



Lucida Architecture Overview.

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AGENDA

Context

Why are we doing this project?
What are the expectations of our stakeholders?

Approach and Architecture Choices

How are we solving this problem?
What qualities will the solution will have to have to satisfy our stakeholders expectations?
Solution Patterns and technology choices
Business benefits

Appendix 1: Application Architecture

Component model & Interaction models
Key architecture decisions
Deployment diagrams

Appendix 2: Solution Capabilities and Technologies Behind Them

Micro Frontends
API Gateway
Standard-based and component level security mesh

Appendix 3: Lucida Phase 2 Project Roadmap



Key Question:

How do we please our stakeholders?

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#1

"It is difficult and time consuming to do business with MedImpact.

I jump through different applications to manage and monitor my Rx Plans.

The systems are outdated and do not speak my language.

It is not easy to help my members with their issues and questions."

- ▲ Client frustrations and disappointments
- ▲ Not living up to the expectations

#2

"Customer satisfaction is low. Some clients are leaving MedImpact because our systems (used by clients) are not modern and user friendly.

Market and client expectations are changing faster and faster and we need stay ahead to meet their expectations.

I need to showcase a friction-free, holistic, modern, customer-friendly, industry leading client experience before the 2021 sales cycle."

- ▲ Modern unified and differentiating client experience
- ▲ Fast development (speed to market)

#3

"We have built and matured many IT assets and process automation over the years. They play important roles in servicing our clients and members.

I need to bring all these applications together and create a unified, modern UX for our clients without having to rewrite our backend systems.

The solution must be robust, delivered fast, and expected to be evolved fast (as market expectations change)

The solution must be available securely in the open internet.

We want to enhance our reputation as modern technology solution provider."

- ▲ Utilize existing assets and processes (where possible)
- ▲ Quality, adaptability, and maintainability
- ▲ System complexity must not be visible to the end user
- ▲ Speed, Speed, Speed!



Key Takeaways...

These are **not competing** use cases; they are rather **complementary** (three sides).

We must be able to **support all these needs simultaneously** to be successful

We must **reimagine** our **processes, organization, and systems** in the context of these new realities...

Key Question: How do we please our stakeholders?

Solution Characteristics:

What qualities the solution must have to satisfy the stakeholder needs?

Key Question: How do we please our stakeholders?

SOLUTION CHARACTERISTICS

Modern, Intuitive, Seamless, User-centric Experience

brings all relevant functions together seamlessly from the user perspective

#1

Composable and Autonomous

Composable at run-time. UX components and backend services are designed, built, deployed, and managed independently

#1

#2

#3

Standard-based Security and Accessibility

each component is secured independently and collectively as a security mesh

#1

#3

Interoperability – Standard-based Integration

Backend business services are accessible using standard protocols, secured, and managed uniformly across the enterprise.

#2

#3

Key Question: How do we please our stakeholders?

Solution Building Blocks:

What solution patterns and technologies will enable these capabilities?

Key Question: How do we please our stakeholders?

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Standard-based Security and Accessibility

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Interoperability – Standard-based Integration

Backend business services are accessible using standard protocols, secured, and managed uniformly across the enterprise.

PROTOCOL | TECHNOLOGY

NEW UX STANDARDS

Single Page Responsive Web App

MICRO FRONTENDS | SINGLE-SPA

OIDC | IBM SECURITY VERIFY

API FIRST APPROACH API GATEWAY | GRAVITEE

Key Question: How do we please our stakeholders?

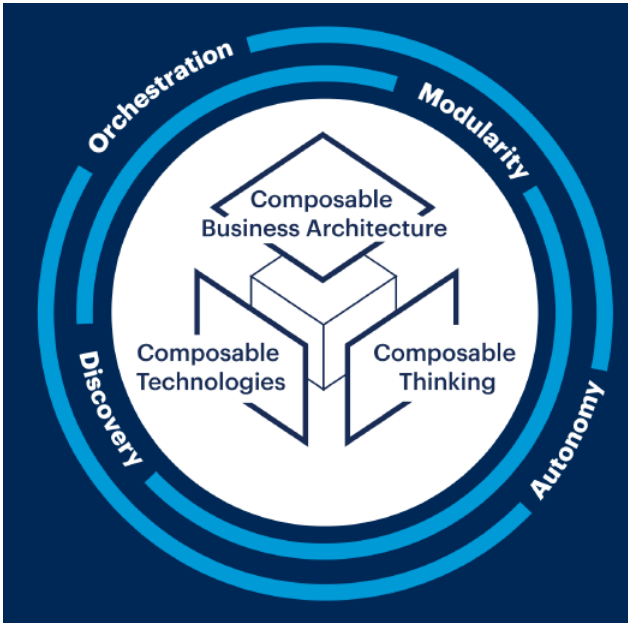
Benefit to MedImpact and our clients

What will be the benefits of this solution?

Business Benefits

SOLUTION CHARACTERISTICS	PROTOCOL TECHNOLOGY	BENEFIT HIGHLIGHTS
Modern, Intuitive, Seamless, User-centric Experience brings all relevant functions together seamlessly from the user perspective	NEW UX STANDARDS Single Page Responsive Web App	<ul style="list-style-type: none"> ✓ Customer satisfaction. Modern, intuitive, guided user experience. ✓ Differentiate in the marketplace. ✓ Better MI branding. Incorporate MedImpact's new branding.
Composable and Autonomous composable at run-time. UX components and backend services are designed, built, deployed, and managed independently	MICRO FRONTENDS SINGLE-SPA	<ul style="list-style-type: none"> ✓ One-stop shop for clients and MI Employees for all things PBM. ✓ Speed-to-market. Significant increase in our ability to deliver solution fast and keep pace with continuous change in stakeholder expectations. ✓ Operational efficiency. Significant reduction in complexity of managing IT assets that come together to deliver holistic user experience. Participating software products evolve independently.
Standard-based Security and Accessibility each component is secured independently and collectively as a security mesh	OIDC IBM SECURITY VERIFY	<ul style="list-style-type: none"> ✓ Client confidence in our security posture. ✓ Customer satisfaction. Seamless sign-on with their organization's security credentials. ✓ Enable business capabilities safely and securely.
Interoperability – Standard-based Integration Backend business services are accessible using standard protocols, secured, and managed uniformly across the enterprise.	API FIRST APPROACH API GATEWAY GRAVITEE	<ul style="list-style-type: none"> ✓ Enables superior digital experience. ✓ Speed-to-market and accessibility. Ability to build, deploy, secure, monitor, and consume APIs in days. ✓ Operational efficiency. Better management and visibility of services (time +\$). ✓ Resiliency and scalability. Self-healing and automatically scalable infrastructure.

Takeaways



LUCIDA IS THE FACE OF MEDIMPACT TO OUR CLIENTS

Lucida will help us stand-out in the marketplace

COMPOSABLE – PLUGGABLE – AUTONOMOUS

Lucida is architected for speed-to-market, flexibility, autonomy of management/evolution of business functions
We must think and organize as an ecosystem of autonomous teams

API – API – API

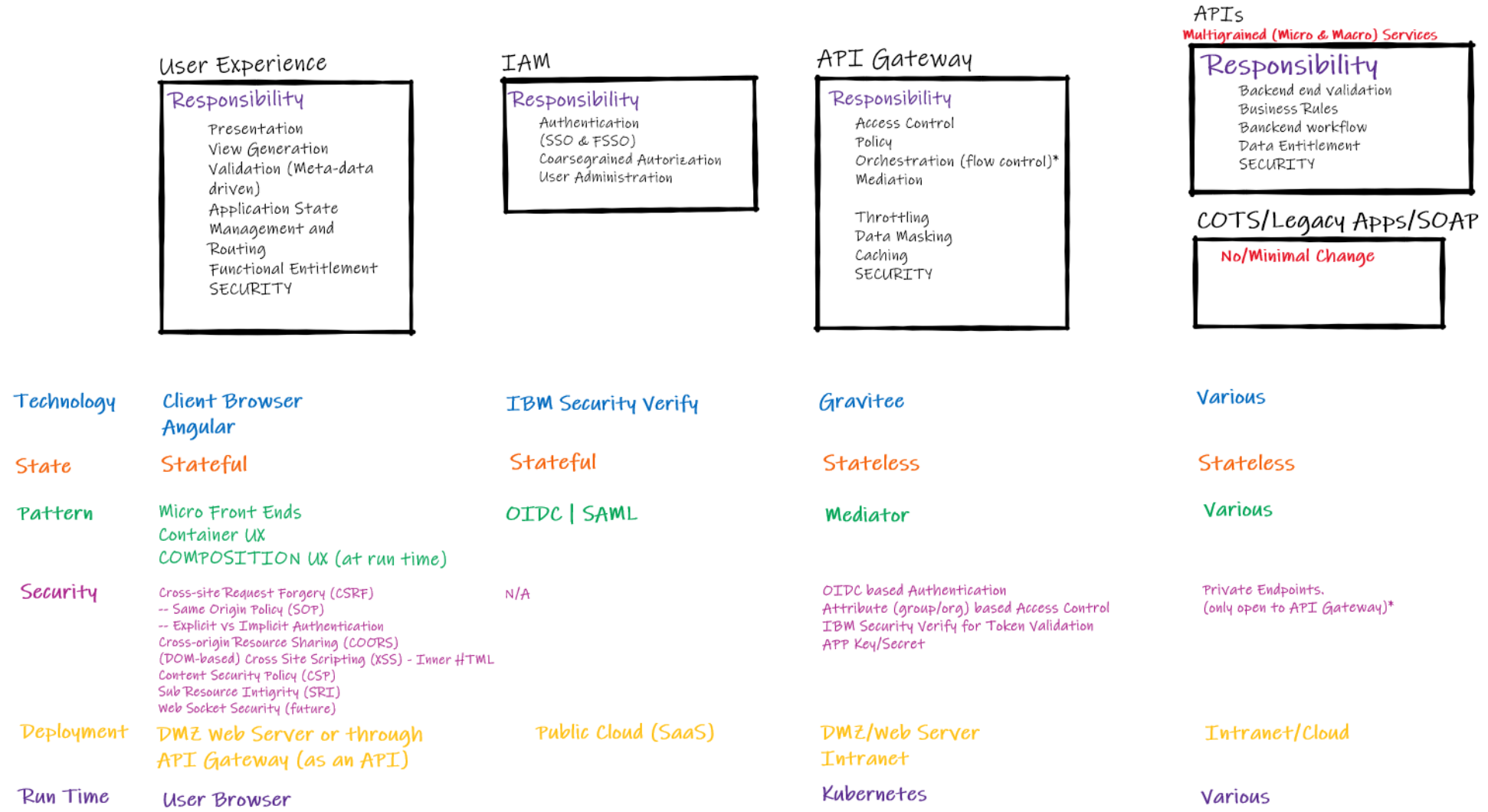
API is the foundation for meeting the expectations of the digital age. Think of API as the new front End for our Applications

Thank you!

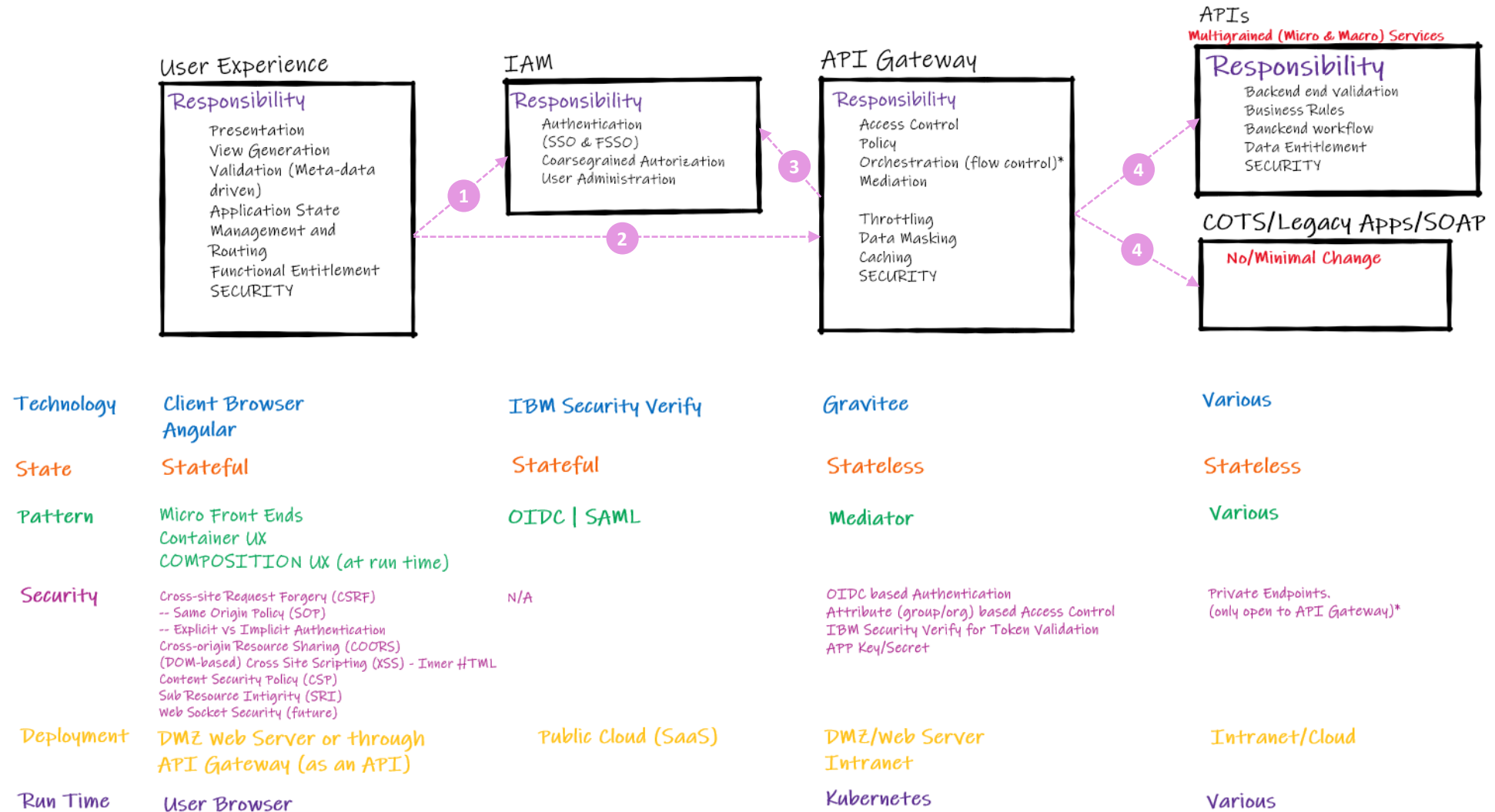
Appendix 1: *Lucida Application Architecture*



Lucida Component Model



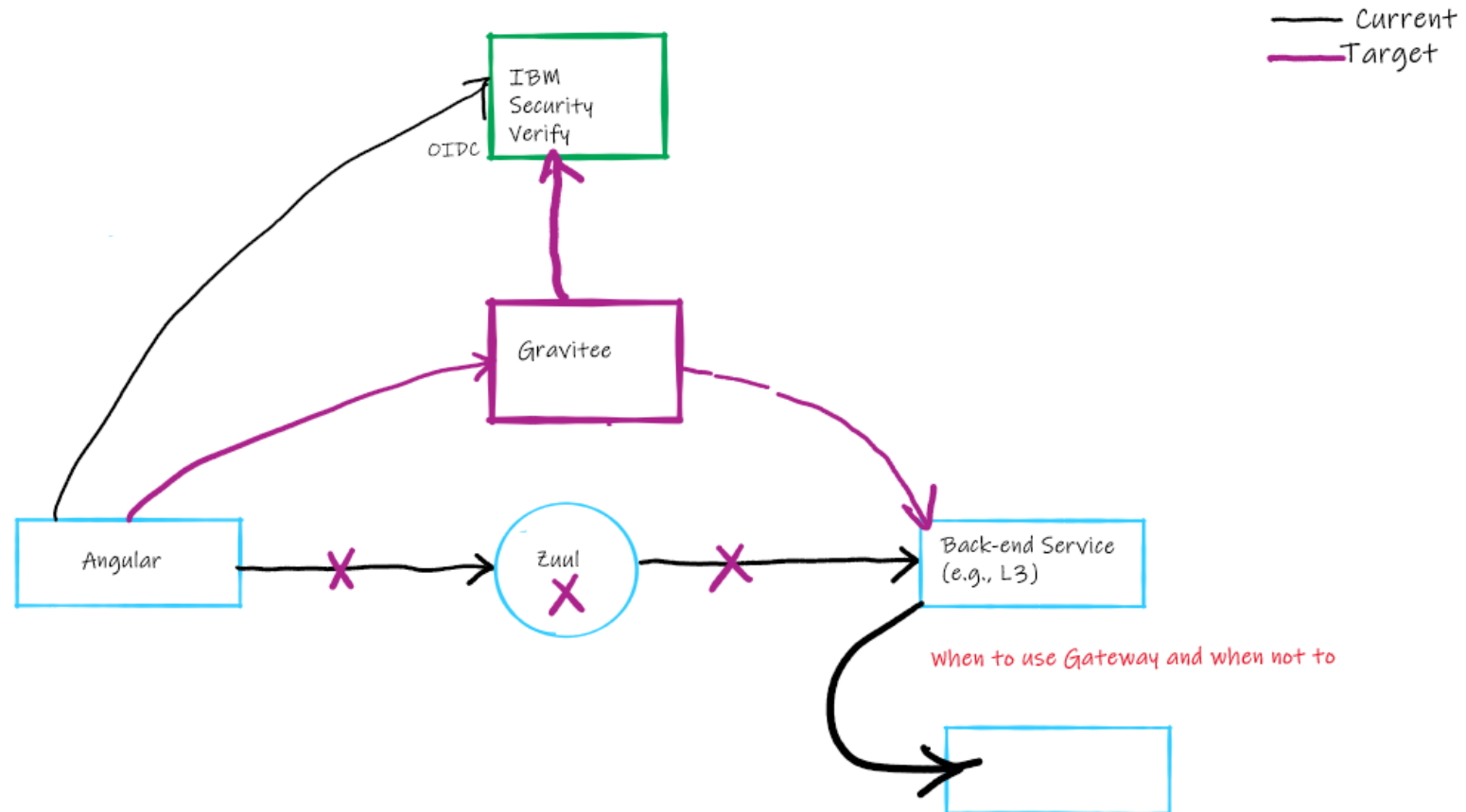
Lucida Component Model



Lucida Core and Pluggable Components



Lucida Interaction Model



Key Architecture and Scope Decisions

IDENTITY & ACCESS CONTROL

1. All Authentication and Authorization (micro-front-ends, API Gateway) will be implemented using OIDC framework!
Implications: Existing Reverse Proxy (WebSeal) apps will be updated to support OIDC and retire WebSeal
2. Lucida project will NOT redesign/rearchitect LDAP group/role structure. May alter or introduce new roles/groups.
3. Functional Entitlementment (UX user menu) will utilize existing USER/RESOURCE solution (may be revisited in the future releases of Lucida)
4. Following our standard, IBM SV will be the IDP for IAM functions. IBM SV will be the SOR for "User-info" (group/role, org, etc.)

API and API GATEWAY

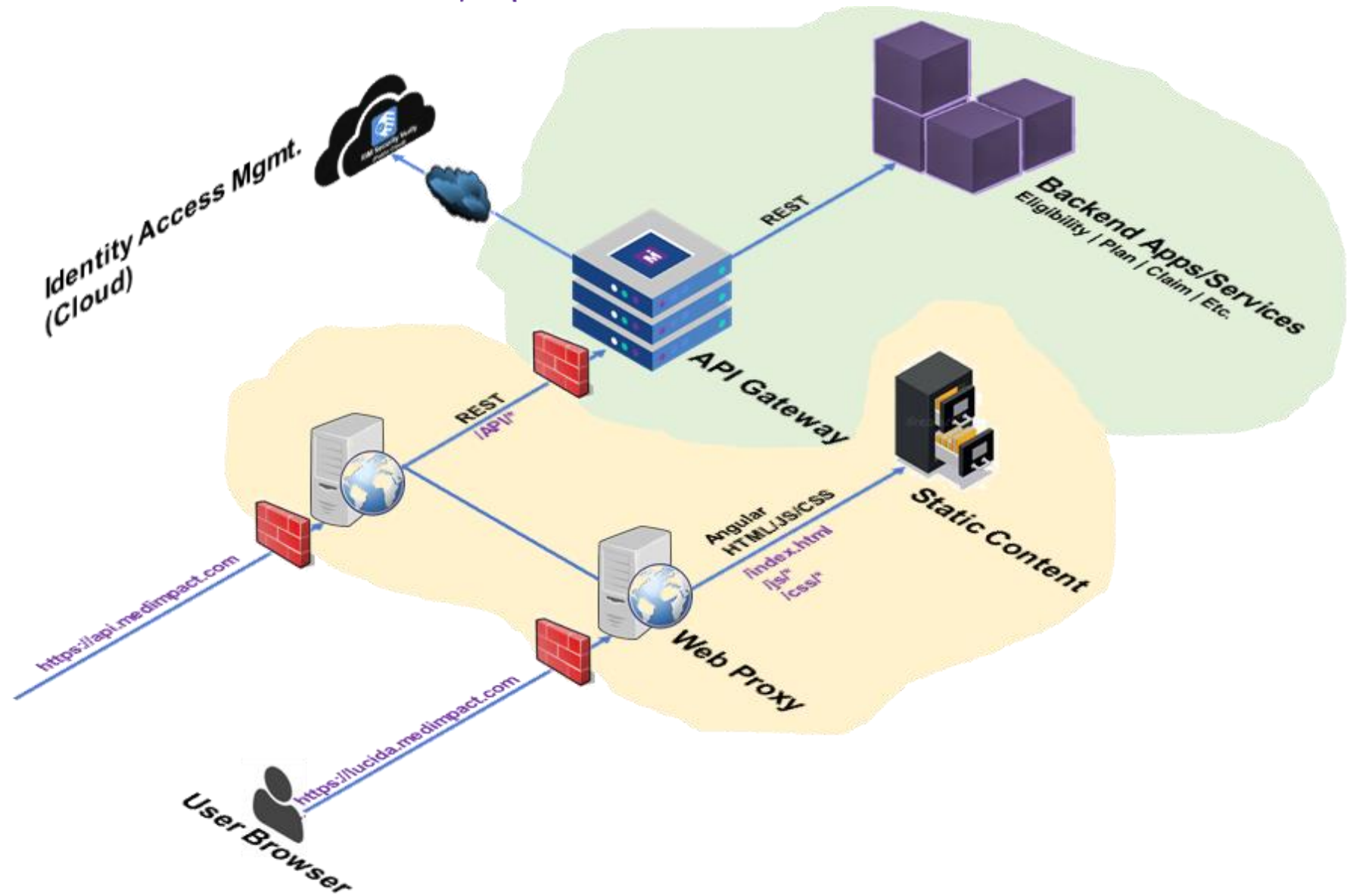
1. Gravitee will be responsible for all API Gateway functions (see Lucida Application Architecture for list of responsibilities by component type)
Implications: Zuul or other components playing the API Gateway functions will be replaced with Gravitee
2. API Gateway is responsible for management/configuration and access control enforcement of APIs (user attribute based)
Implications: API access management will NOT utilize User Service (currently used for UX Functional Entitlementment)
3. API Gateway will require "Access Token" for API calls, the Gateway will validate the token and get "user info" from IBM SV. Gateway will cache the "user-info".
4. API Gateway will be agnostic of the calling application, i.e., Gateway will not be specific to an app.
5. APIs will be STATELESS.
6. API end-points exposed via the Gateway will be known as "Outer APIs". The backend private service end-points will be known as "Inner APIs"
7. The Inner APIs will be secured and only be allowed be to called by the API Gateway.

USER EXPERIENCE

1. Micro Front End design pattern/framework
2. OIDC based authentication and authorization using IBM SV
3. Single-SPA
4. ECS: Do NOT build a separate front-end for Lucida. Enhance current code-base.
5. ECS: Prioratize look and feel changes over work-flow enhancement for phase 1.*****

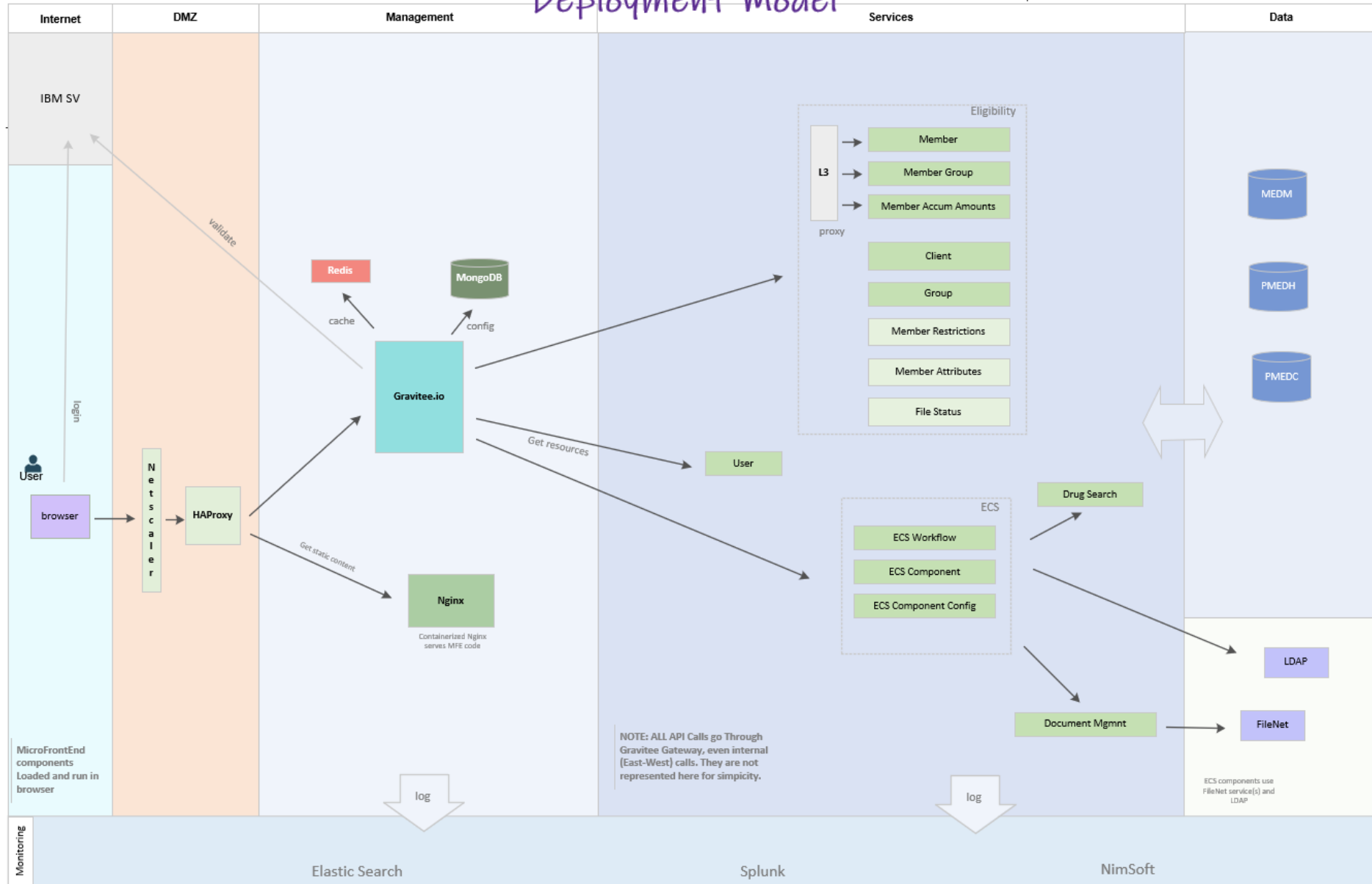
LUCIDA APPLICATION ARCHITECTURE

Deployment Model



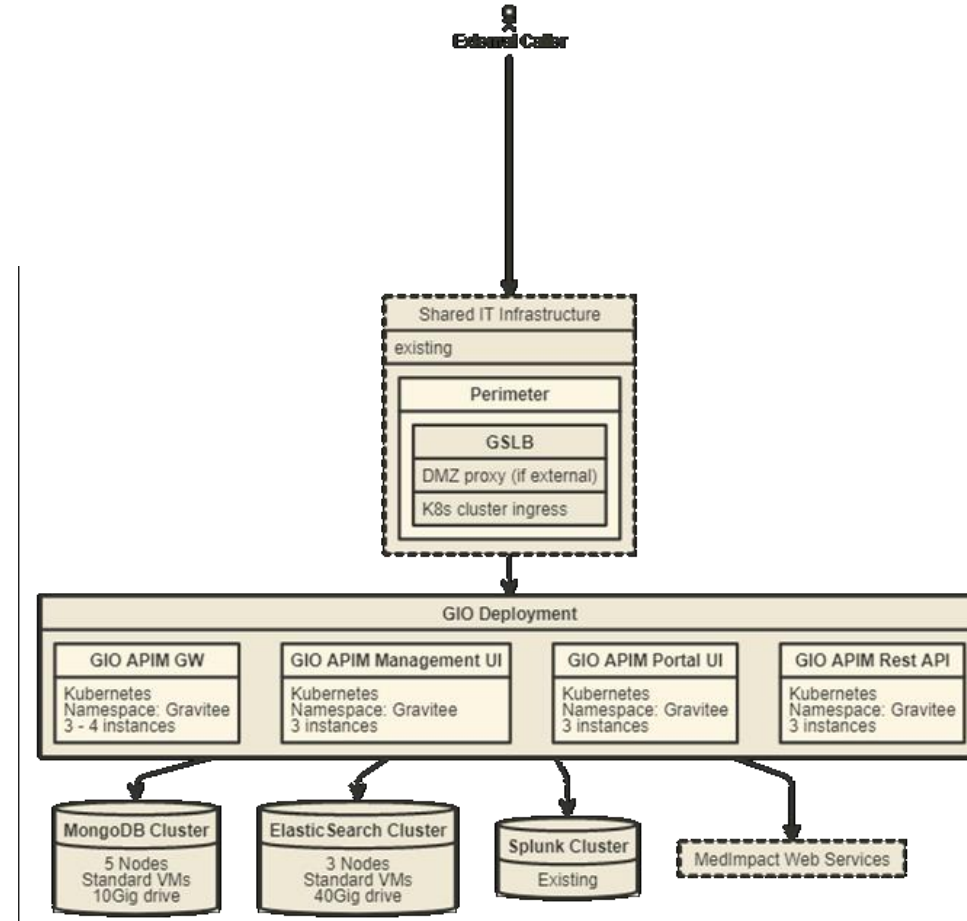
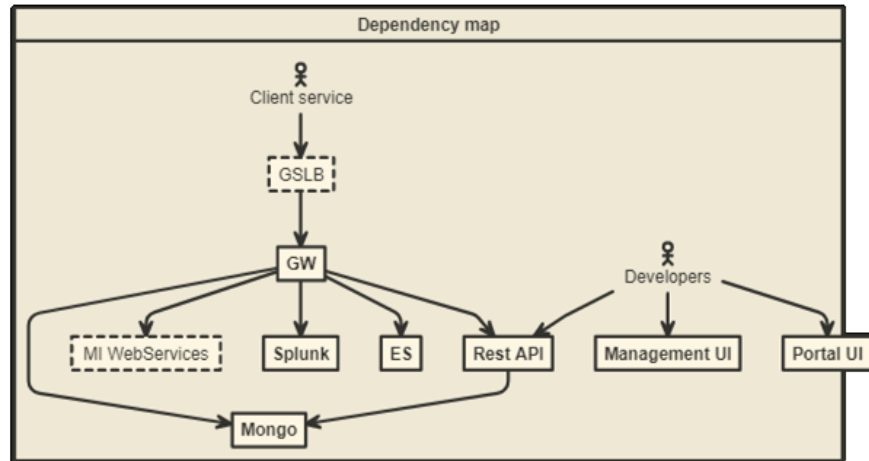
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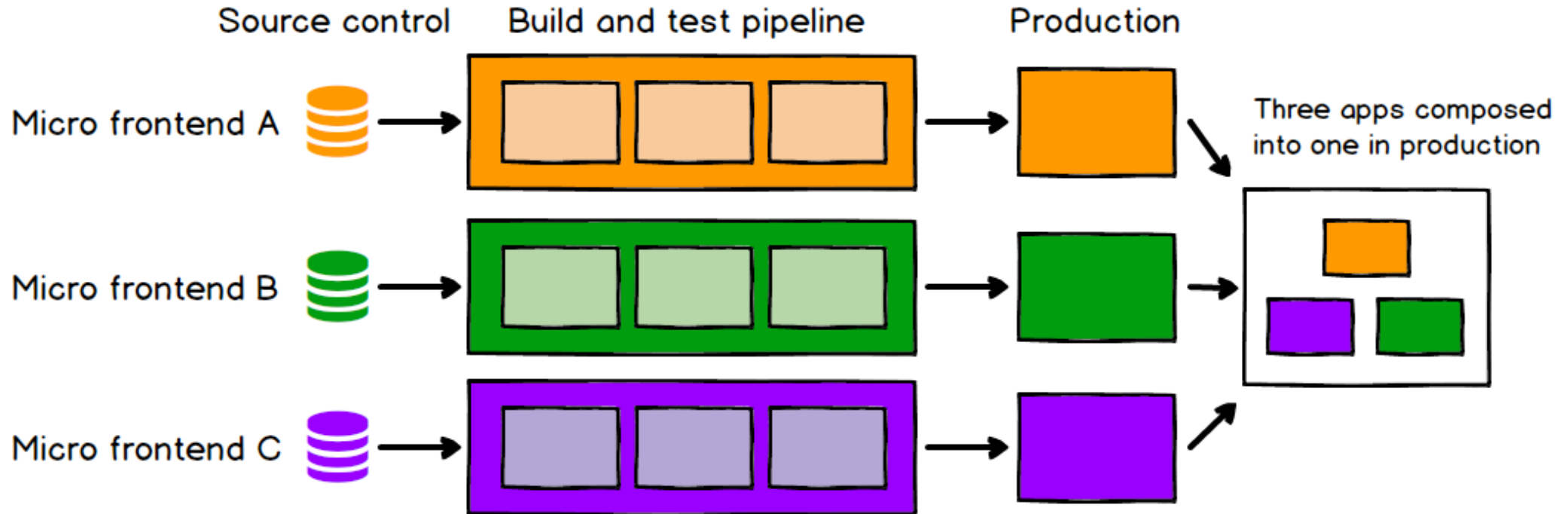
API Gateway (Gravitee) Deployment Model



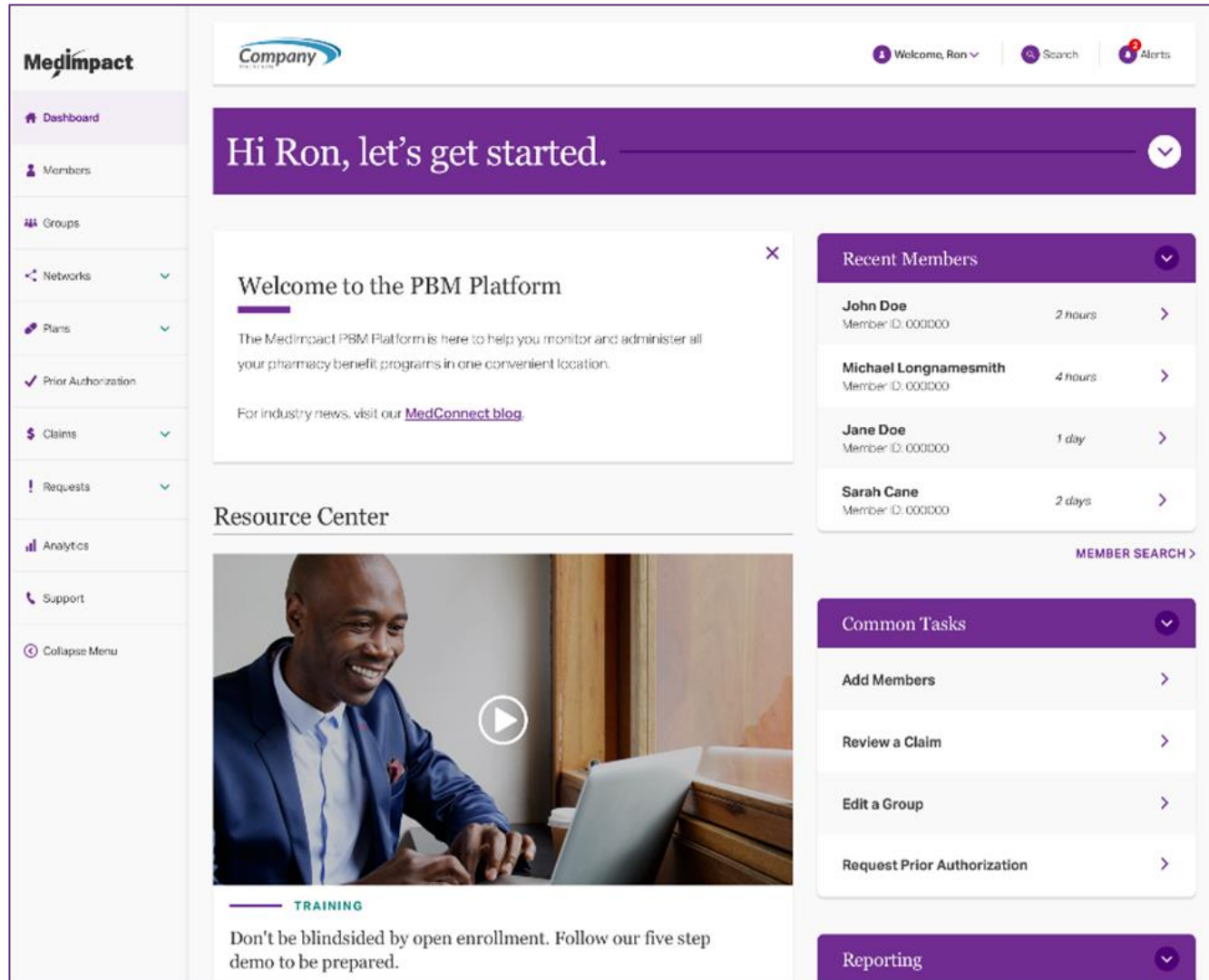
Appendix 2: Micro Front Ends (Single-SPA), API Gateway (Gravitee), and IBM Security Verify



Micro Front Ends



Micro Front Ends



Micro Frontends

Angular

Client-side Security

Persona Driven UX

Multiexperience

Different apps for different
personas and modalities

Omnichannel



LUCIDA APPLICATION ARCHITECTURE

API Gateway

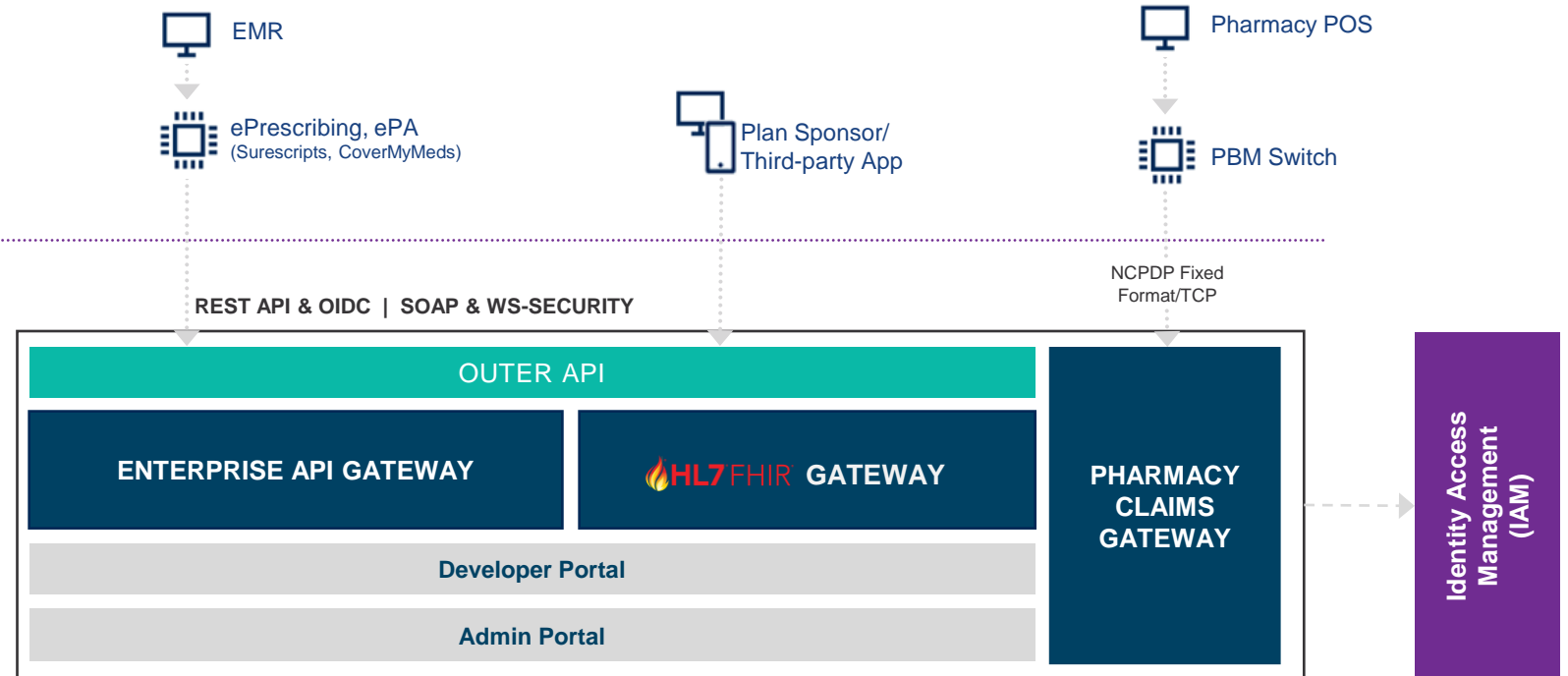
API Consumers

MULTIEXPERIENCE

- Different apps for different personas and modalities

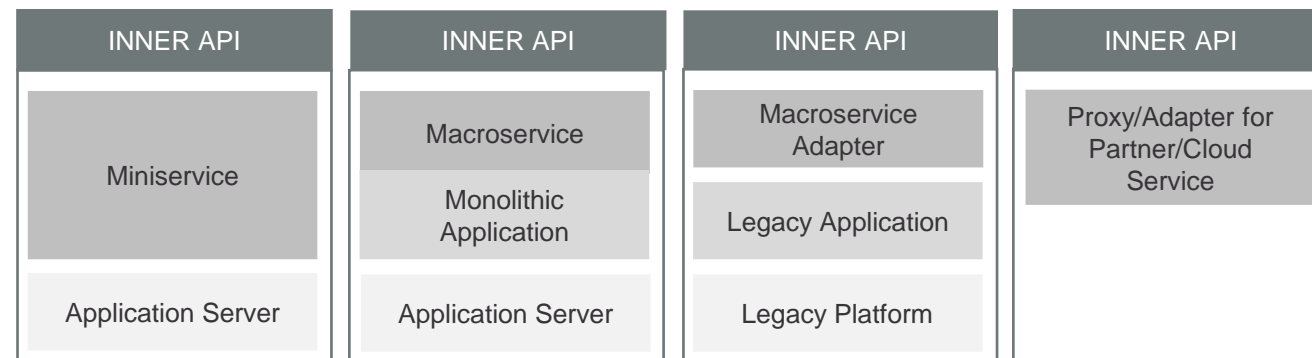
API MANAGEMENT LAYER

- OIDC-based end-user Access Control
- Security & Monitoring
- Traffic Management
- Transformation
- Data Masking
- Caching



MULTIGRAINED SERVICES

- Macro/Mini/Micro
- New/Old
- On-premises/Cloud
- Internal/External



LUCIDA APPLICATION ARCHITECTURE

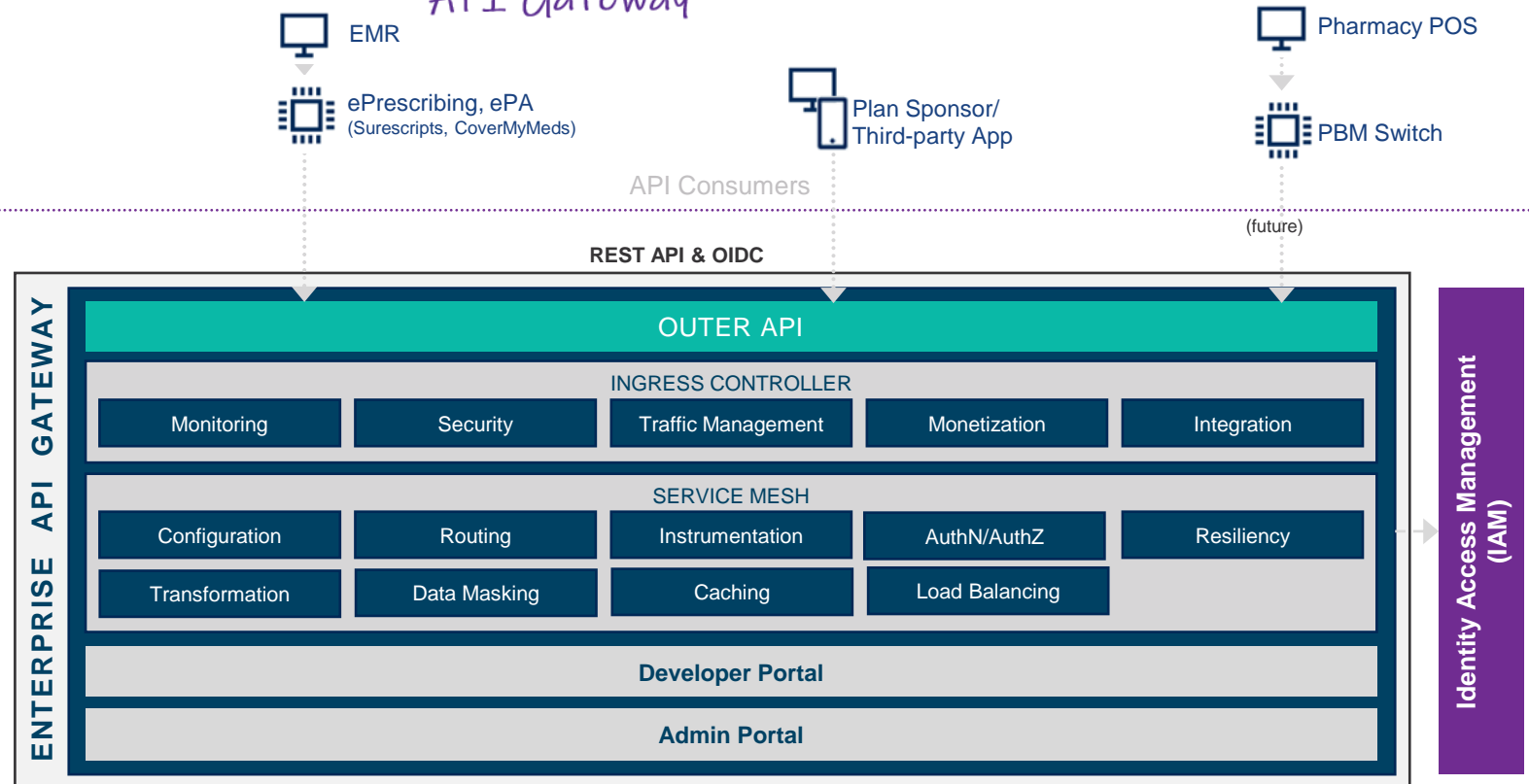
API Gateway

MULTIEXPERIENCE

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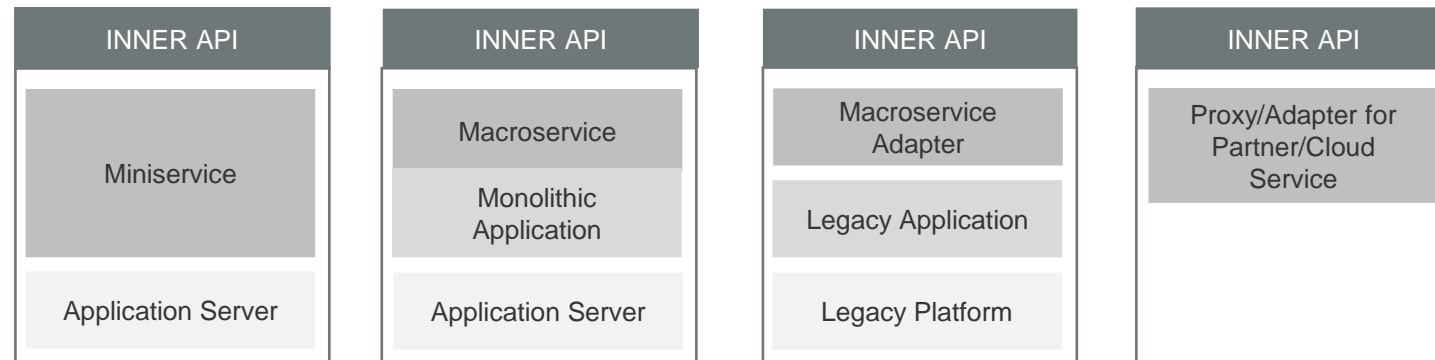
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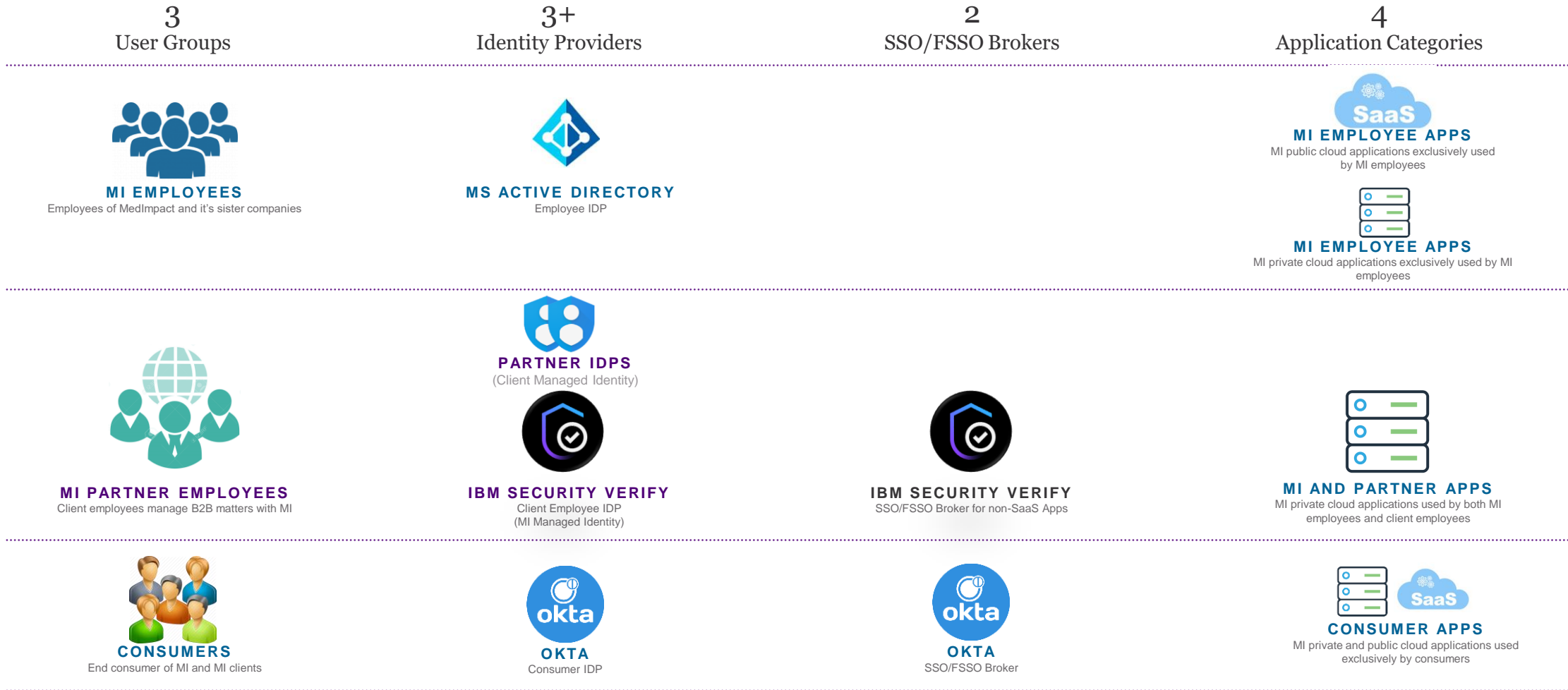
MULTIGRAINED SERVICES

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LUCIDA APPLICATION ARCHITECTURE

Identity and Access Management



- ✓ Standard-based (OIDC/SAML) SSO and FSSO capability
- ✓ Multi-factor and scenario-driven authentication model
- ✓ Layered access control*

Appendix 3: *Lucida Phase 2 Roadmap*



LUCIDA APPLICATION ARCHITECTURE

