Grey Matter

Multi-Cloud, Hybrid Mesh Operations & Analysis

Make the Most of Your API, Microservice, Multi-Cloud, and Existing IT Investments

TM & © 2020 Decipher Technology Studios. All rights reserved.

ىنىنىنىنىنىنىنىنىنىنىنى تۇرىغىنىنىنىنىنىنىنى

The Monolith	3
Microservices	4
Containers	5
Service Meshes	6
Grey Matter	7
Conclusion	8

Enterprise IT systems grow more complex and dispersed by the day. Your IT stack is loaded with technologies promising to solve your most pressing problems. But how do you keep them working together? How do you ensure you're getting the most value for your investments?

The Grey Matter mesh platform connects your enterprise hardware, software, cloud, API, edge, and microservice-based applications seamlessly. Unlocking their potential in ways no other capability can match.

In this white paper, we present some of the key technologies underpinning today's enterprise IT stack, answering a few key questions: What do these technologies offer? What challenges do they present? And ultimately, how does Grey Matter unlock their full potential?

We start with a discussion about Enterprise "monolith" applications and systems, a ubiquitous component of enterprise IT.

The Monolith

The monolith is a self-contained, tiered application combining data access, middleware, networking, and user interface in a single program. It is a necessary architecture powering many enterprise-critical business systems. Monoliths are considered easy to implement and maintain due to their unitary nature. Fig. 1 presents a typical monolithic software architecture, with data, core requirements, services, UI and networking that are all wired into a single code base.



Fig 1. Monolithic software architecture

Complex and Difficult to Scale

Monoliths are a less modern approach compared to modular microservices and cloud-native architectural patterns. They are difficult to quickly and cheaply scale, slowing delivery to market. Fig. 2 provides an example of what monolith scaling often looks like. Every function – all

middleware, all networking elements and all services and applications – are recreated, placing incredible demand on an enterprise IT environment. Furthermore, data synchronization and security strategies become complex and dependent on "regional" rules or data center policies and procedures anywhere the replicated monolithic application is deployed.



Fig 2. Monolith scaling creates serious resource challenges

The monolith's unitary nature also often means if one component fails, either the entire capability fails or a large portion of its features are down. Downtime costs money or potentially worse – customers. For enterprises where multi-channel customer engagement, 24-hour availability, austere regional approaches and constant innovation are a must, these are major concerns.

Microservices

Microservices, small, light-weight modularized packets of loosely coupled code, are a modern alternative to the monolith. They offer vastly improved flexibility, scalability, and speed in the cloud and on-prem compared to the monolith. Companies like Netflix, Apple, Google, and Amazon can't operate at scale without them.

Black-box Sprawl

Microservices enable rapid deployments of new capabilities. However, they do so at the cost of visibility and management complexity. Sprawl is a significant enterprise-scale concern. Volumes of new services must be governed, secured, tracked, and monitored as they move from dev to prod environments across countless container-, on-prem-, and cloud- environments. Container portability makes monitoring even harder. Teams must adopt several external health monitoring tools at additional training time and resource expenditure.

Containers

Containers are a common microservices organization and deployment solution. They're a standard software that packages code, libraries, and dependencies for reliable deployment and ops across multiple environments. Containers are a lightweight means of operating system (OS) virtualization, isolating system processes while managing memory, CPU, and disk use.

Vendor-locked Mini-liths?

When deployed at enterprise-scale, containers can end up acting like monoliths transferred to the cloud. They lack the same observability across regions, clouds, and Kubernetes (the current leading container orchestration infrastructure, aka K8s) distributions. They can also be difficult to connect across platforms. Bridging existing IT investments with new containerized capabilities residing in K8s requires heavy lift tooling, significant work, and high-priced expertise. Flexibility across cloud and on-prem platforms is a growing area of enterprise focus. Unfortunately, most enterprises are now dealing with mini-lith K8s environments that are isolated for specific purposes. This further exacerbates the need for special network traffic patterns, more cloud-native layers, more application level tooling, and security and auditing solutions that do not match across the IT infrastructure, and certainly not across cloud providers.

The drive to a single "platform" vendor or "cloud" provider with purpose-built limitations which defeat the promise of multi-cloud hybrid operations represents another challenge. Existing technologies and systems persist in most enterprise IT stacks. This is not a bad thing. They may be critical long-standing operations support systems (OSS) and business support systems (BSS). They may be resources that don't lend themselves easily to migration or modernization. They may require significant security and business policy modification. Cost and downtime are major concerns. Yet, as demonstrated in Fig 3. enterprise IT may find itself deciding between costly, time-consuming forced migration, or the quarantine of critical resources.



Fig 3. Container limitations quarantine critical existing IT investments

Service Meshes

Service meshes provide critical command and control connecting mini, micro, and macro services across- APIs, microservices, and applications mostly residing in containers and cloud environments. The mesh enables service interactions, network management, access control, and other critical functions. It's what allows microservices to stay "micro" and is key to hybrid and multi-cloud systems interoperability.

Missed opportunities and the cost of free

Open-source service mesh capabilities receive the lion's share of media attention. However, their adoption can be both challenging and surprisingly costly in prod environments. Why?

- The open-source market constantly changes. Innovations happen sometimes overnight. These changes require constant upgrades in order to maintain true enterprise readiness. Such changes may not be uniform and may break any backwards compatibility.
- Many open-source meshes only work with specific container environments. For example, Istio requires K8s. Others may only work with a particular vendor's on-prem hybrid cloud solutions. This limits interoperability and often disregards the reality of an Enterprise's existing IT investments.
- 3. Open-source meshes require a good amount of tool augmentation in most enterprise usecases. These tools require additional training, independent upkeep, and further expertise – all creating added cost. As demonstrated in Fig 4, architectural bloat is a near certainty.



Fig 4. Free service meshes require add-on after add-on, for only a fraction of the capability

Open-source service meshes also miss critical additive value features such as the operational and business intelligence data generated by the mesh itself. Service mesh operations generate volumes of highly granular user and systems performance data. The deeper the visibility, the greater the harvest. Harnessed correctly, this data can power additive value functions like AI for network mesh anomaly detection, resource and cost-control automation, and business decision-making.

Grey Matter The Universal Mesh Platform Fix for Enterprise IT Business Optimization

The enterprise-proven Grey Matter platform securely and intelligently connects all of your enterprise APIs, microservices, containers, public and private cloud, and existing IT investments. As shown in Fig 5, Grey Matter is more than a service mesh, delivering out of the box SDKs, security, and intelligent operations, connecting developers, engineers, architects, and business decision-makers alike.



Fig. 5 Grey Matter Universal Mesh Platform Architecture

Granular service mesh-enabled observability, analytics, and automation optimize performance throughout your hybrid/multi-cloud and on-prem environments. Zero-trust data and systems segmentation localize and mitigate breach impacts if they occur. Unique layer 3, 4, and 7 visibility and data capture apply throughout the connected stack. An API gateway controls north - south traffic flow and a sidecar data-plane provides granular east-west internal traffic routing. The platform fully supports several network protocols beyond just HTTP REST, to include Kafka, MongoDB, RDBMS TCP, Redis, and more. And integrated visualization, analytics, and automation provide insight for performance management, anomaly detection, and direct action without external tool support.

Modernization doesn't come at the expense of on-going business operations. Completely agnostic and polyglot, Grey Matter enables hybrid and multi-cloud interoperability regardless of container or cloud vendor. The platform wraps existing IT investments in a ubiquitous layer 3, 4, and 7 network that securely connects existing OSS/BSS layers to cloud-native technologies.

Grey Matter provides:

- Unmatched value-added business intelligence and service mesh-powered insight,
- Unique multi-cloud and hybrid agnostic service mesh with full, exposed support for Envoy configuration and control augmented by a collection of additional bespoke filters,
- Ansible, Helm, and Terraform tooling for installation on multiple environments,
- A full audit-compliance engine and SPIFFE/SPIRE identity authorization out of the box,
- A single RESTFUL API for mesh network configuration and resources/assets cataloging and tooling,
- Unique layer 3, 4, and 7 visibility and control, with live service taps for full audit capture,
- JWT services and mesh propagation for easy integration with any enterprise Identity Management suite,
- Data mesh frameworks for easy management, creation, and integration of critical data assets as first-class citizens within your enterprise platforms,
- Open-source friendly package support for Prometheus, Grafana, Jaeger, Zipkin, and Elasticsearch,
- Multi-platform support, including K8s, AWS EKS, Azure AKS, Openshift OCP, OKD, Konvoy, and bare metal,
- API Gateway functionality,
- Intelligently automated indications and warning, scaling, and performance optimization,
- A team of proven industry professionals to support and guide your entire mesh journey.

Grey Matter is an enterprise-ready capability based on open architecture principles. Our development team is highly respectful of, and engaged with the open-source community. Envoy Proxy, Prometheus, and SPIRE are key open-source Grey Matter components.

Conclusion

Your enterprise IT stack is filled with opportunity and potential. The marriage of existing and modern cloud-based technologies can offer significant benefits, but it can also present challenges that aren't always easy to spot. Grey Matter connects everything, acting as a proven enterprise blueprint putting your business needs first and driving the most value from your new and existing tech investments.



Decipher Technology Studios builds Grey Matter, the intelligent hybrid mesh platform for enterprise microservice, container, and hybrid cloud operations.

Decipher Technology Studios 106 N. Lee Street, Second Floor Alexandria, VA 22314

(877) 356-3011 greymatter.io

TM & $\ensuremath{\mathbb{C}}$ 2020 Decipher Technology Studios. All rights reserved.