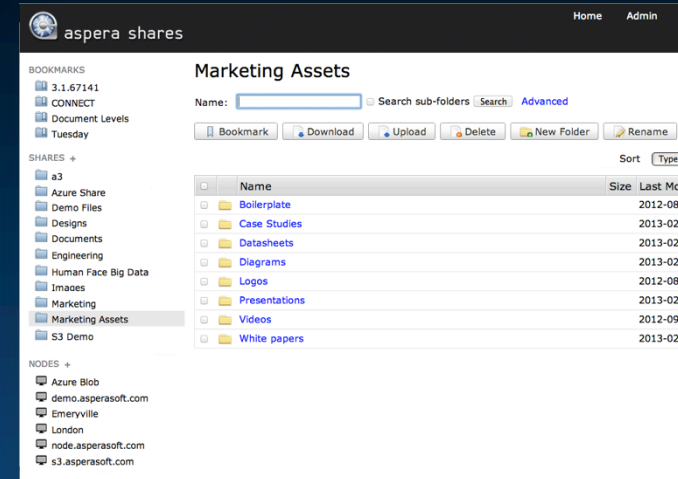
Aspera *FASPex*
Person-to-Person File Exchange and Collaboration

Key Features and Benefits

- Global person-to-person and ad-hoc project-based file-exchange and collaboration
- Easy to use Web-based interface, email, mobile & desktop client interfaces
- Interoperable with Aspera Drive, Shares, Cargo & *faspex* mobile
- Easily create and manage work groups for file-based collaboration
- Enterprise-scale user management and access control
- Advanced support for Hybrid On Premise and On Cloud content storage with remote File Storage feature
- Enhanced SAML support with just in time provisioning of *faspex* users on SAML login
- Automatic expiration of *faspex* user accounts by inactivity

Applications and Use cases

- Internal distribution of digital assets within the enterprise
- Collaboration enablement for geographically-distributed teams
- File-based review, approval and quality assurance workflows
- Digital delivery & collaborative file transfer with external partners
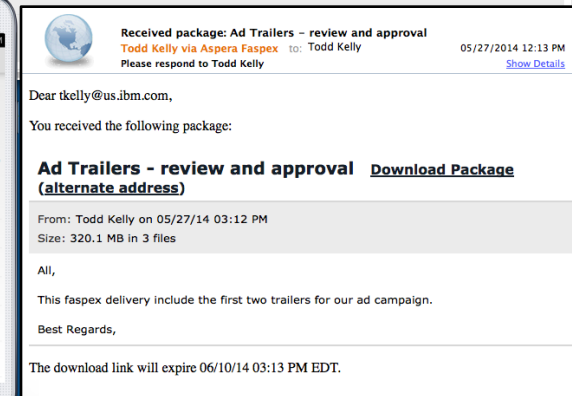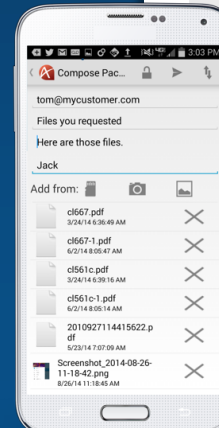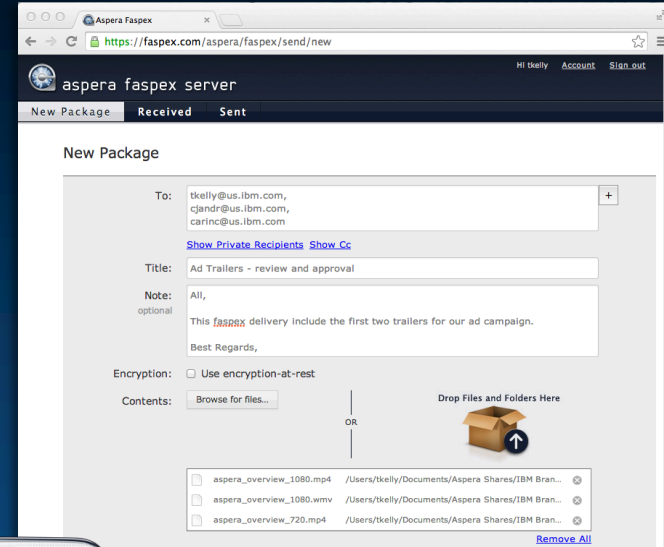
Ad-hoc 3rd party submission and distribution

Ad-hoc submission and distribution capabilities

- Fully integrated with email, does not require a registered *faspex* account
- Auto-expire privileges can be set using time - or event-based policies
- Ability to add required custom fields for new user accounts that are displayed and searchable
- Uploads are delivered to private area with private tracking and notification
- Metadata entries for drop boxes are fully configurable per workgroup
- Metadata is stored as an XML file on the server
- Rich reporting on metadata available through Aspera Console

Public Dropboxes & private contribution requests

- Drop boxes can be configured with public URLs, or groups can invite specific contributors
- Senders receive an email with a link that allows them to send files with Connect browser plug-in to the group dropbox or to an individual inbox
- Files are uploaded to *faspex* server and optionally relayed to configured remote storage locations

Public Dropbox URL:
- https://faspex.com/aspera/faspex/sent/to/dropbox/marketing
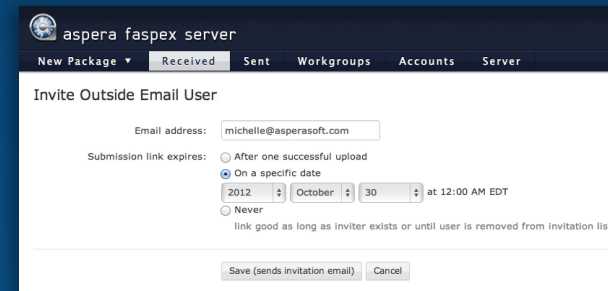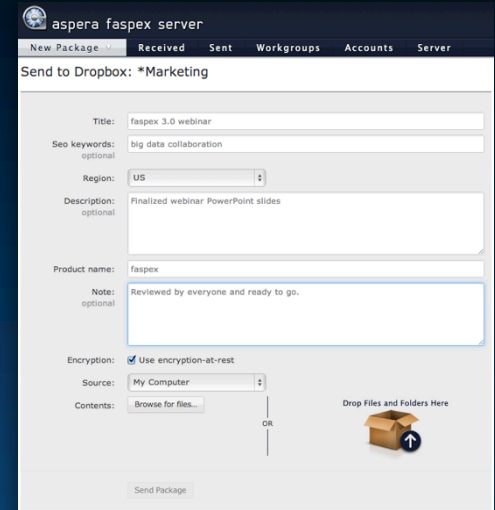
Aspera FASPex Client Options
Browser, Desktop, Mobile and Email apps
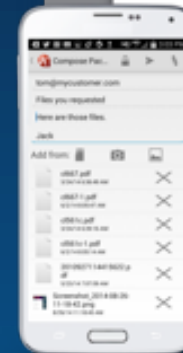
Key Features and Benefits

- Integrated with FASP® and faspex™ security models, encryption at rest enabled via simple toggle
- High-speed Mobile transfer app for iOS and Android devices, with native app look and feel
- Cargo automatic downloader to the desktop
- Microsoft Outlook client add-in

Applications and Use Cases

- Remote news collection, upload and publish to central hub
- Viewing and approving images or video as part of a file based workflow
- Sending large files or folders from email clients
- Automatically bringing in new content for follow-the-sun working with no delay
- Remote medical image viewing and diagnosis

faspex Mobile on iPad

*faspex* Mobile on Android
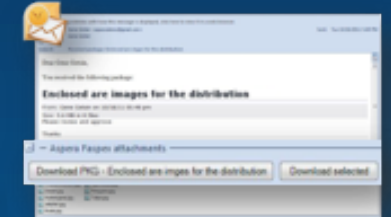
faspex Add-in for Outlook

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Aspera Console
Network-wide transfer management, monitoring and control

Key Features and Benefits

- Highly scalable "pull" architecture
- Transfer load balancing and failover
- Prioritise & manage transfer speed & bandwidth utilisation
- Centrally configure and manage transfer nodes
- Browse and initiate transfer jobs between remote sites, within and between organisations
- Automate transfers, including scheduling and distribution
- Support transfers initiated behind an Aspera Proxy and easily manage permission settings for sharing
- Create customised activity, usage and billing reports and notifications
- Single sign-on support through SAML
- Provide secure private views and control capabilities on individual transfers and paths
- Open architecture for integration with business process management and content transformation tools

Applications and Use Cases

- Centrally manage, monitor and control all Aspera file transfer activity in the Enterprise
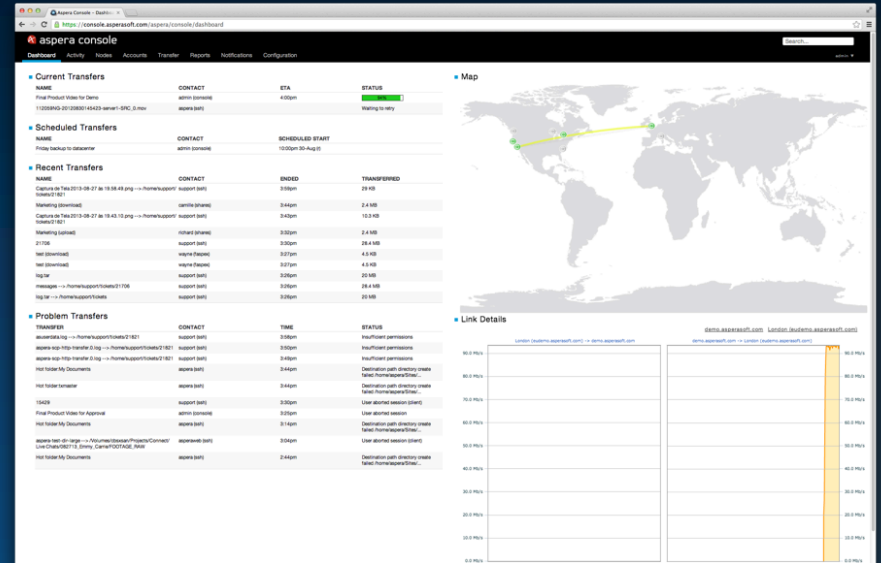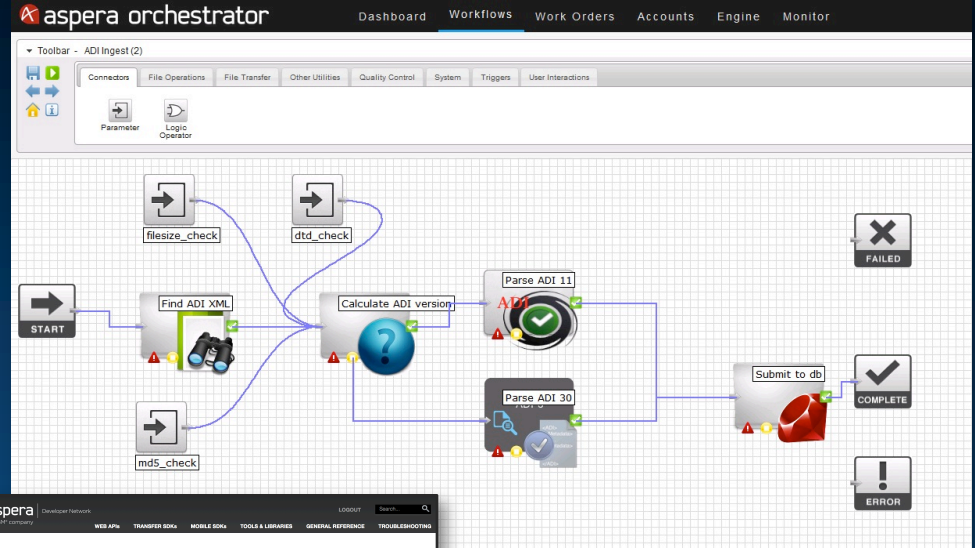
Orchestrator
Automated Workflow Platform

Key Features and Benefits

- Intuitive web graphical workflow designer
- Real-time monitoring of active workflows
- Unattended and interactive workflows
- Integrated AD and LDAP support
- Role-based access control
- Highly scalable, Supports the most demanding on premise, on cloud, or hybrid workflows
- Integrates with the Aspera high-speed file transfer environment and Aspera Console

Applications and Use cases

- Advanced contribution and automation
- High volume processing and transformation
- Ad ingest and insertion for video-on-demand
- End-to-End content preparation and distribution

Orchestrator - Open Platform 3rd Party Library
Free to Orchestrator Users

Transcoding

BIGBAND networks
sorenson media
encoding.com
Telestream
ELEMENTAL
FFMPEG
digital rapids
RHOZET NOW PART OF HARMONIC
T3Media Thought Equity Motion
envivio
zencoder

MediaInfo
Digimetrics Aurora
Tektronix
interra systems
meta glue
IRT

Database/ Stores

Microsoft SQL Server
MySQL
central desktop
ORACLE

Ad Insertion & Media Management
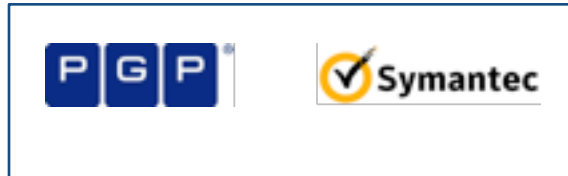
PilatMedia Empowering the Media Enterprise
SeaChange
xytech

Encryption

PGP
Symantec

Antivirus

McAfee
Symantec
SOPHOS

Email

Gmail
Microsoft Exchange

File Transfer

aspera
DAV
iTunes
FTP/SFTP
SCP

Watermarking

civolution

Image Manipulation

ImageMagik

Media Management

You Tube

IT Management

Microsoft System Center Operations Manager
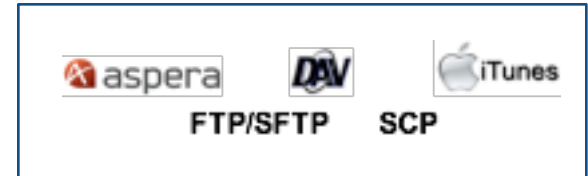
Aspera for Microsoft® Sharepoint®
Features and Capabilities

Key Features and Benefits

- FASP high-speed uploads and downloads for files and data sets of any size into SharePoint
- Overcome SharePoint 2GB file size limit and 4TB content repository limit
- Separate SharePoint from storage location and architecture
- Leverage existing configuration including Active Directory, SharePoint application permissions, and library metadata
- Check in and check out facilities collaboration
- Preview files during upload
- Fully integrated with Aspera Drive
- New: Compatible with hosted Office 365 SharePoint deployments as well as standalone SharePoint 2013

Applications and Use Cases

- Rapid transfer of large sets of files into SharePoint 2013 implementations
- Storage of large video, imagery, and graphic media assets
- Transfer of large engineering and architecture files
- Secure archiving of medical images and scanned documents
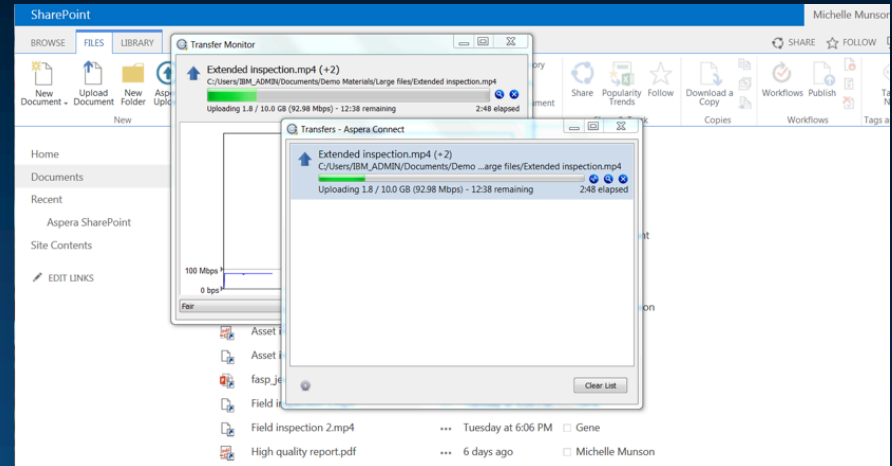
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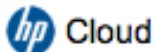
Aspera on demand
Available on IBM SoftLayer, Amazon Web Services, Microsoft Azure, Google

Transfer Servers - FASP servers as VM images for high-speed transfer with cloud storage

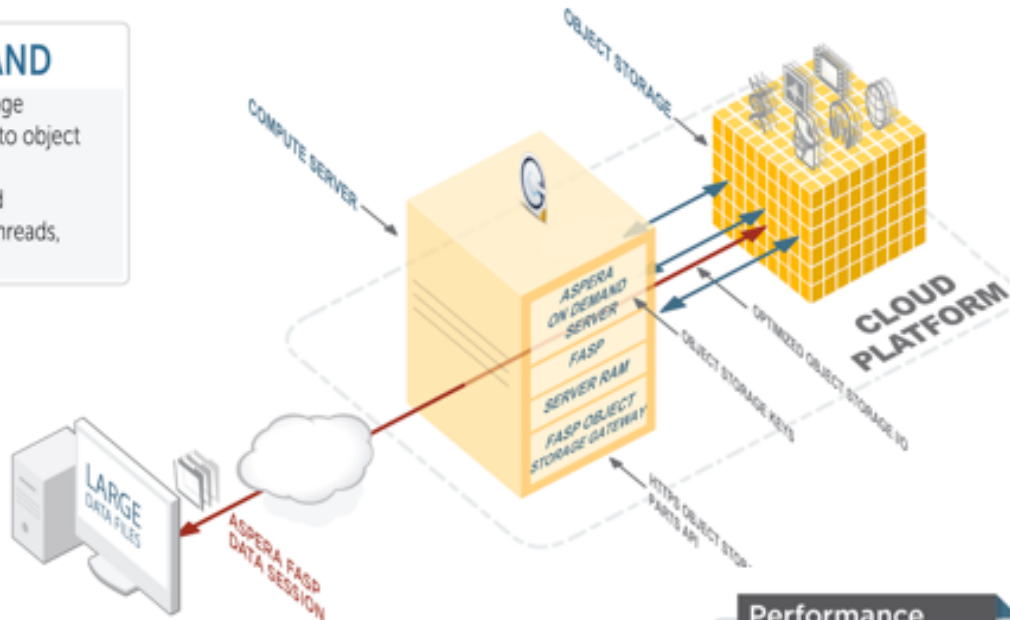- Direct integration with AWS S3, Microsoft Azure BLOB, Google Cloud Platform, OpenStack Swift
- Unlimited scale out with additional transfer server instances
- Fully interoperable with all Aspera clients
- Base transfer server, or Web-enabled application platform with for integration with 3rd party cloud applications

Web Applications - Add-ons to the base Transfer Server

- Aspera Shares –Multi-node file ingest and sharing, provides access to content across any location (on cloud, other clouds, or on-premise) with powerful security and access model
- Aspera faspex – Global Person-to-person file delivery, collaboration, exchange and distribution
- Perfect for Hybrid deployments – Easily Publish, Store, or Receive content on-premises or on cloud storage

Optional Clients

- Optional add-ons to extend the content ingestion and distribution to mobile devices and email clients
- Supports faspex iOS Client, Outlook plug-in, Cargo Automatic Downloader, and Mobile Uploader

Licensing and Availability

- Tiered usage (up to 1PB a month) based on GB transferred; No bandwidth caps, no user counts, no limit on number of "servers" (or "instances") one can run
- Month-to-month pay as you go, or annual and multi-year terms
- Available now: http://cloud.asperasoft.com

amazon webservices™

SOFTLAYER®
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Google

Microsoft Azure

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Key Features and Benefits

- Current Aspera mobile apps include Drive Mobile, *faspex* Mobile, and Mobile Uploader 2.0 for iOS
- Enables the transfer of large files over Wi-Fi and cellular networks at speeds that are many times faster than traditional mobile transfer technologies
- Fully supports the FASP security model
- Provides look and feel of native device apps and integrate seamlessly with device cameras and photo galleries

Applications and Use cases

- Remote access to enterprise files for work on-the-go
- Viewing and approving files, video, and imagery from the mobile device
- Rapid collaboration with remote users
- Remote content creation, upload and publish to collaborators of groups or individuals
- Viewing and approving documents as part of a file based workflow
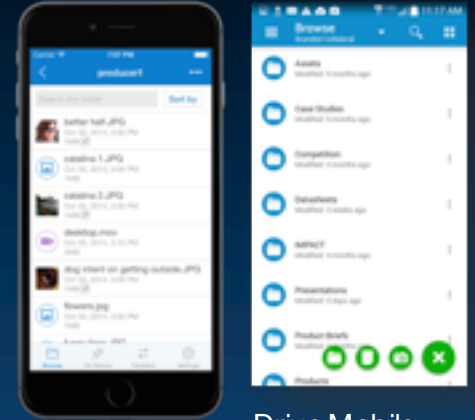
Drive Mobile

Mobile Uploader for iOS

faspex for Mobile

Aspera Sync
High-Speed synchronisation and replication

Cross platform software application designed for high performance synchronisation and replication of large file stores over the WAN

Key Features and Benefits

- High speed, multi-directional synchronisation of remote files and directories
- Highly scalable – new ultra-fast snapshot performance for synchronisation of giant file stores   containing 1 million or more files
- Highly efficient – designed for long distance WANs
- Secure – matches security standards set by government, FIPS 140-2 compliant
- Platform agnostic – runs on industry standard Linux and Windows
- Storage agnostic – compatible with any standard file storage system as well as cloud-based object storage
- Familiar rsync-like interface shrinks the learning curve for IT professionals
- Rich include and exclude filters, full support for soft and hard links
- File-level de-duplication (now in bidirectional as well as unidirectional mode) eliminates unnecessary transfers, reduces sync times and reduces storage use
- Windows bidirectional synchronisation tolerates open files during sync

Applications and Use cases

- Offsite synchronisation and replication for storage migration, disaster recovery and business continuity
- Bi-directional system mirroring for alternate access to digital content
- Hub and spoke sync for high-speed content collection or distribution

Synchronisation
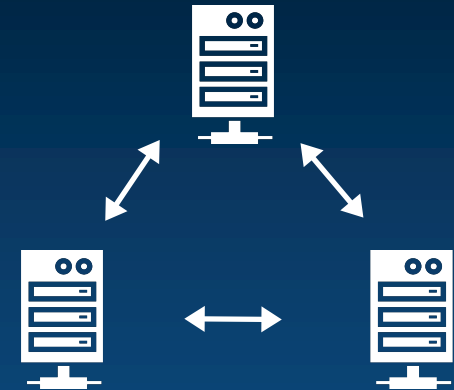
Scalable, multi-directional, multi-node synchronisation

Use Case
High Performance Data Synchronisation

Key points

- Flexible synchronisation solution well suited for file systems with 100's of millions of files and petabytes of data
- Agnostic to data storage type
- Flexible deployment with 100% software-based approach
- Alternative to NetApp SnapMirror, EMC/Isilon QNAP, RSYNC, etc.

Disaster Recovery / Business Continuity

Hub and Spoke for Collection or Distribution

- Daily collection or distribution of data across a large network of end points
- Continuous update of online content, software and media

Data Migration for Diverse Storage Environments

- Replicate mission critical data from a primary site to one or more alternate sites
- Systems remain available after a system outage or site loss - critical data is preserved

- Replicate entire file system, or portions of the file system
- Preserve file attributes such as permissions, access times, ownership, etc.

Aspera Sync
Performance Benchmarks

First Run

Small File Synchronisation

Performance comparison synchronising many small files (average size 100kb) over WAN of 100ms/1%

Small files performance	No. of files	Data set size	Sync time	Throughput
Async	978,944	93.3 GB	9,968 sec (2.8 hours)	80.4 Mbps
rsync	978,944	93.3 GB	814,500 sec (9.4 days)	0.99 Mbps
Speed up difference	**81x**			

Large File Synchronisation

Performance comparison synchronising many large files (average size 100 MB) over WAN of 100ms/1%

Small files performance	No. of files	Data set size	Sync time	Throughput
Async	5,194	500.1 GB	4,664 sec (1.3 hours)	921 Mbps
rsync	5,194	500.1 GB	4,320,000 sec (50 days)	0.98 Mbps
Speed up difference	**940x**			

Second Run

Synchronisation time after adding 31,056 files to 1 million small files (100 KB each) over Wan of 100ms/1%

Change file performance	No. of existing files	No. of files added	Total size	Sync time	Through-put
Async	978,944	93.3 GB	9,968 sec (2.8 hours)	80.4 Mbps	
rsync	978,944	93.3 GB	814,500 sec (9.4 days)	0.99 Mbps	
Speed up difference		**39x**			

Synchronisation time after adding new files to set of large files (100MB) over WAN of 100ms/1%

Change file performance	No. of existing files	No. of files added	Total size	Sync time	Through-put
Async	5,194	54	5.49 GB	54 sec	871 Mbps
rsync	5,194	54	5.49 GB	54,573 sec (15 hrs)	0.86 Mbps
Speed up difference		**1000x**			

Aspera Developer Network

Complete set of SDKs with, reference info, and sample code for integrating Aspera technology into desktop, network-based, and web applications in place of FTP, HTTP, or custom TCP-based copy protocols using C++, Java, JavaScript, or .Net.

Aspera Mobile APIs

Android SDK
Aspera Android SDK provides a Java API to transfer files using FASP-AIR™.

iPhone SDK
Aspera iPhone SDK with Objective C API to transfer files using FASP-AIR™.

Aspera Browser APIs

Connect - JavaScript API
JavaScript API exposed by Aspera Connect for integration of *FASP* based file transfers into web applications for a complete in-browser experience

Aspera Application APIs

Shares API
Full programmatic control over browsing Shares, transfer authorisation, and upload/download.

***faspex*™ Web API**
A set of services that enables users to create and receive digital deliveries via a Web interface, while taking advantage of FASP high-speed transfer technology

Console API
Full programmatic management of transfer sessions including initiation, queuing, control and management through a RESTful API.

Aspera Transfer APIs

Aspera Web Services
A SOAP based web service API that allows initiation, monitoring and controlling of FASP based file transfers.
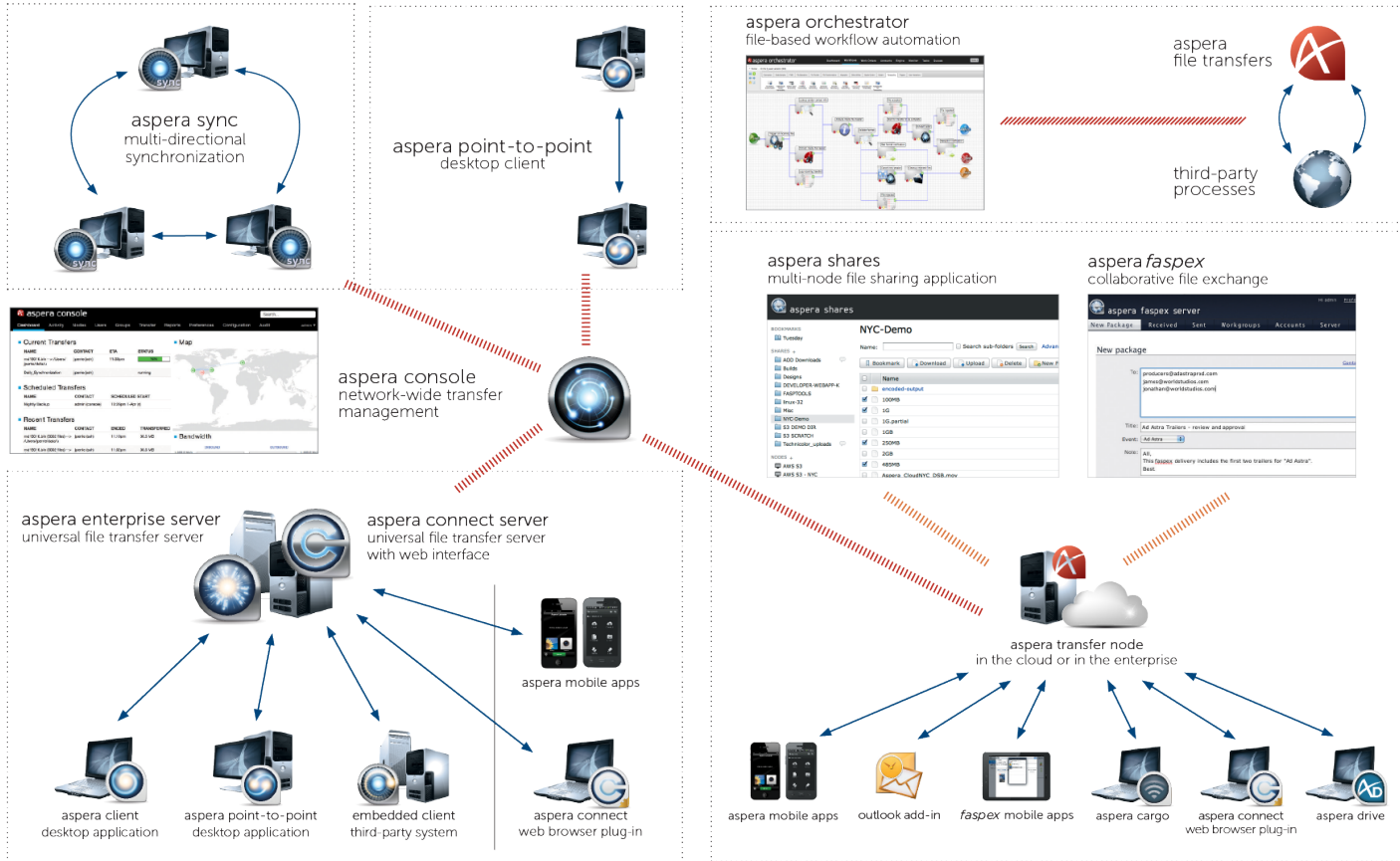
FASP Manager
A class library that allows initiations, monitoring and controlling of FASP based file transfers.

Aspera FASPStream API
Enables the transfer of bytes as they are being created or captured and allows access to portions of a file in memory during the transfer process.

fast Software Environment

Customer Case Studies

NETFLIX

With over 23 million streaming members globally, Netflix delivers streaming movies and TV shows to over 700 different devices – PCs, internet-connected TVs, gaming consoles, tablets and smart phones.
Solution: With over 50 terabytes of new content a month from over 200 global partners, Netflix uses Aspera On Demand Direct-to-S3 technology to move, process and store content in Amazon Web Services S3 storage.
Benefit: High-speed FASP™ transfers direct to S3 storage allow Netflix to leverage the extreme scalability of AWS, eliminating the need to build its own data centres and enabling on demand compute capacity control.

华大基因 BGI

BGI, the world's largest genomics research institute, produces thousands of genomes a day. Using hard drives to send data to customers and partners had proven expensive, error-prone and time consuming.
Solution: BGI integrated Aspera's FASP™ high-speed transfer technology into its "EasyGenomics™" cloud-based bioinformatics service and deployed Aspera Connect Server for high speed sequencing data delivery service.
Benefit: With fast cloud transfers, EasyGenomics™ takes advantage of unlimited parallel computing offered by the cloud and Aspera's rich APIs enabled the integration of high-speed transfers directly within EasyGenomics™ web portal.

UNIVERSAL

Universal Pictures produces major motion pictures such as "Battleship" and "Snow White" – massive projects requiring an army of partners and facilities seamlessly working together to deliver a top-notch final product.
Solution: High-speed, reliable and secure exchange of daily post-production media files (15-30GB each) between multiple companies around the globe using Aspera faspex™.
Benefit: Easy-to-use file transfer solution that's deployed in hours, not weeks and real-time collaboration between geographically distributed teams leading to significant reduction in production cycle times.

at&t

AT&T U-verse delivers advanced digital TV, high-speed Internet, and digital home phone service together over state of the art fiber optic technology and computer networking as a fully integrated experience.
Solution: High-speed digital file transfers of ad content from sponsors into an end-to-end fully automated ad-ingest and file-based workflow that verifies, schedules, and confirms delivery and broadcast.
Benefit: "Lights out" automation enables large scale ad ingest, with high reliability and service levels driving increased ad revenue and more sponsors at significantly lower operational costs.

Customer Case Studies

Cloud

Media

Service & Technology

Storage