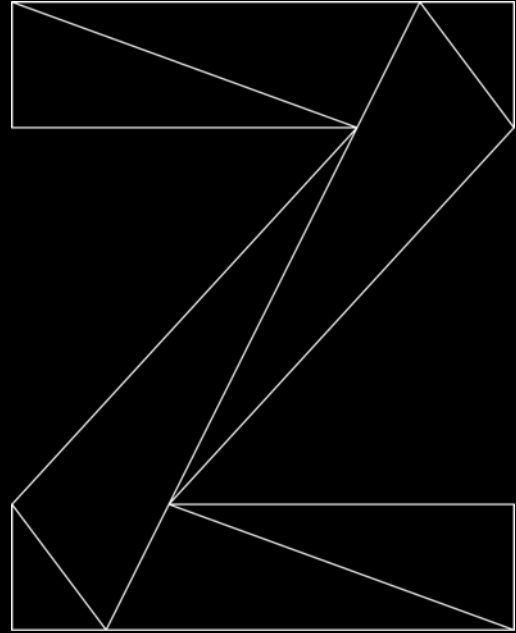


IBM z15 and IBM MQ for z/OS



A perfect partnership

**Best of breed
messaging**



**Connectivity built to exploit the strength of
the underlying platform**

**Best of breed
hardware**

**IBM® Z® – the secure, resilient and agile
platform for hybrid multicloud**

Elevate your hybrid cloud with IBM z15



Service Level Excellence

Industry's highest level of business uptime to meet SLA and regulatory compliance



Data Protection & Privacy

Industry-first solution to protect sensitive data across your multicloud



Mission Critical Cloud

Integrate seamlessly into hybrid multicloud, blockchain and AI

Standardized & Flexible for the Cloud Data Center

Modular, scalable and proven cloud-ready infrastructure

z15 Key Capabilities

Data Protection & Privacy

Enterprise out data protection

- **Fibre Channel Endpoint Security** encrypts data in flight to IBM Storage

Protect against next generation threats

- **Cryptographic Agility** – Quantum safe algorithms for trusted digital signatures of system data

Protect Individuals' Identity

- **Data Privacy Passports** protects data at the point of extraction and is enforced at the point of consumption

Business Continuity & Resiliency

Workload restart and recovery

- **System Recovery Boost** uniquely expedites system restart from both planned and unplanned outages and accelerates client workload recovery

Embedded operational data and analytics

- **Synchronized diagnostic** data for faster root cause analysis of key issues
- **Privacy diagnostic technology** delivers serviceability protection of key client data

Cloud Integration

Cloud workloads & management

- **z/OS Container Extensions** allows for the integration of z/OS with cloud for developer independence
- **IBM Cloud Private and z/OS Cloud Broker** delivers self-service access of z/OS computing resources

Cloud Native

- **IBM Z DevOps** - unlock an open-source based DevOps pipeline for z/OS software delivery
- **Zowe™**- Open framework for interacting with z/OS- command line, REST APIs, and web

Standardized & Flexible for the Cloud Data Center

Modular and Scalable

1-4 frames depending on capacity requirements

Industry Standard

19" Form Factor with choice of power and cooling

On-Chip Acceleration

Compression accelerator reduces cost of storing, transporting & processing data

Make the most of z15 with MQ for z/OS

Data Protection & Privacy

Protected data within IBM Z

- *MQ supports z/OS data set encryption as part of a pervasive encryption strategy*

End-to-end data protection

- *MQ Advanced Message Security secures data throughout the messaging network, protecting against external and internal security threats*

Enhanced encryption performance

- *Crypto Express7S and CPACF acceleration reduces cost of MQ channel and message level encryption*

Business Continuity & Resiliency

Workload restart and recovery

- *MQ benefits automatically from System Recovery Boost, speeding queue manager restarts and workload catchup*

Service and data high availability

- *MQ Queue Sharing Groups exploit the resiliency of IBM Z hardware, providing truly active-active messaging*

Embedded operational data and analytics

- *MQ SMF data provides KPIs that can feed the diagnostic and analytic capabilities of z15*

Cloud Integration

Cloud workloads & management

- *MQ runs within z/OS Container Extensions to provide cloud applications with a connectivity gateway to the mainframe*
- *MQ exploits Aspera fasp.io protocol to accelerate long-distance messaging between multiple clouds*

Cloud Native

- *Cloud applications can easily access MQ resources via the MQ service provider for z/OS Connect with build toolkit support to automate DevOps pipelines*
- *MQ REST APIs, web console and CLI available within Zowe framework*

Standardized & Flexible for the Cloud Data Center

Modular and Scalable

1-4 frames depending on capacity requirements

Industry Standard

19" Form Factor with choice of power and cooling

On-Chip Acceleration

Compression accelerator reduces cost of messages over MQ channels and storage for persistent messages

Theme: Data protection and privacy

From selective encryption to pervasive encryption



The practice of pervasive encryption can:

- Reduce risk associated with undiscovered or misclassified sensitive data
- Make it more difficult for attackers to identify sensitive data
- Help protect an organization's digital assets
- Significantly reduce the cost of compliance

Pervasive
encryption
is the new
standard

Encrypting only the data required to achieve compliance should be viewed as a

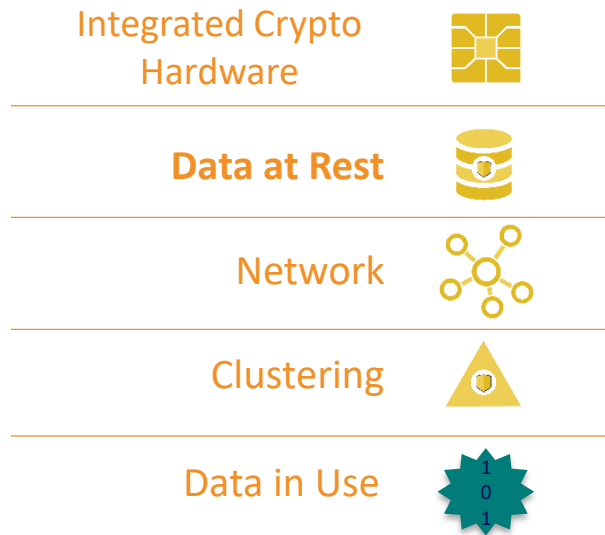
minimum threshold

not a best practice

Dataset encryption

- z/OS 2.2 and later has support for policy based dataset encryption
- Provides a consistent approach to protecting data at rest throughout the mainframe
- Requires a CryptoExpress coprocessor to use
- Dataset encryption was supported by default for the following MQ datasets:
 - BSDS, CSQINP*, Archive logs
- **MQ for z/OS V9.1.4 extended support** to include:
 - Pagesets, Logs
- **MQ for z/OS V9.1.5 extended support** to include:
 - SMDS

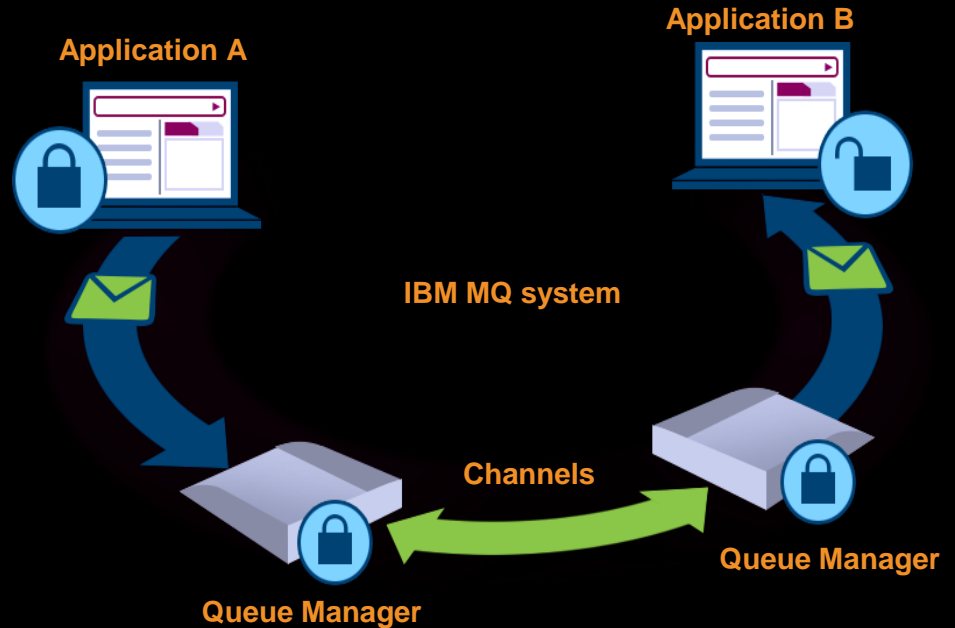
Pervasive encryption with IBM z Systems



Extend security with MQ Advanced Message Security*

Protects data at rest, in-flight and in-memory to guarantee privacy of message contents

- Apply end-to-end encryption to existing messaging infrastructure easily and with no application changes
- Authenticate and protect messages across the enterprise making audit simple
- Reduce time and skills needed to comply with aspects of common security standards (PCI-DSS, HIPAA, etc.)
- Detect and remove rogue messages
- Confidentiality option for encryption has minimal performance impact
- **MQ Advanced for z/OS V9.1.3 extended support** for AMS policies to be applied to messages received from non-AMS queue managers

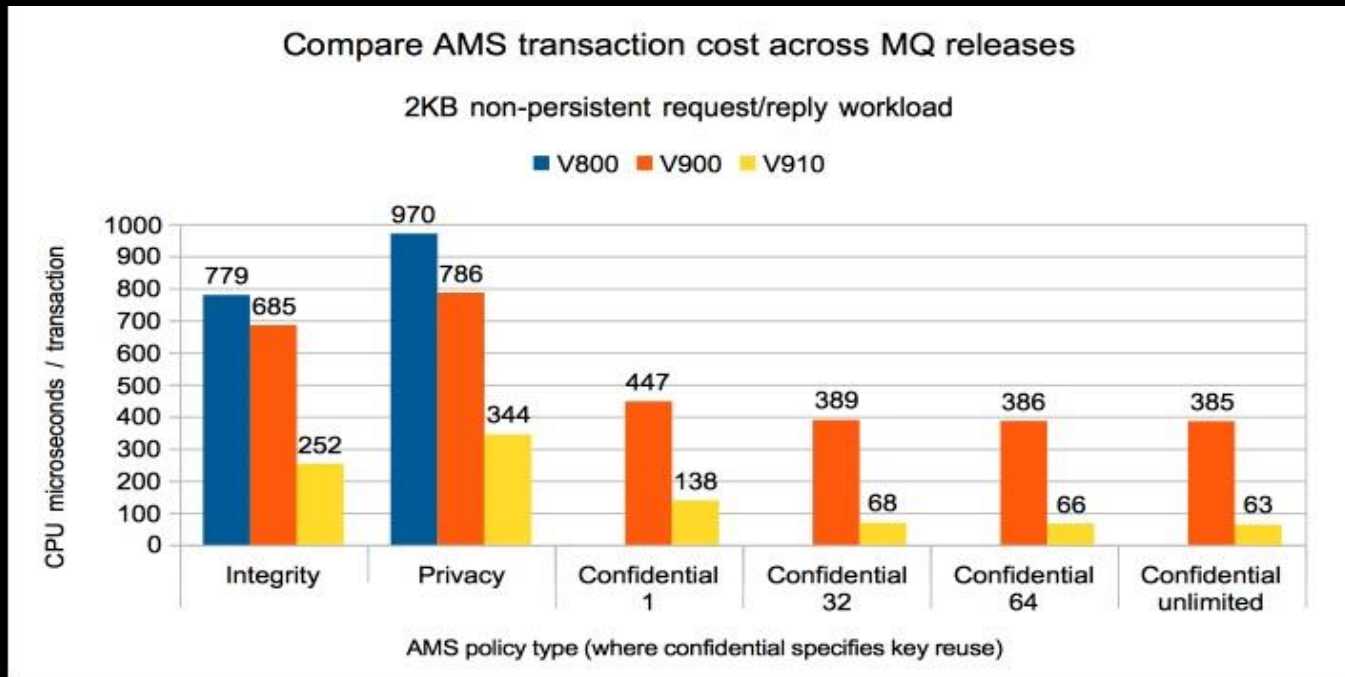


Protecting your **business**, your **reputation**, and your **customers**

* Only available in IBM MQ Advanced for z/OS (VUE)

Configurable policies to optimize performance

End-to-end encryption without excessive overhead



A cost comparison between v9.0 and v9.1 shows:

- **Integrity: 45%** of the equivalent v9 measurement
- **Privacy: 40%** of the equivalent v9 measurement
- **Confidentiality: 15-25%** of the equivalent v9 measurements

What is Confidentiality?

Flexible re-use of symmetric keys

Quicker processing, reduces costs, flexible security

Theme: Business Continuity and Resiliency

Queue sharing groups are the gold standard for High Availability

Applications connect to the group rather than individual members

Main advantages of Queue Sharing Groups:



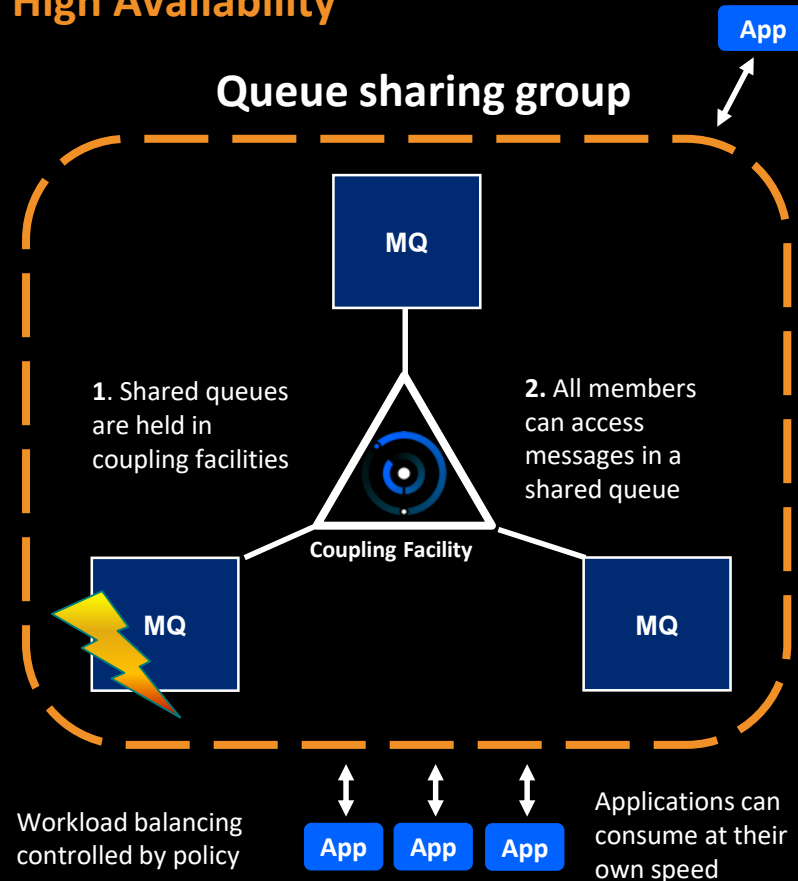
Scalable: a single profile and a security definition



Highly available: multiple queues accessing the same messages



Workload balancing: distributes workload between queues in group



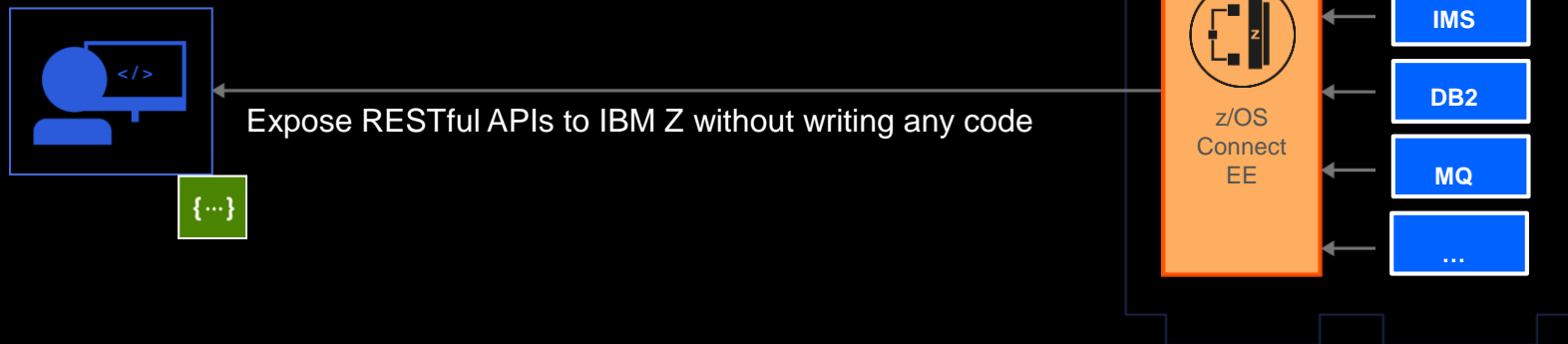
Theme: Cloud Integration

Simplify access to MQ resources and operations with z/OS Connect Enterprise Edition



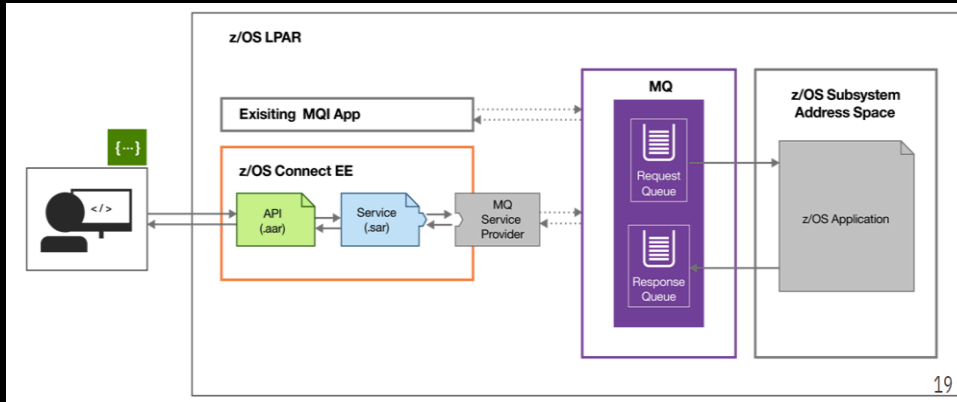
IBM z/OS Connect Enterprise Edition

- Provides a single, RESTful entry point to your IBM Z assets and data
- Enables reuse of existing assets, exposing them to environments where it is natural to use REST
- Those new consumers do not need to understand or be aware of the specifics of the subsystems
- No changes to subsystems required, all handled via configuration



MQ service provider for IBM z/OS Connect Enterprise Edition

- Allows existing services fronted by MQ to be accessed via a RESTful front end
- Users need have no knowledge of MQ - Advanced users can specify some attributes using HTTP headers
- **New since z/OS Connect v3.0.21:**
 - MQ service provider now part of zOS Connect Enterprise Edition offering
 - MQ SARs can be built as part of an automated build pipeline using the build toolkit
- **New since z/OS Connect v3.0.32:**
 - MQ APIs can be built using the Eclipse-based API toolkit



- Expose **bespoke** REST APIs to new consumers, who don't understand COBOL copybooks or PL/I
- Backend is hidden and invoked using JSON / HTTP

Accelerating MQ using IBM Aspera



MQ is the leading enterprise-grade solution for secure and reliable messaging between applications.

In globally deployed MQ environments, challenges can arise with real time delivery due to distance and network conditions.

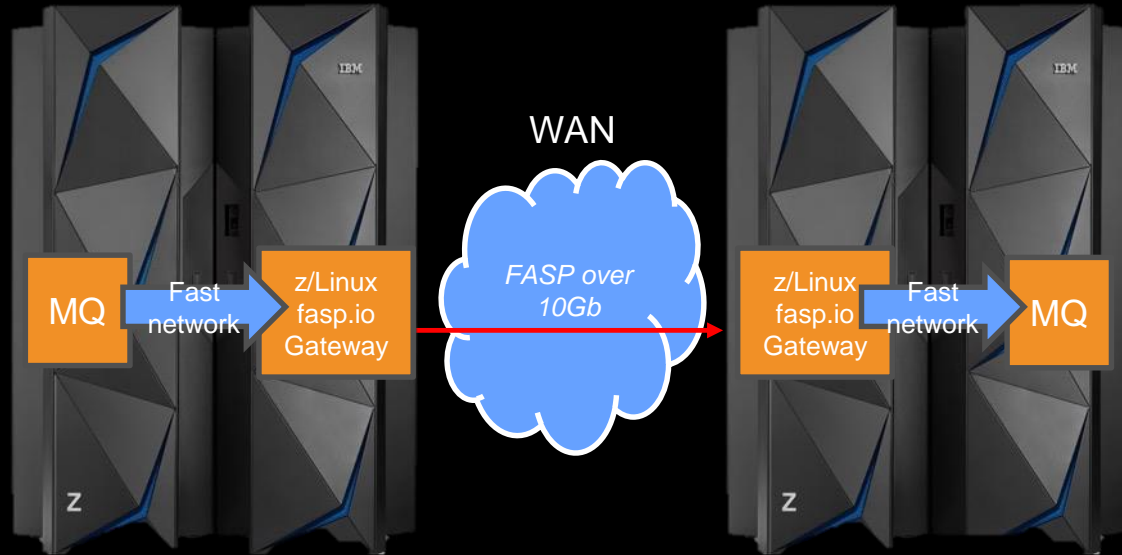
By integrating the IBM Aspera FASP® protocol, MQ can move messages at **high speed over distance** for many different real-time processes, e.g., financial transactions.

By fully utilizing available network bandwidth with existing infrastructure, businesses can increase operational efficiency and outcomes with minimal additional expense.

MQ Advanced for z/OS VUE delivers acceleration using Aspera V9.1.5 provides images and entitlement to use fasp.io gateways for MQ workloads*

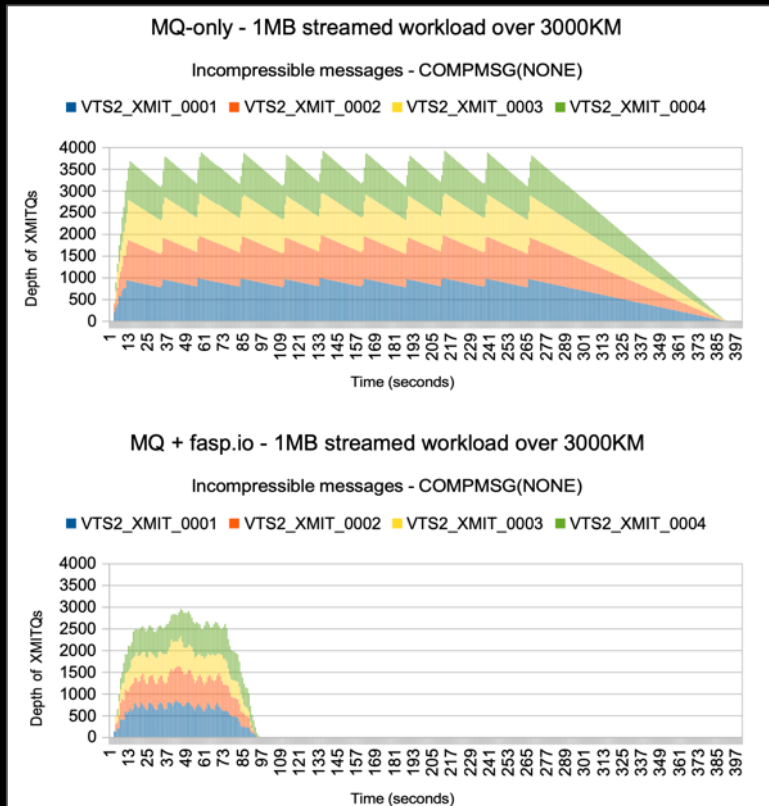
- Lightweight Unix-based software service with the **Aspera FASP** protocol that bridges **TCP** and **FASP**
- Provides **bidirectional** and **multi-session** support for data streaming
- Optimized for **bulk data streaming** over long distance or bad networks
- Quickly and transparently integrates easily with **existing TCP workflows**
- Easy to configure with no application changes required!
- **HA topologies** for resilient MQ and gateway components

MQ + IBM Aspera fasp.io gateway basic topology



* Other workloads require separate Aspera entitlement

Substantial performance benefit for long distance messaging



MQ and MQ + Aspera performance over 3000 kilometers

| | MQ-only | MQ+FASP |
|--|---------|-----------------------------|
| Time to complete (seconds) | 390 | 94 |
| CHANNEL send rate after capture complete (MB/Second) | 31.2 | 125 |
| Cost / Message (CPU milliseconds / transaction) | 4.3 | 5.1 |
| | | Workload is log constrained |

MQ with Aspera fasp.io Gateway

- Time to complete reduced by 4X
- Send rate increased by 4X

MQ support for Zowe

Zowe is an open source mainframe tools project based on a collaboration between IBM, CA and Rocket

Provides tools to make it easier, and more natural, to administer z/OS from a laptop environment, by treating z/OS like any other cloud platform

Includes a virtual desktop, API gateway, rich set of REST APIs, CLI

MQ is starting to add support:

- MQ REST APIs within the API catalog
- MQ web console within the Virtual desktop
- CLI plugin for MQ

A framework for software services



An open source community



A simple, intuitive environment



<https://www.openmainframeproject.org/projects/zowe>

<https://zowe.org/home/>

A word cloud featuring the phrase "Thank You" in numerous languages and scripts. The words are arranged in a circular pattern, with "Thank" and "You" being the largest and most prominent. Other visible words include: "Maake", "Asante", "Shukria", "Dhanyavadagalu", "Manana", "Dankon", "Kiitos", "Maauruuru", "Biyan", "Chokrane", "Arigato", "Gracias", "cảm ơn bạn", "Tack", "Kop Khun Khap", "Obrigado", "Eskerrik Ask", "Tingki", "Raibh Maith Agat", "Salamat", "Merci", "Danke", "Hvala", "Děkuji", "Grāzas", "Dakujem", "Bedankt", "Ua Tsaug Rau Koj", "Nirringrazzjak", "Rahmat", "谢谢", "Xβαλα", "Ευχαριστώ", "Di Ou Mèsi", "Dziękuję", "Juspaxar", "Dank Je", "Suksama", "Dankscheen", "спасибо", "kösönöm", "Vinaka", "Maake", "Asante", "Shukria", "Dhanyavadagalu", "Manana", "Dankon", "Kiitos", "Maauruuru", "Biyan", "Chokrane", "Arigato", "Gracias", "cảm ơn bạn", "Tack", "Kop Khun Khap", "Obrigado", "Eskerrik Ask", "Tingki", "Raibh Maith Agat", "Salamat", "Merci", "Danke", "Hvala", "Děkuji", "Grāzas", "Dakujem", "Bedankt", "Ua Tsaug Rau Koj", "Nirringrazzjak", "Rahmat", "谢谢", "Xβαλα", "Ευχαριστώ", "Di Ou Mèsi", "Dziękuję", "Juspaxar", "Dank Je", "Suksama", "Dankscheen", "спасибо", "kösönöm", "Vinaka".