Facilitating Integration:

WebSub as an Enabler

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Ballerina

Swan Lake

WebSub as an Enabler: Facilitating Integration

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In this presentation

The problem

The solution: WebSub

The benefits of Ballerina WebSub hub

Ballerina/WSO2 and MOSIP Connection and the problem that brought us together

WSO2 office in Sri Lanka

Bakerina

MOSIP team was putting together a large puzzle in the form of a distributed system

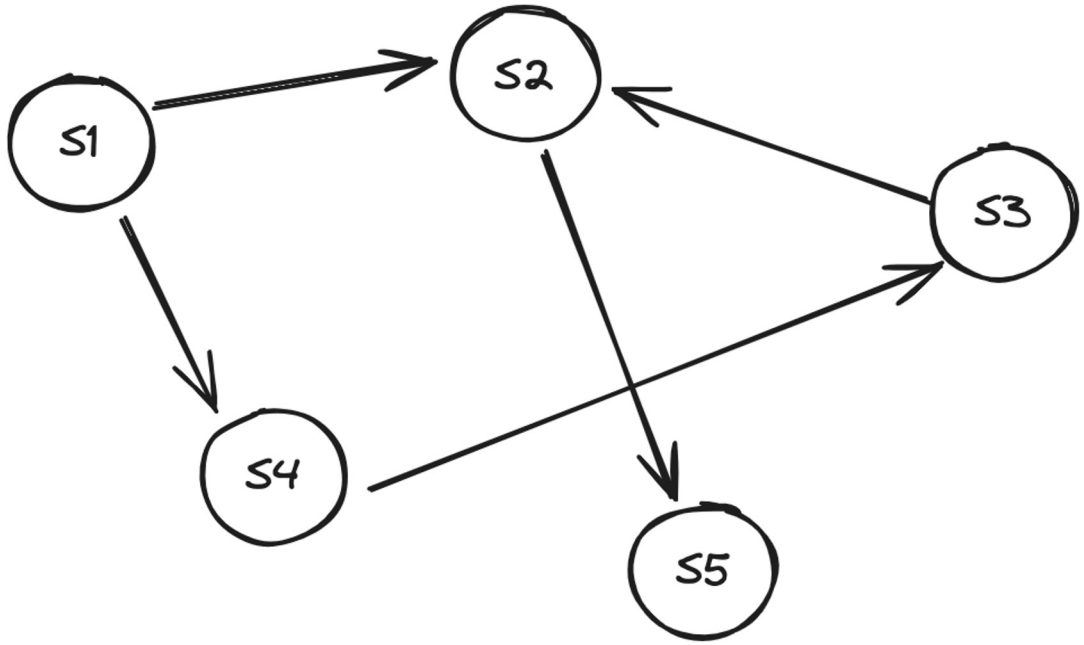
Need a way to integrate external users to their system over the internet

Ballerina team: A piece of the puzzle

Fun fact: Both teams haven't met each other in person until now, until we did 3 million requests per day!

A distributed systems problem

What is a distributed system?

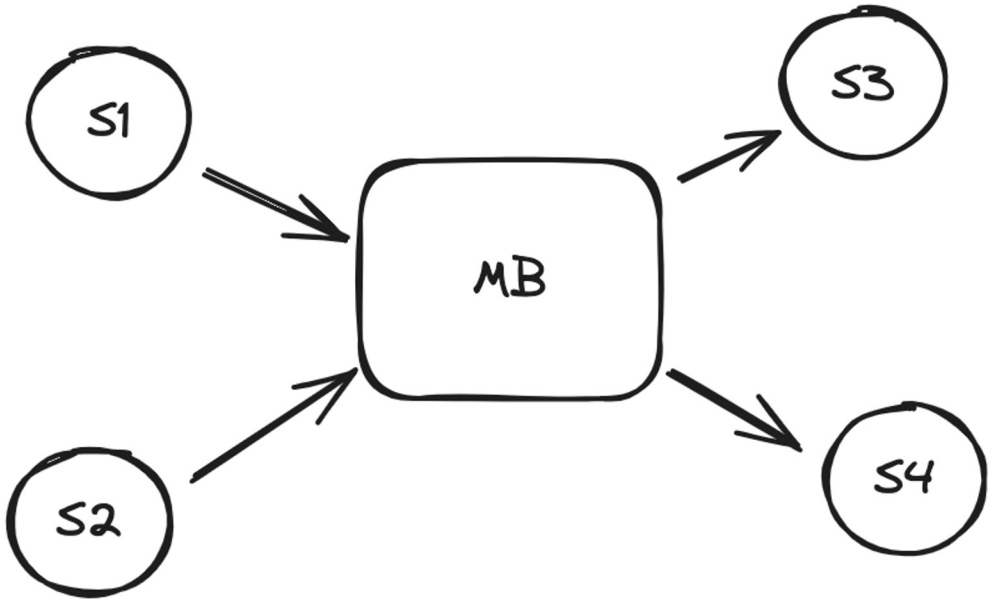


Two ways of organizing servers

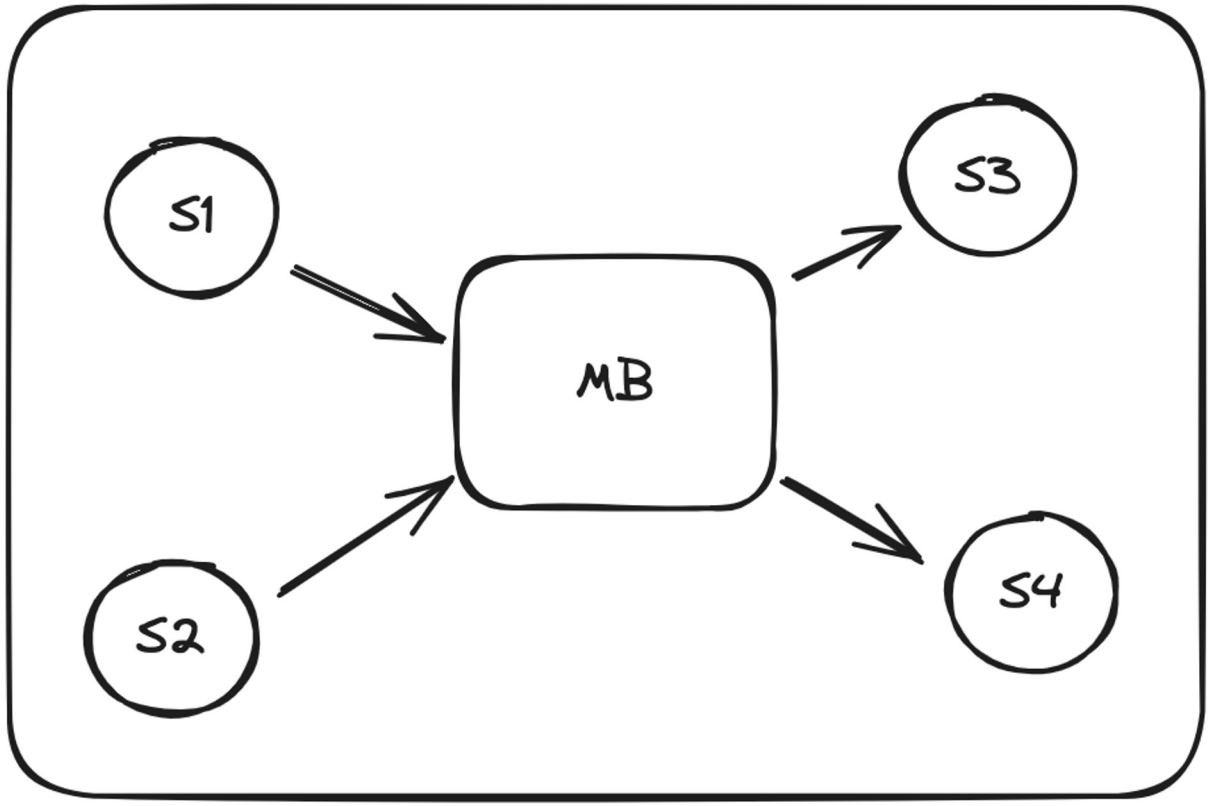
- Request Response Architecture
- Event Driven Architecture (EDA)

Request Response Architecture

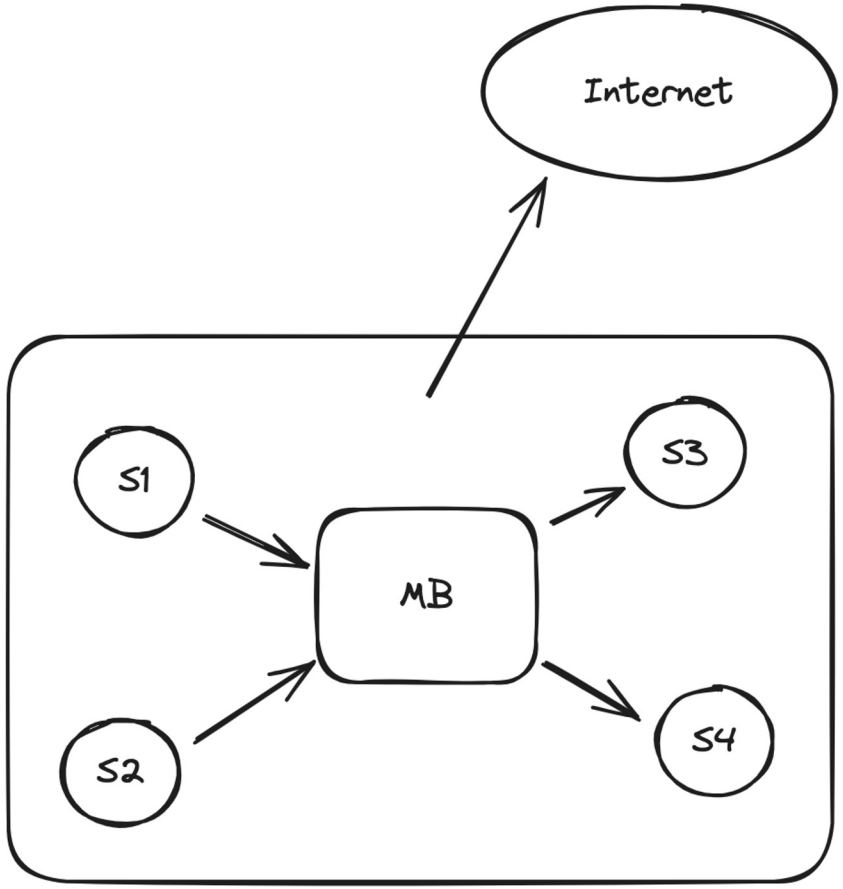
Event Driven Architecture (EDA)



The problem with EDA



MOSIP wanted to go beyond



Ballerina

The internet/World Wide Web (WWW)

Building blocks of WWW

- Hyperlinks
- HTTP
- URL

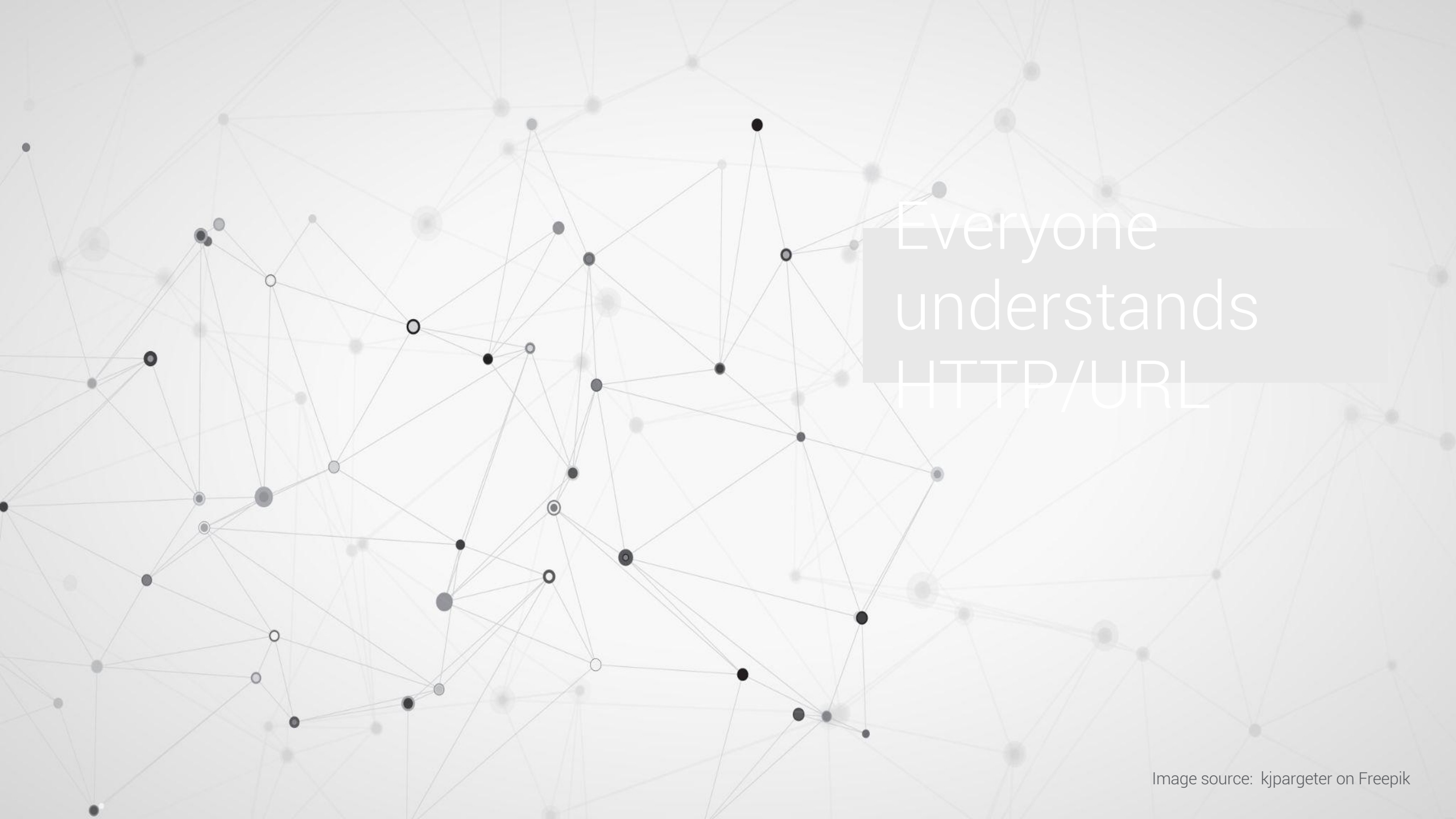


Image source: kjpargeter on Freepik

How do you extend your EDA over the internet?

Ballerina

The solution: WebSub

PubSubHubbub

What is WebSub?

- Open Protocol for distributed pub/sub communication
- Based on HTTP
- Main Roles:
  - Publisher
  - Subscriber
  - Hub
- Specification: https://www.w3.org/TR/websub/

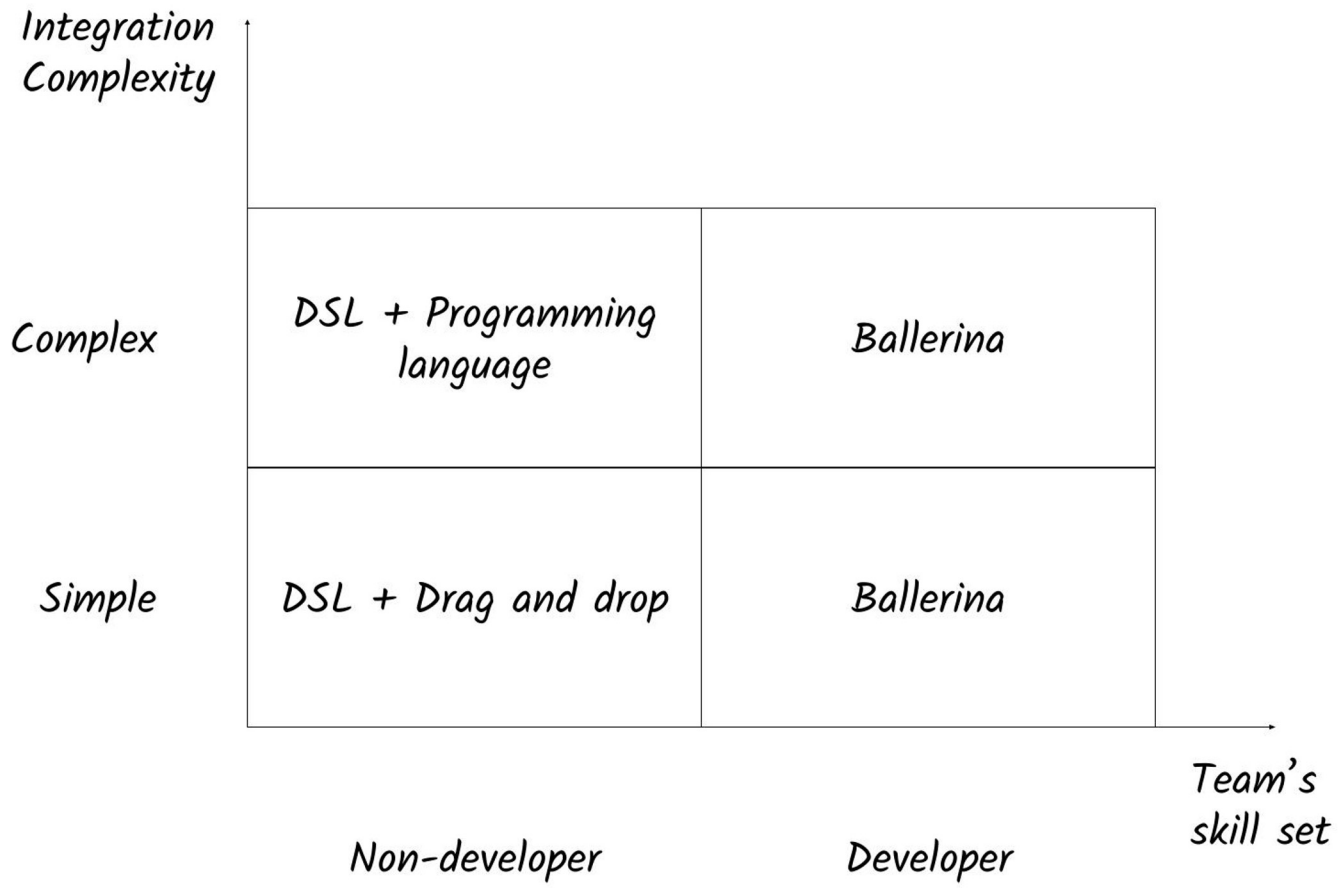
Ballerina

Swan Lake

Introduction to Ballerina

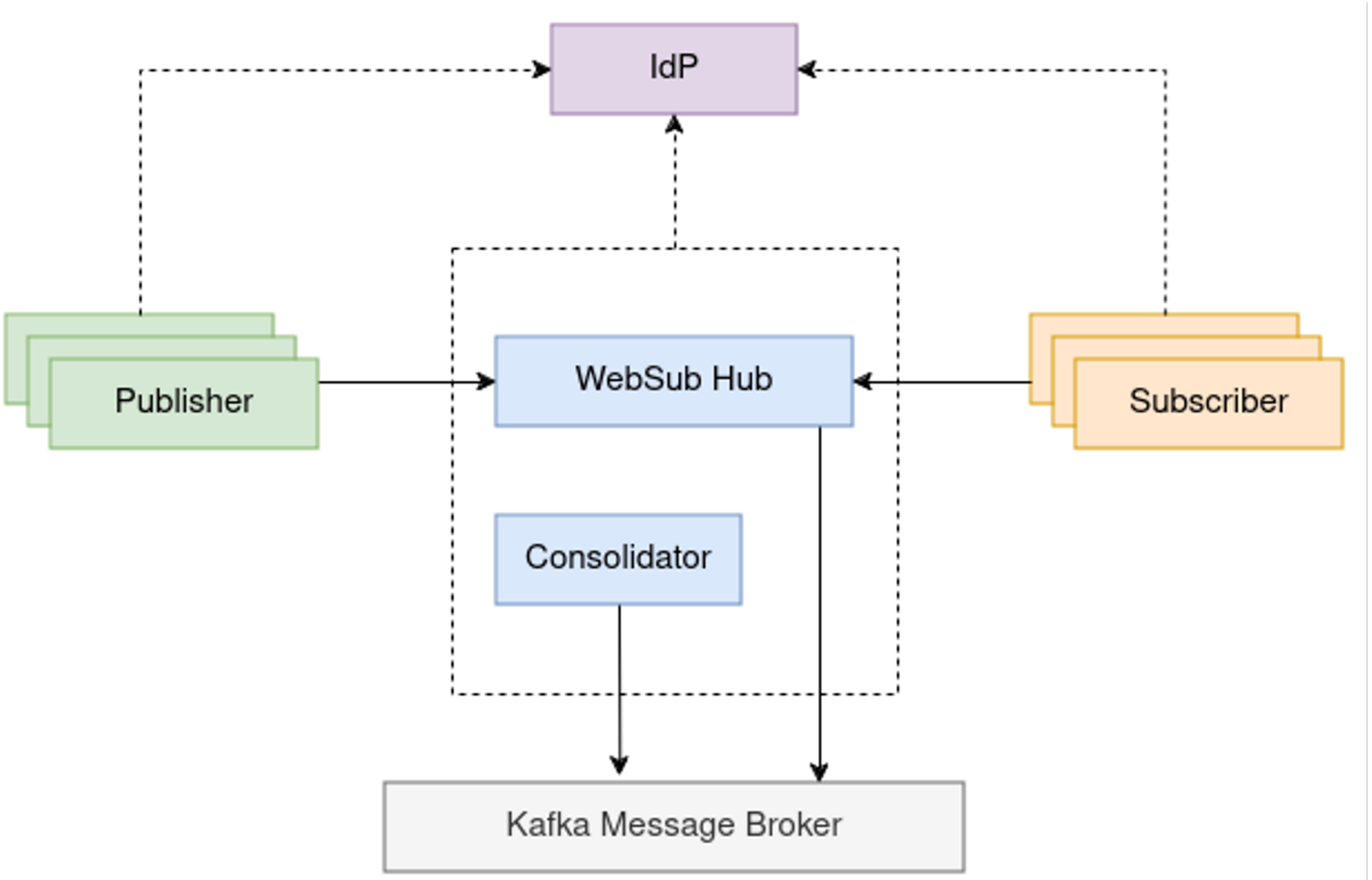
- Open source, cloud-native programming language optimized for integration
- Developed by WSO2 since 2016 and first released in February 2022
- Rich ecosystem of network protocols, data formats, and connectors
- Edit/view source code textually or graphically as sequence diagrams and flowcharts
- Built-in, easy and efficient concurrency with sequence diagrams and safety primitives

Introduction to Ballerina



Ballerina WebSub Hub

Ballerina WebSub Hub architecture



Ballerina WebSub Hub architecture - WebSub Hub

- Standard WebSub Hub implementation
- Provides an HTTP API

Ballerina WebSub Hub architecture - Consolidator

- Responsible for managing the overall state
- Uses Event Sourcing

Ballerina WebSub Hub architecture - Apache Kafka

Persistence storage of the system

Ballerina WebSub Hub architecture - Producers

- A simple HTTP client can be used as a producer
- Can be written using any language or framework

Ballerina WebSub Hub architecture - Subscribers

- An HTTP Webhook
- Ballerina has a tailor-made WebSub subscriber

Ballerina WebSub Hub - QoS

Security

- Standard SSL/TLS communication
- External IdP to manage Authn and Authz
- OAuth2 with JWT as the Authz protocol

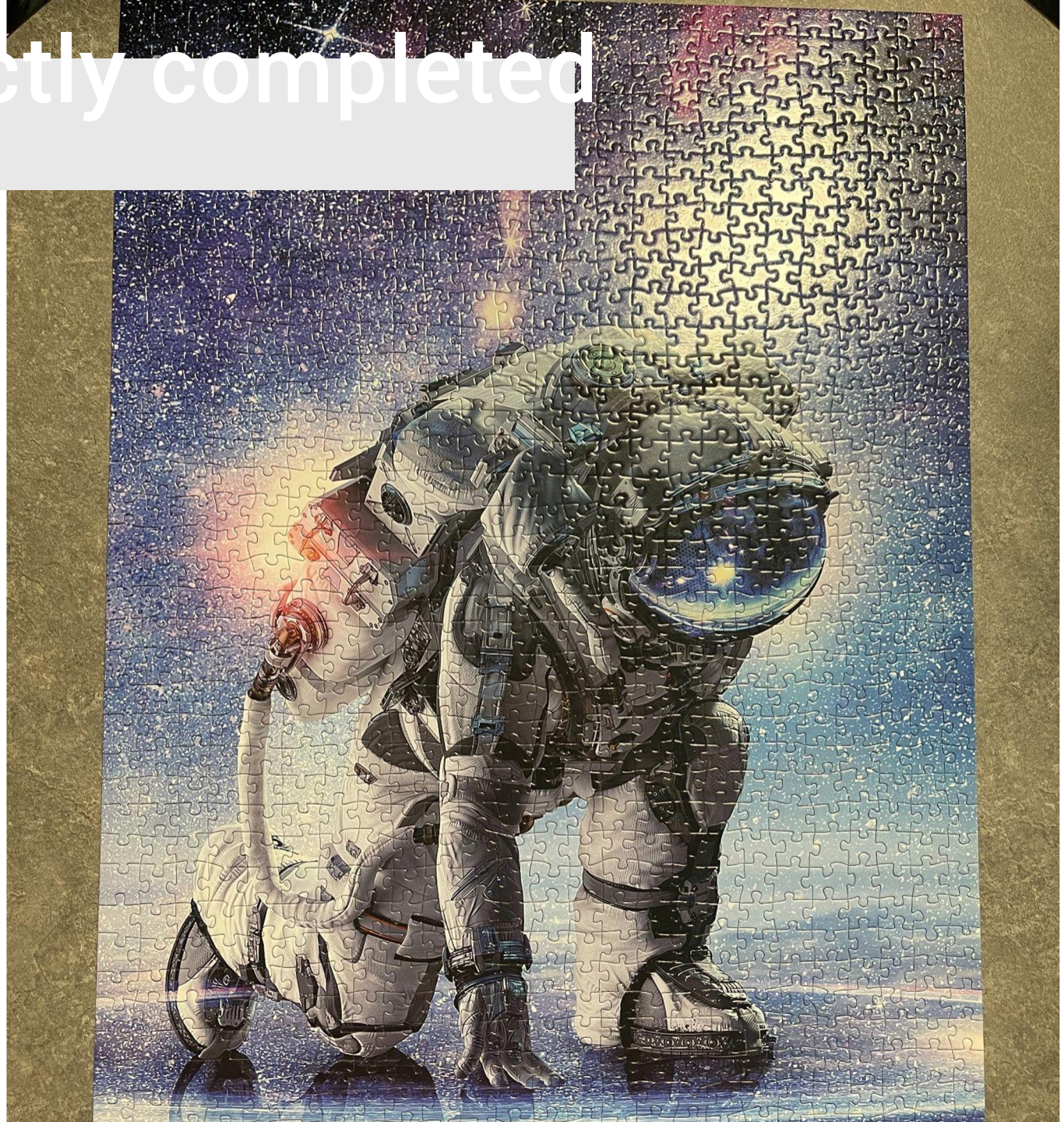
Scalability

- Workload is proportional to the # of subscribers
- Subscribers are equally distributed among nodes

Resilience

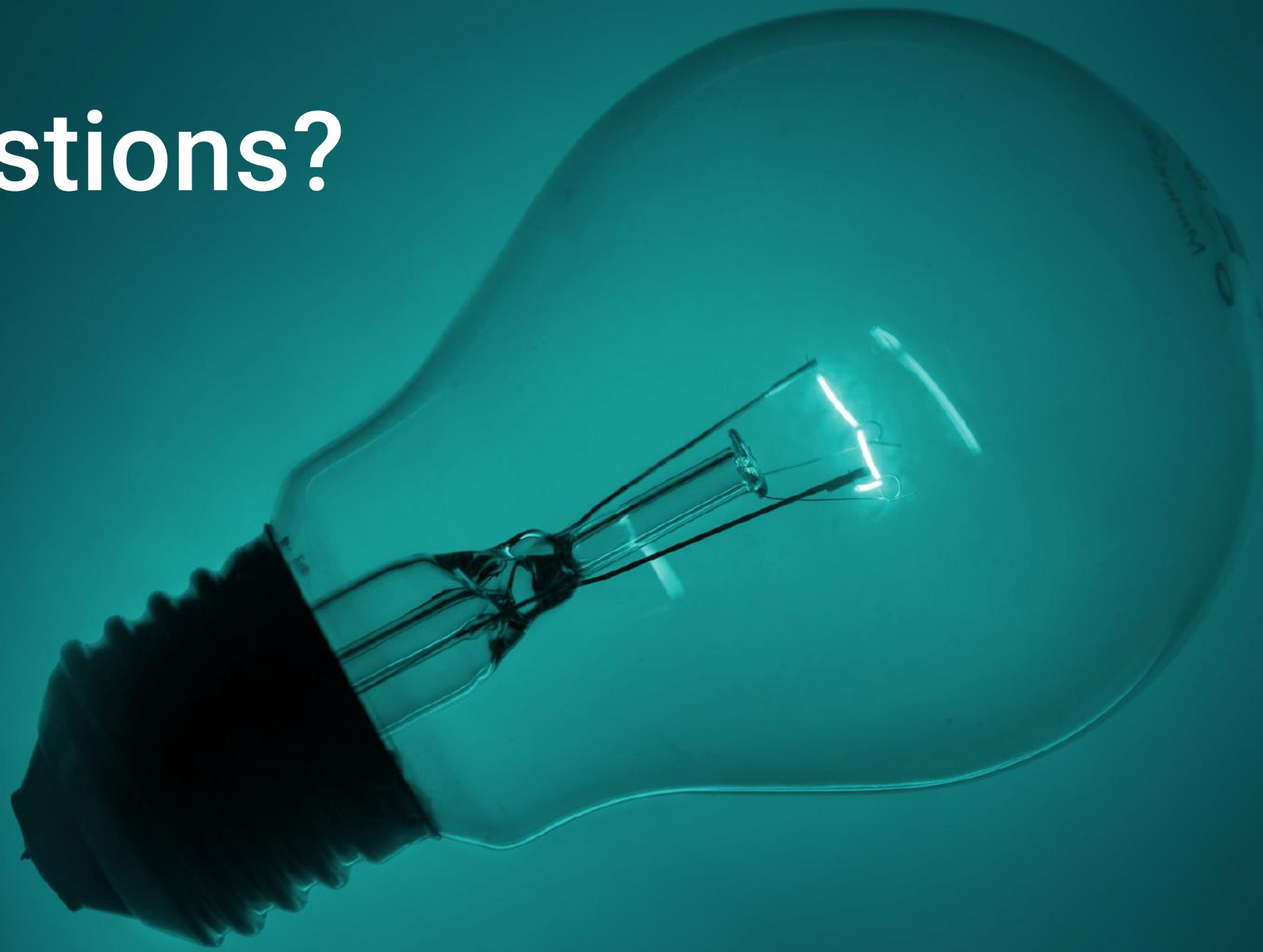
- Recover from unexpected system breakdowns
- Retry message delivery on transient failures
- Resume message delivery after non-transient failures

A perfectly completed puzzle



Ballerina

Questions?



Ballerina

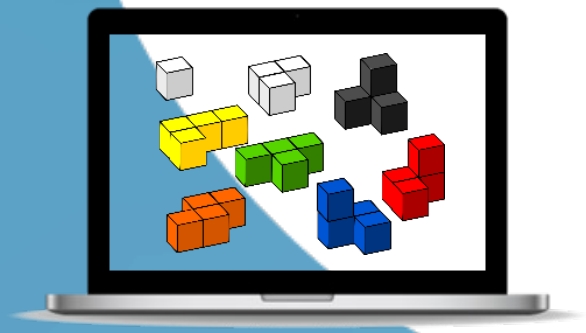
Thank you!

If you have any further questions, please email **contact@ballerina.io** or raise them in the **Ballerina Discord server.**

Ballerina

ID System Integration and Interoperability with MOSIP

By: Khaled SAMIR - ID Architect



MOSIP Connect – Addis Ababa
7th of March 2024

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1 INTRODUCTION

OVERVIEW OF TODAY'S TALK

- SPEAKER SELF-INTRODUCTION
- ACHIEVED PROJECTS
- INTEGRATION WITH MOSIP
- INTEROPERABILITY WITH MOSIP
- JOURNEY AND CHALLENGES

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2

Integration Challenges

Common Challenges

DATA SECURITY

Sensitive data are stored in the ID systems including biometrics which requires a high level of security not only where is saved but also during processing and sharing.

VARYING STANDERS

Systems have different interfaces adapted and different technologies, which makes it challenging to interface efficiently

COST OF IMPLEMENTATION

Working with nonflexible systems take lots of efforts to implement as well as to integrate with external systems which impacts the decision to use these systems

TIME FOR ADAPTATION & SCALABILITY

Fast implementation and customization are something crucial for ID systems as the regulation changes, also many stockholders are involved.

DATA SHARING

Easy data sharing is one of the most important to consider, how to secure its access and make is as easy as possible for seamless usage.

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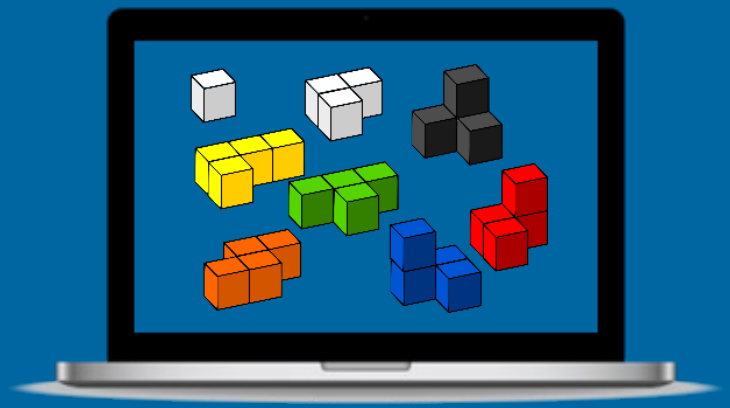
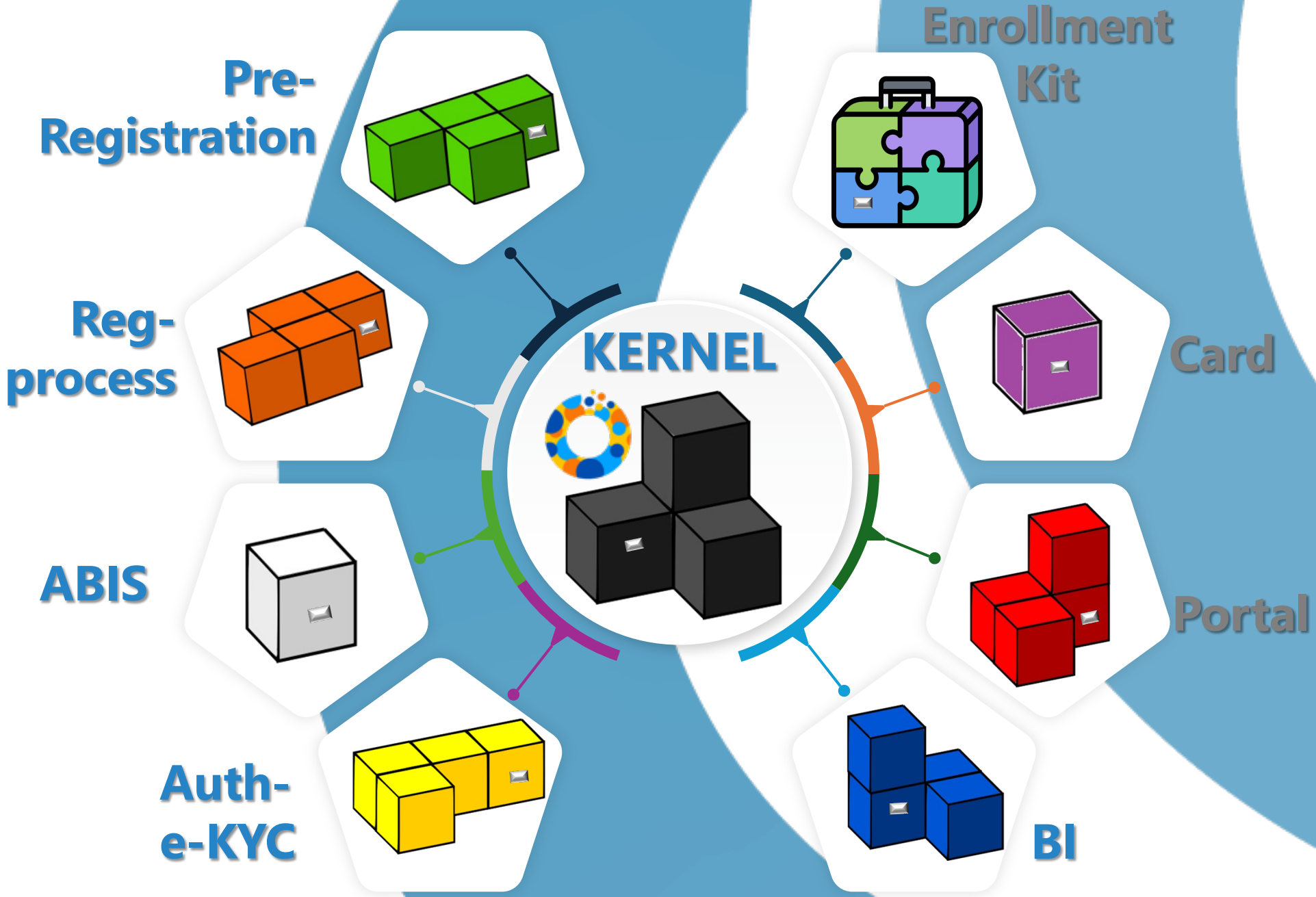
PUT PIECES TOGETHER





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ENROLLMENT KIT

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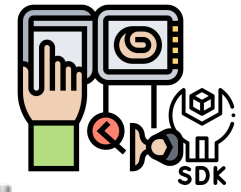
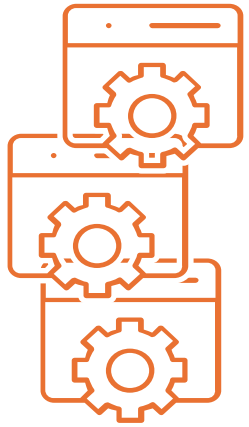
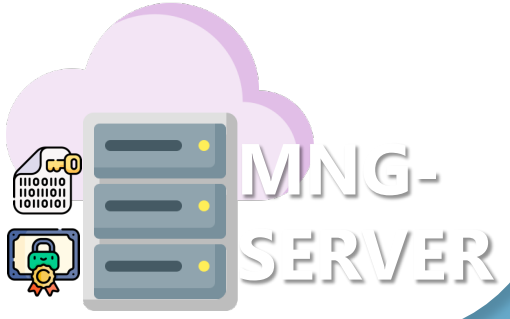
REGISTRATION KIT INTEGRATED



- MOSIP
- Standard
- SBI interface

SBIs





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PRE-REGISTRATION

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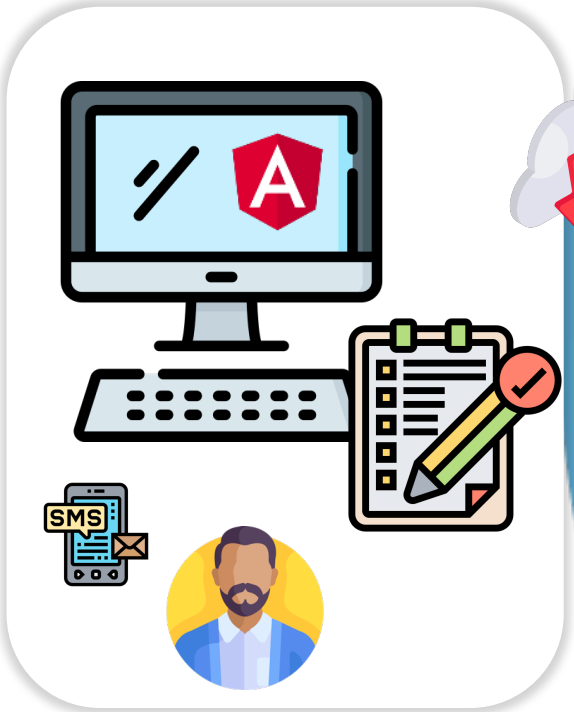
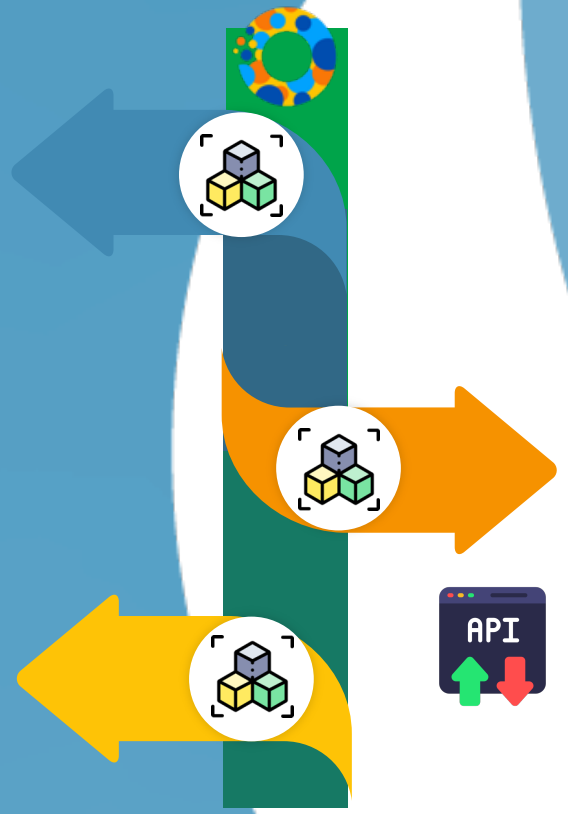
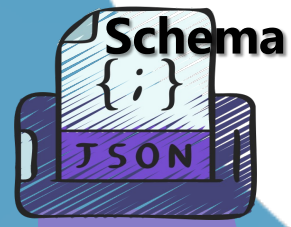
PRE-REGISTRATION INTERFACES







FILL THE FORM OF PRE-REGISTRATION

VALID

USE IT DURING ENROLLMENT

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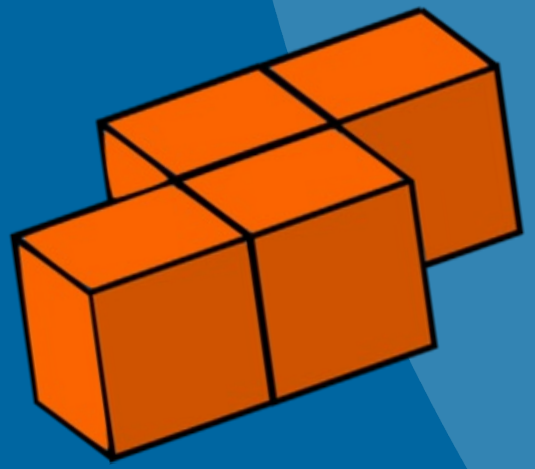

REGISTRATION PROCESS

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REGISTRATION PROCESS

multiple integration types

Messaging

Standard interface msg & use AMQ to communicate with ABIS

Bio SDK

Interfacee available to integrate any Biometric SDK

Custom Stages

Seamlessly add stages & add your custom code

Packet

ZIP

kafka

SMS | Email

Standard SMTP & interface ready to adapt for SMS provider

HSM

Integrated using PKCS11 standard interface

Object Store

Using S3 possible to integrate with any object store

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ABIS

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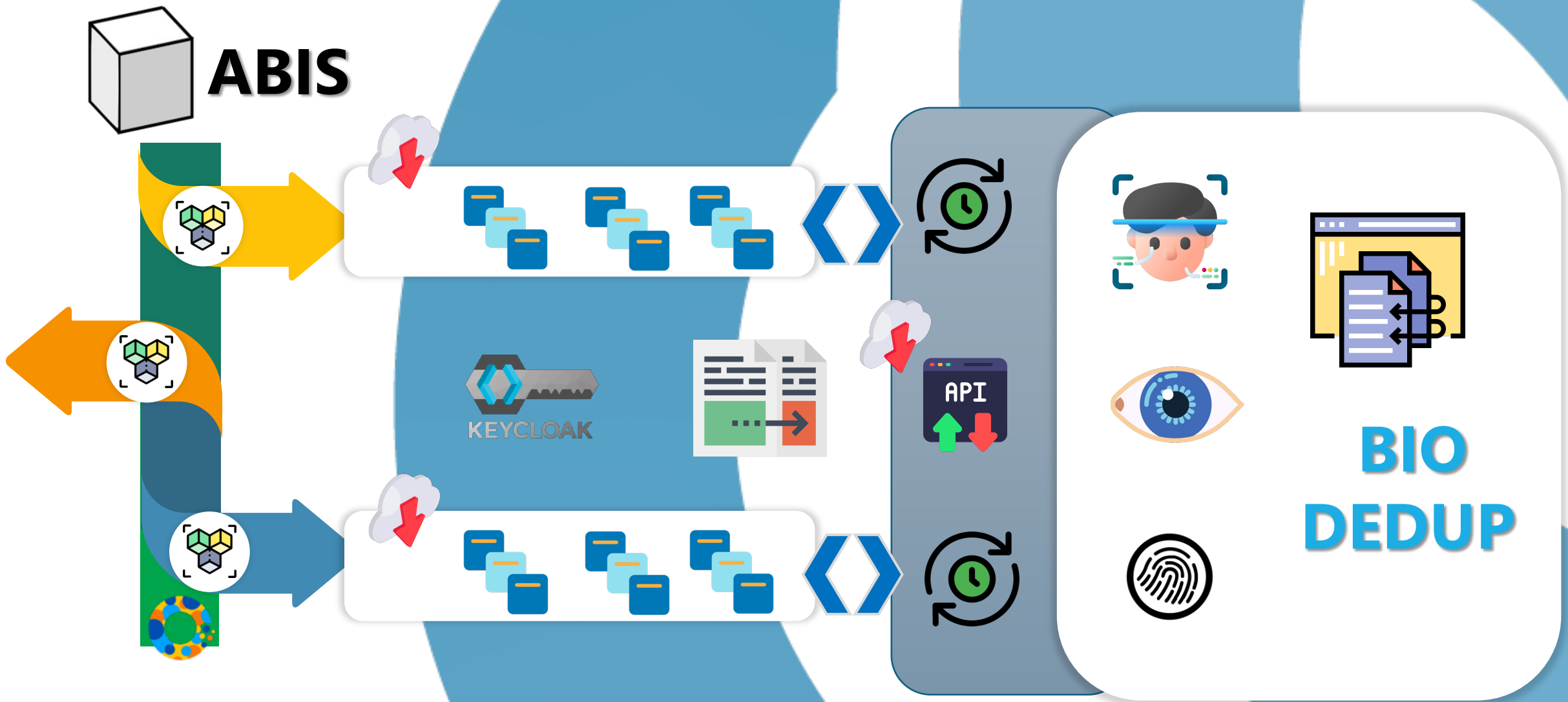

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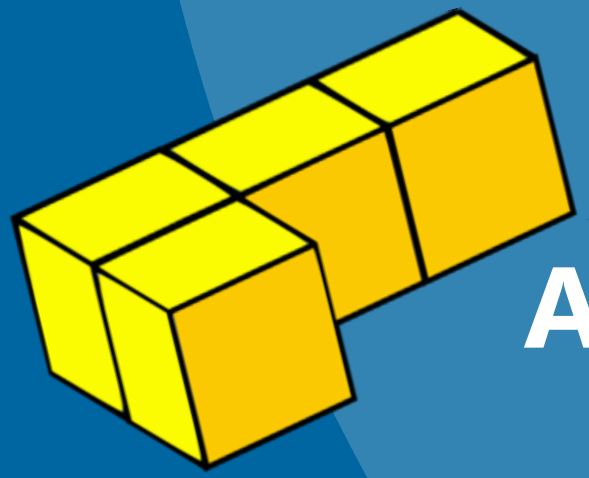

AUTHENTICATION | E-KYC

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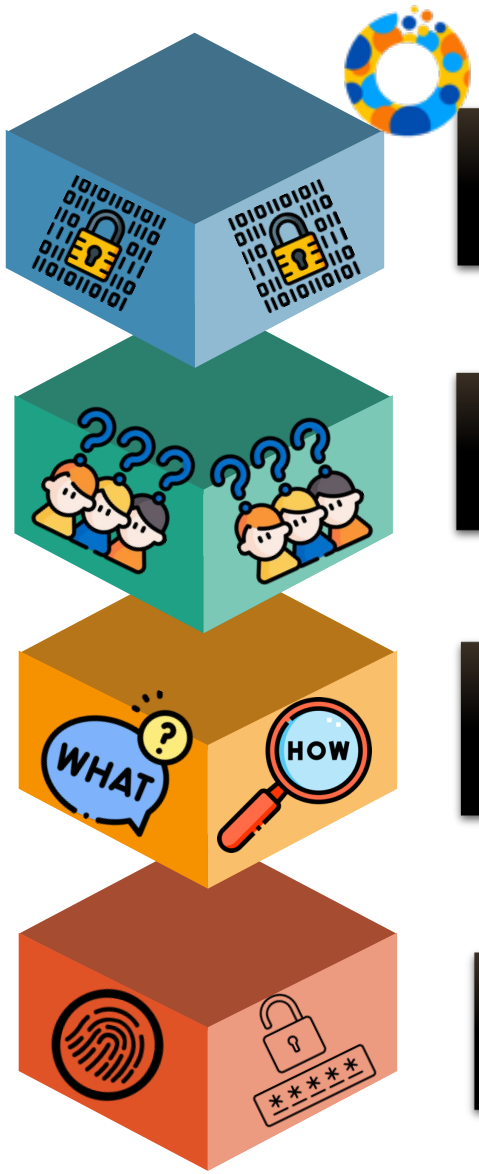
CONTROLLED AUTH & E-KYC

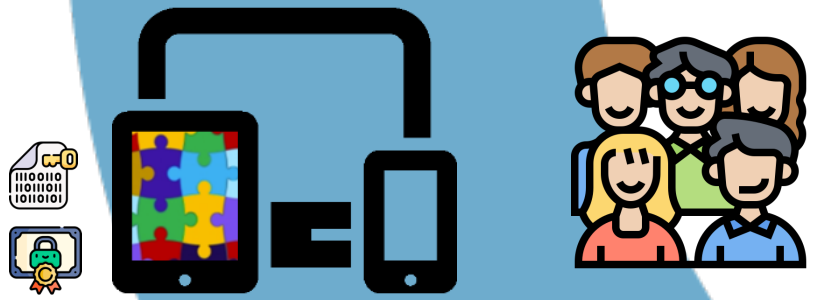


DATA ENCRYPTION

WHO IS ACCESSING

ACCESS WHAT & HOW

CHALLENGE TO ACCESS



- SEND DATA AFTER PREPARATION & ENCRYPTION
- VERIFY SOURCE LICENCE & CERTIFICATE
- DECRYPT THE REQUEST & PROCESS IT
- VERIFY THE REQUEST & ACCESS LEVEL
- RETURN E-KYC IF CHALLENGE PASSED

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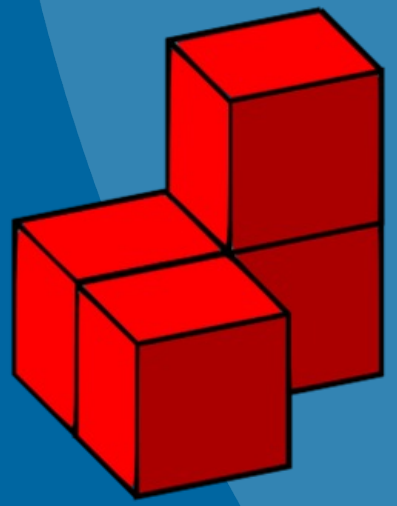

PORTAL | MOBILE APP

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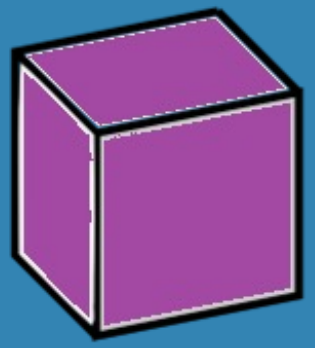

CARD

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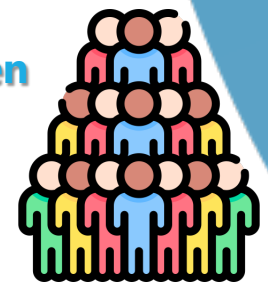
PRINTING & VERIFIED DELIVERY

PRINTING SERVICE

DELIVERY APP

- Scan QR using the App
- Bio Auth the citizen
- Deliver the card

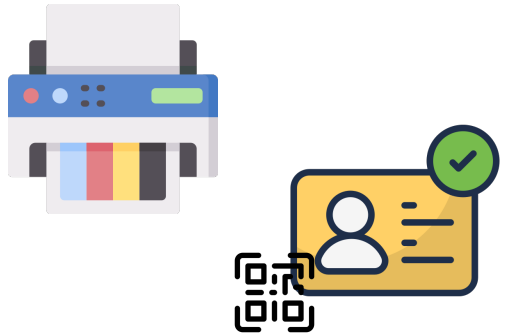


Print Request

API

PRINTING SOLUTION

API



- Validate Printing Order
- Print & Check Card
- Notify As Card Is Ready

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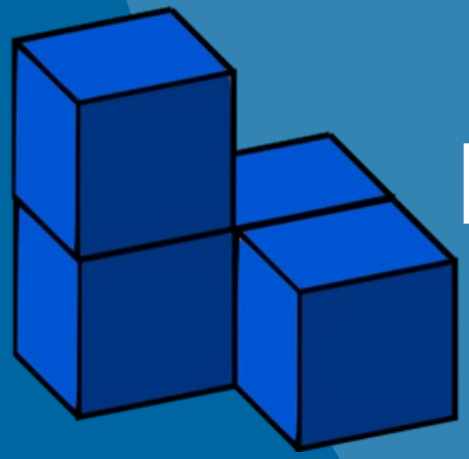

BUSINESS INTELLIGENCE

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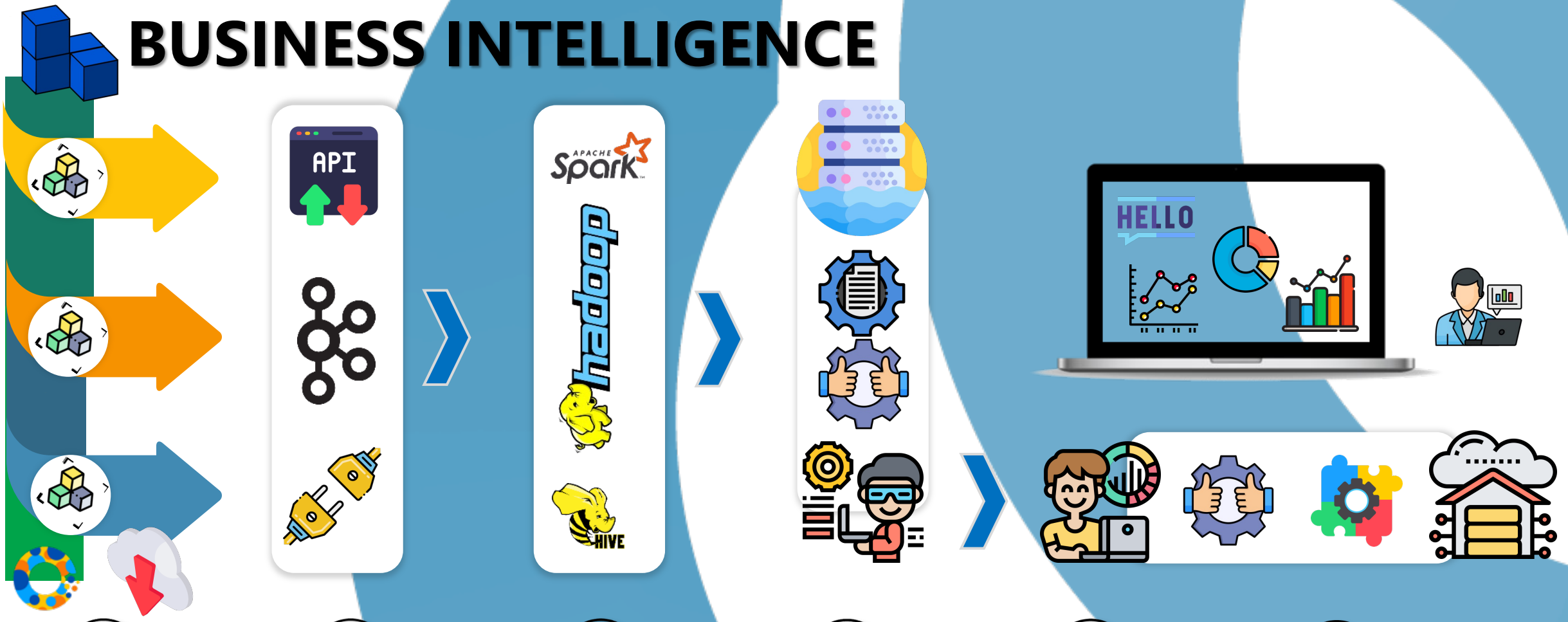
BUSINESS INTELLIGENCE



Identification of Production data sources

Setting up data flows

Data collection

Transformation

Data organization & history

Big Data Processing

Data Warehousing

Data Analysis

Generation of indicatorts

Reporting

Insight

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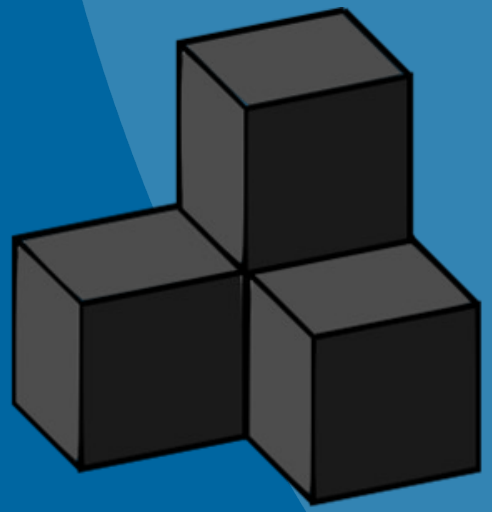

KERNEL

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MOSIP ENABLEMENT

APIs & Messaging systems

MOSIP give great number of APIs ready to use as well as interfaces with messaging systems

Data Share

Core important component that work on sharing data in secure & efficient way

Secure data

High level of data security in different level as well level of access

Standards

Defining standards on how to interface with different modules in MOSIP

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QUESTION ?

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THANK YOU

By: Khaled SAMIR - ID Architect

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