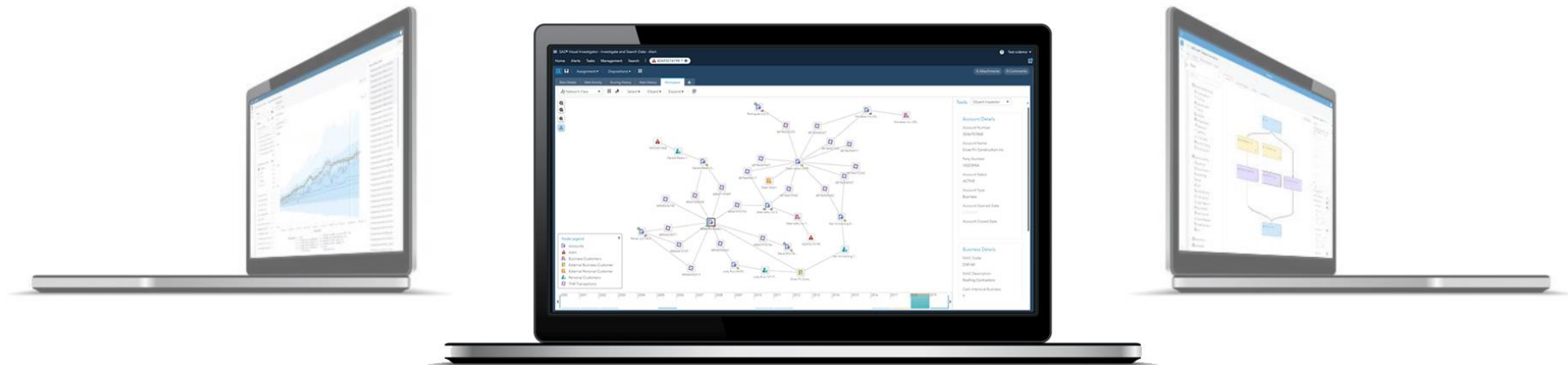




Analytical Services for Smarter Interoperability in a Microservices Architecture



SAS focus on Data Management, Data Quality and Machine Learning for Intelligent Decisioning

Agenda

- Conceptual Model
- Zoom on services integration
- Develop services
 - MACHINE LEARNING
 - DATA MANAGEMENT AND DATA QUALITY
 - DECISION AND INVESTIGATION SUPPORT
- Deploy services
- Software Architecture
- Microservices integration

Conceptual model

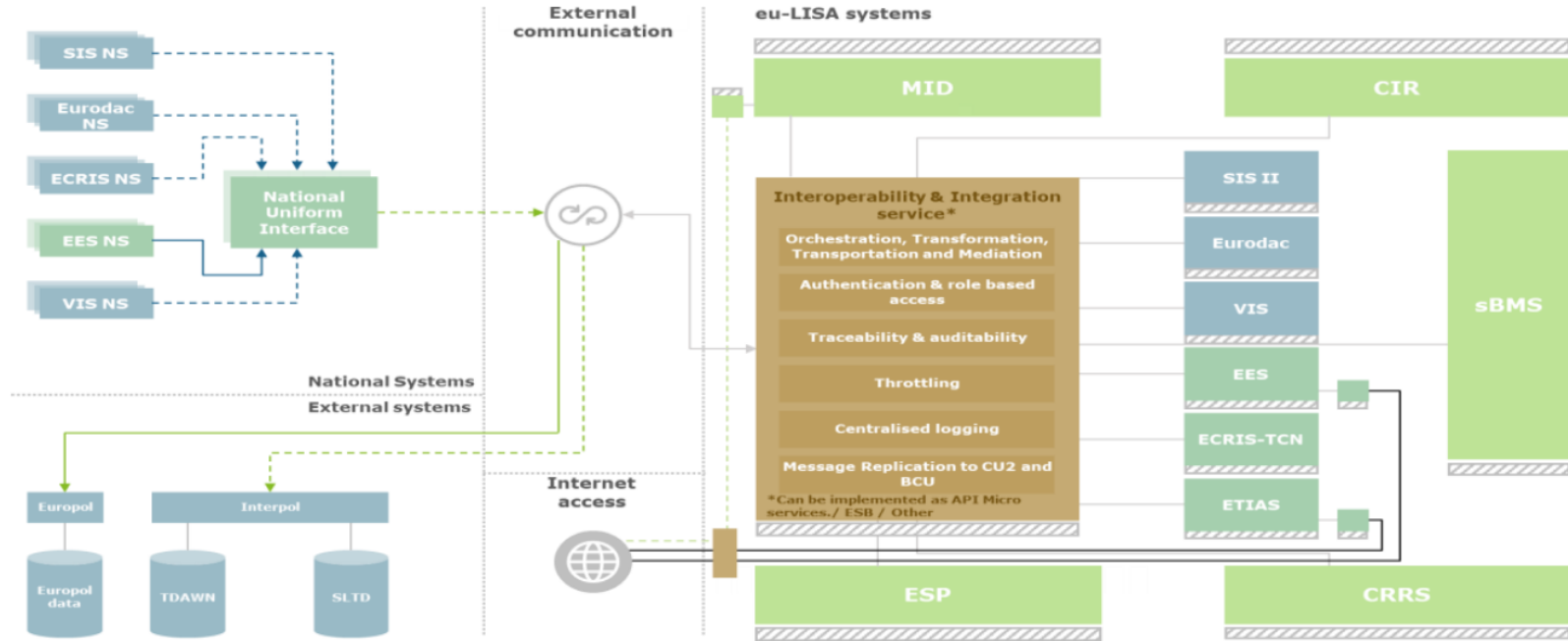
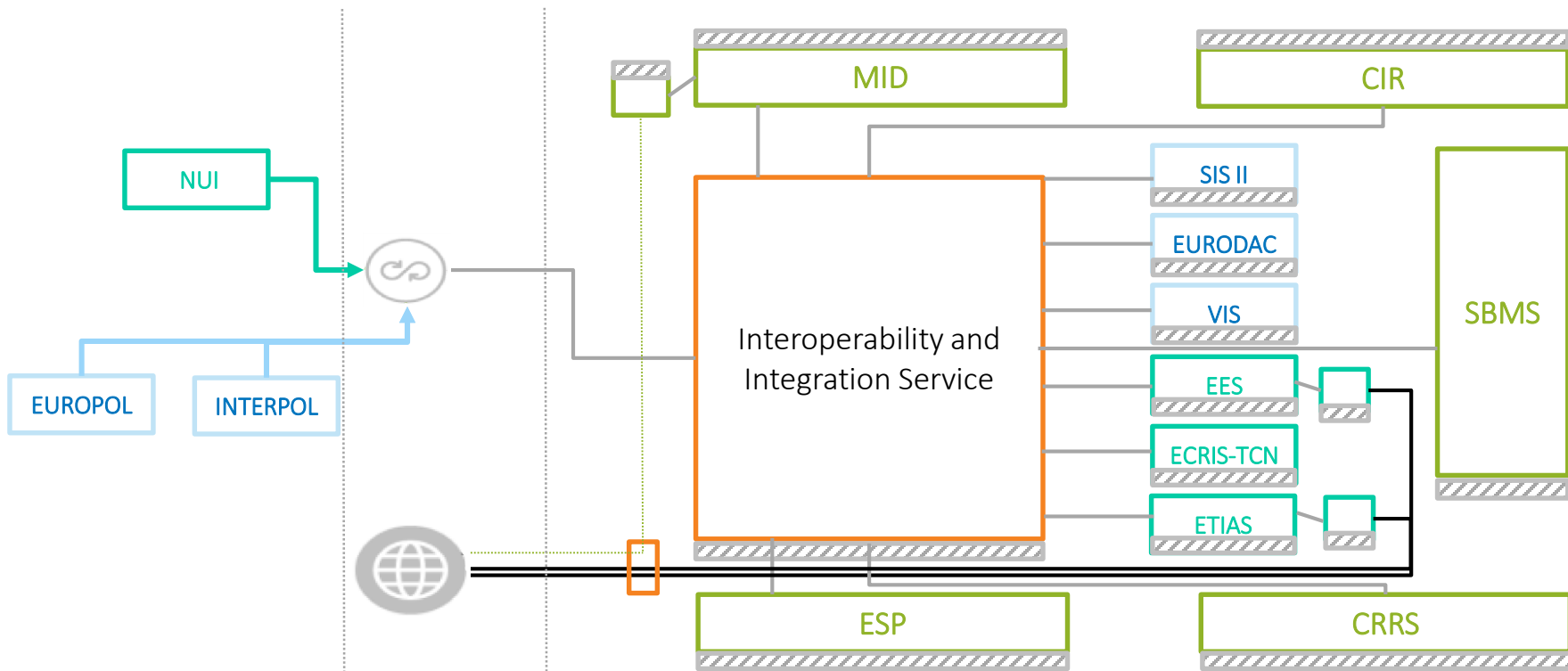
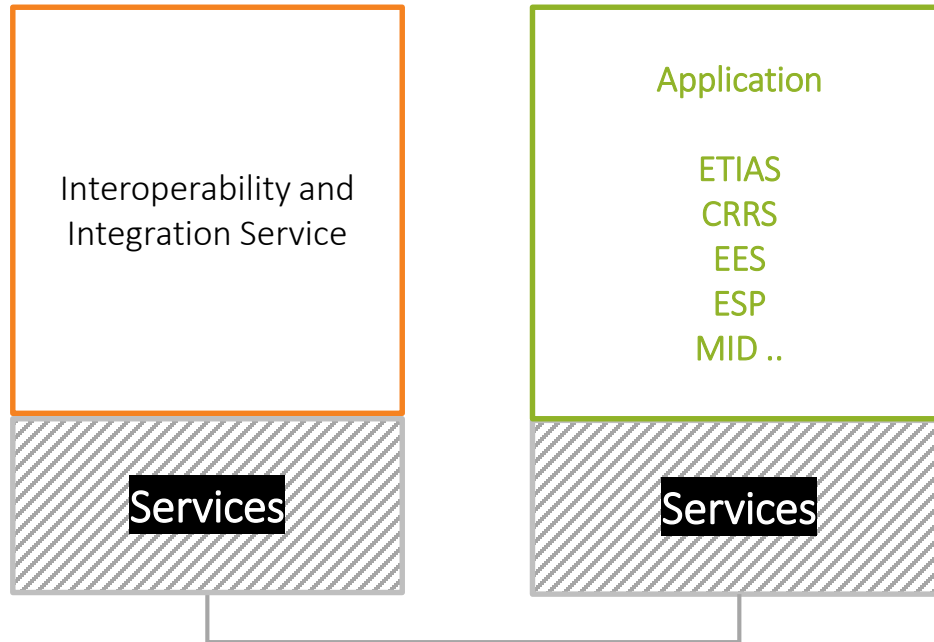
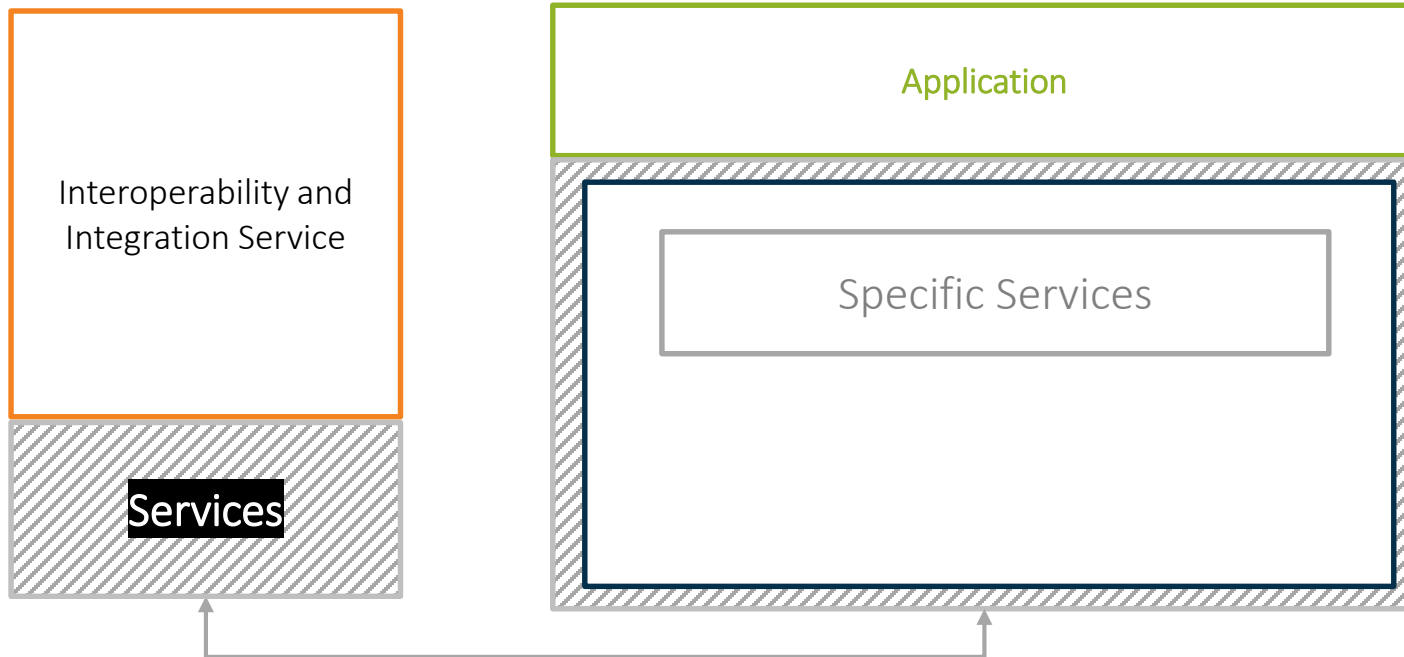


Figure 3. Conceptual model of the Integration option



- Conceptual Model
- **Zoom on services integration**
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MAS API Module:

MAS Module *inspectiondecision* loaded.

Package Declaration Inputs :

📦 Category :	<input type="text" value="Electronics"/>
📍 Entry Point :	<input type="text" value="Antwerp"/>
📍 Origin :	<input type="text" value="China"/>
📦 Fragile :	<input type="text" value="Yes"/>
💳 Payment Method :	<input type="text" value="Electronic check"/>
💰 Price :	<input type="text" value="250"/>
📦 Weight :	<input type="text" value="100"/>
📦 Volume :	<input type="text" value="1"/>

The package has a high probability to be : **SUSPICIOUS**

Suspiciousness probability : 0.7352608654961595

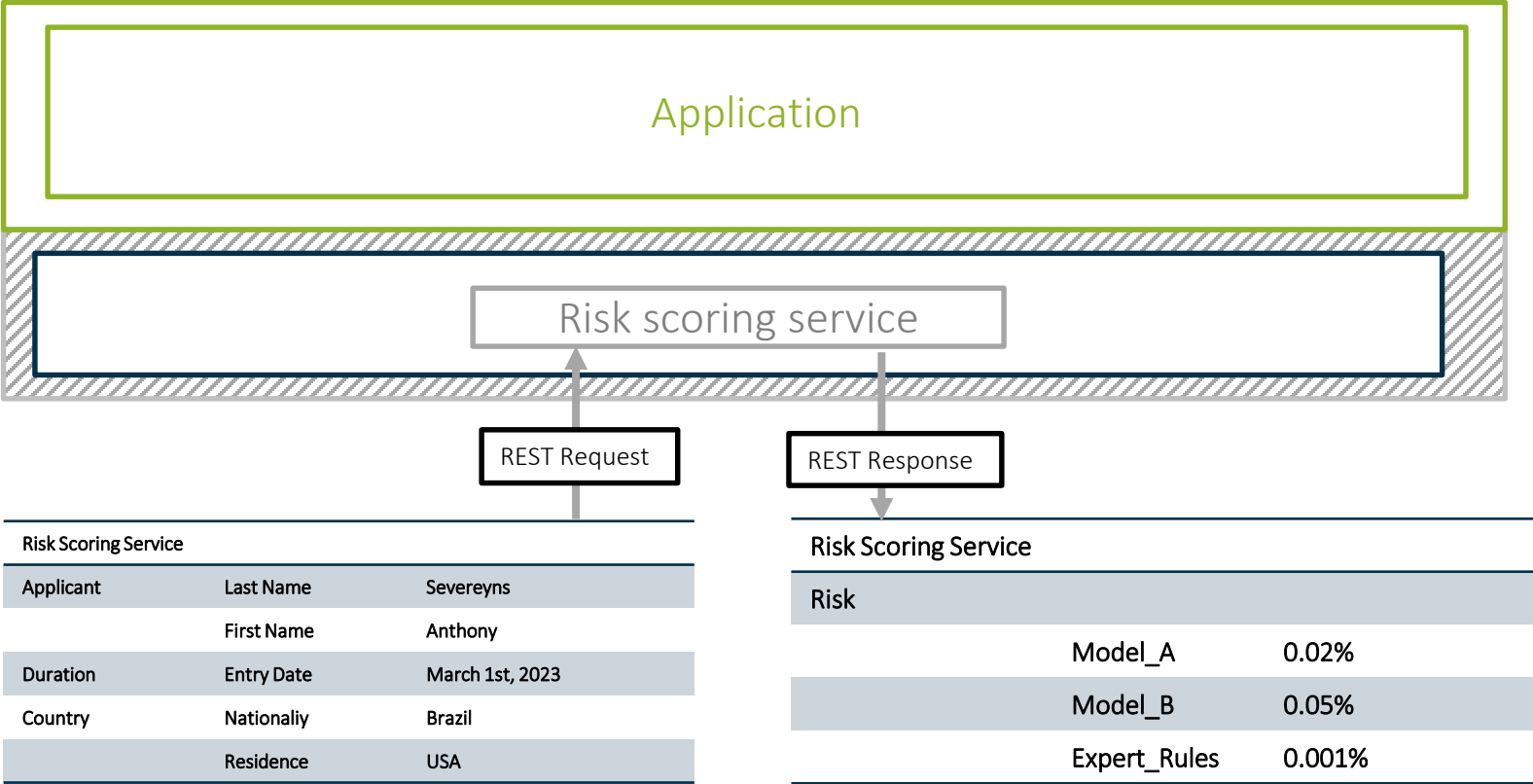
Automated Decision : High Priority! Please inspect the package

Response time : 390ms

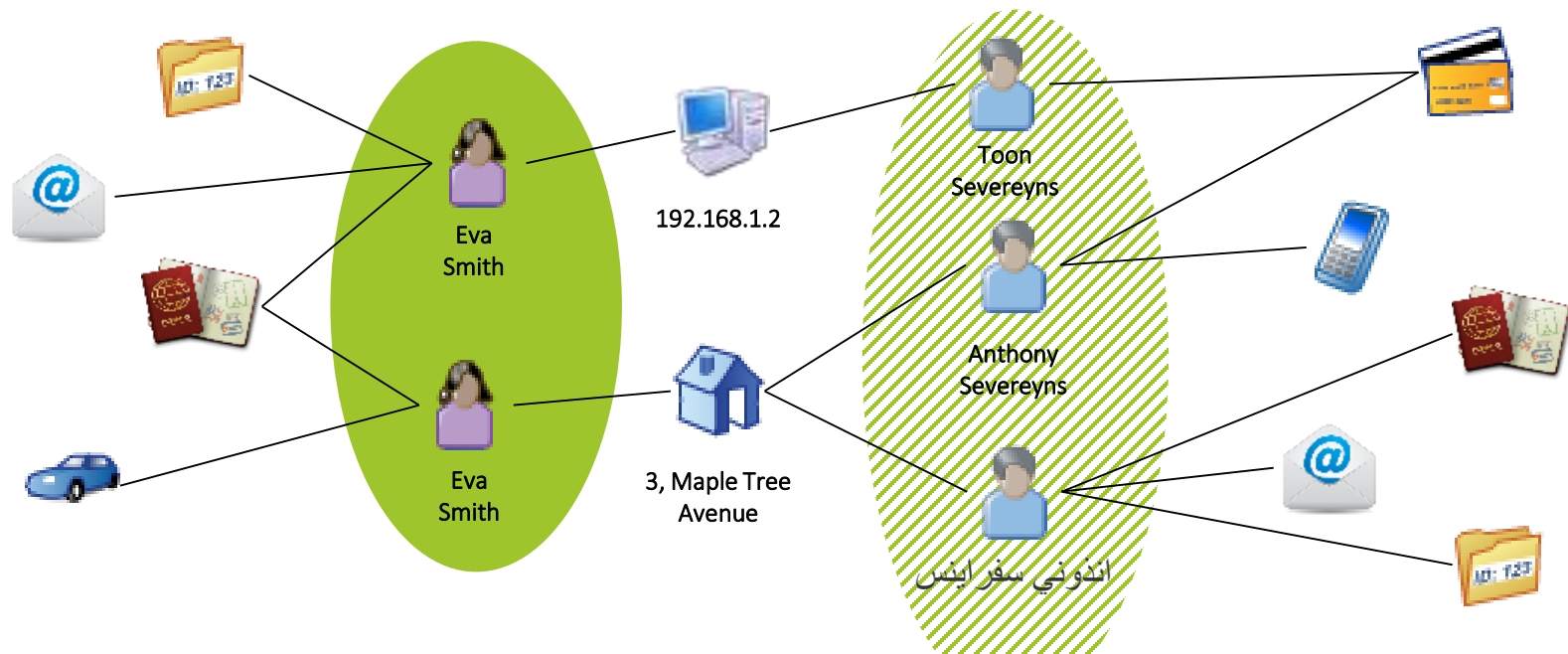
- Conceptual Model
- Zoom on services integration
- **Develop services once, deploy many**
 - MACHINE LEARNING
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The screenshot displays the SAS Data Science 2018 software interface. On the left, a 'Decision Tree' panel shows a hierarchical structure of machine learning tasks. The main workspace shows a workflow diagram starting with 'Data', branching into 'Data Exploration', 'Data Cleaning', and 'Data Transformation'. 'Data Transformation' leads to 'Feature Selection', which then branches into 'Linear + Logistic', 'PCA + Logistic', 'Autoencoder', 'Linear Encoding', and 'Gradient Boosting'. All these lead to 'Model Comparison'. The right panel shows 'Model Comparison' settings, including 'Model selection strategy', 'Model selection metrics', and 'Model selection settings'. The bottom of the interface shows a 'Response' plot with 'Neuron Absolute Average' and 'Logit Absolute' on the x-axis and 'Response' on the y-axis.

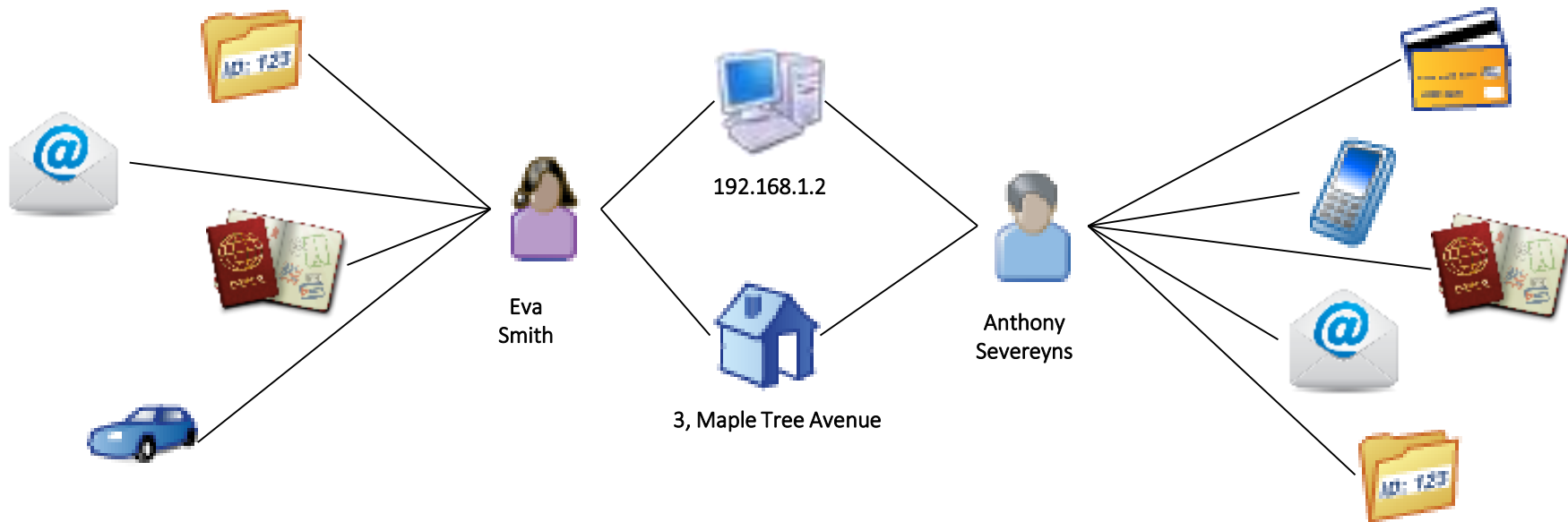
Support integration



- Conceptual Model
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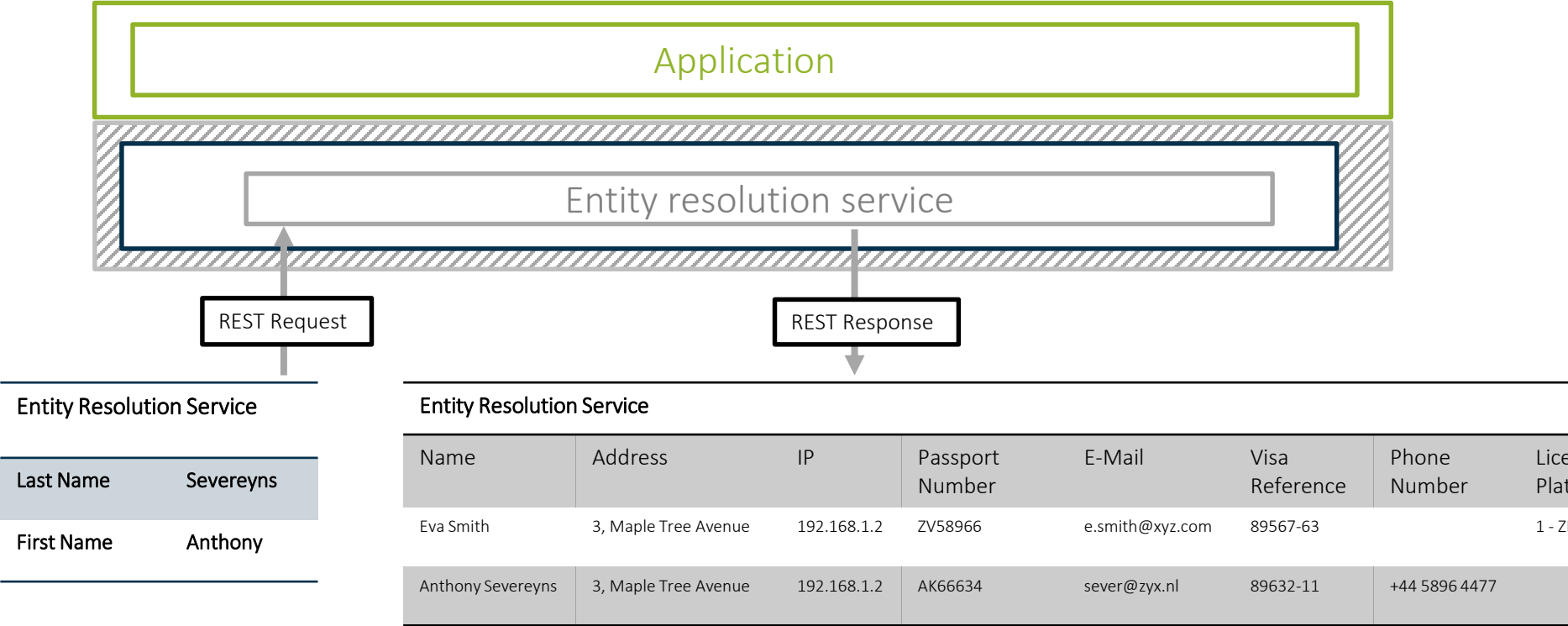


Name	Address	IP	Passport Number	E-Mail	Visa Reference	Phone Number	License Plate	CC Number
Eva Smith		192.168.1.2	ZV58966	e.smith@xyz.com	89567-63			
Toon Severeyns		192.168.1.2						XXXX- XXXX - XXXX - 4586
Anthony Severeyns	3, Maple Tree Avenue					+44 5896 4477		
Eva Smith			ZV58966				1 - ZIV - 88	
اندوني سفراينس	3, Maple Tree Avenue		AK66634	sever@zyx.nl	89632-11			



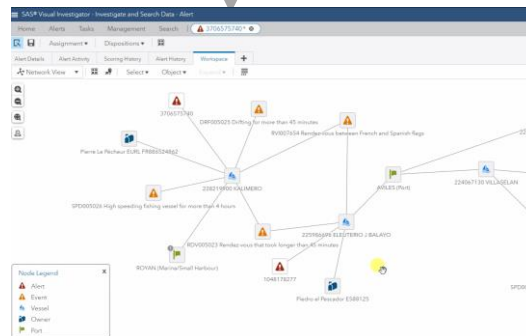
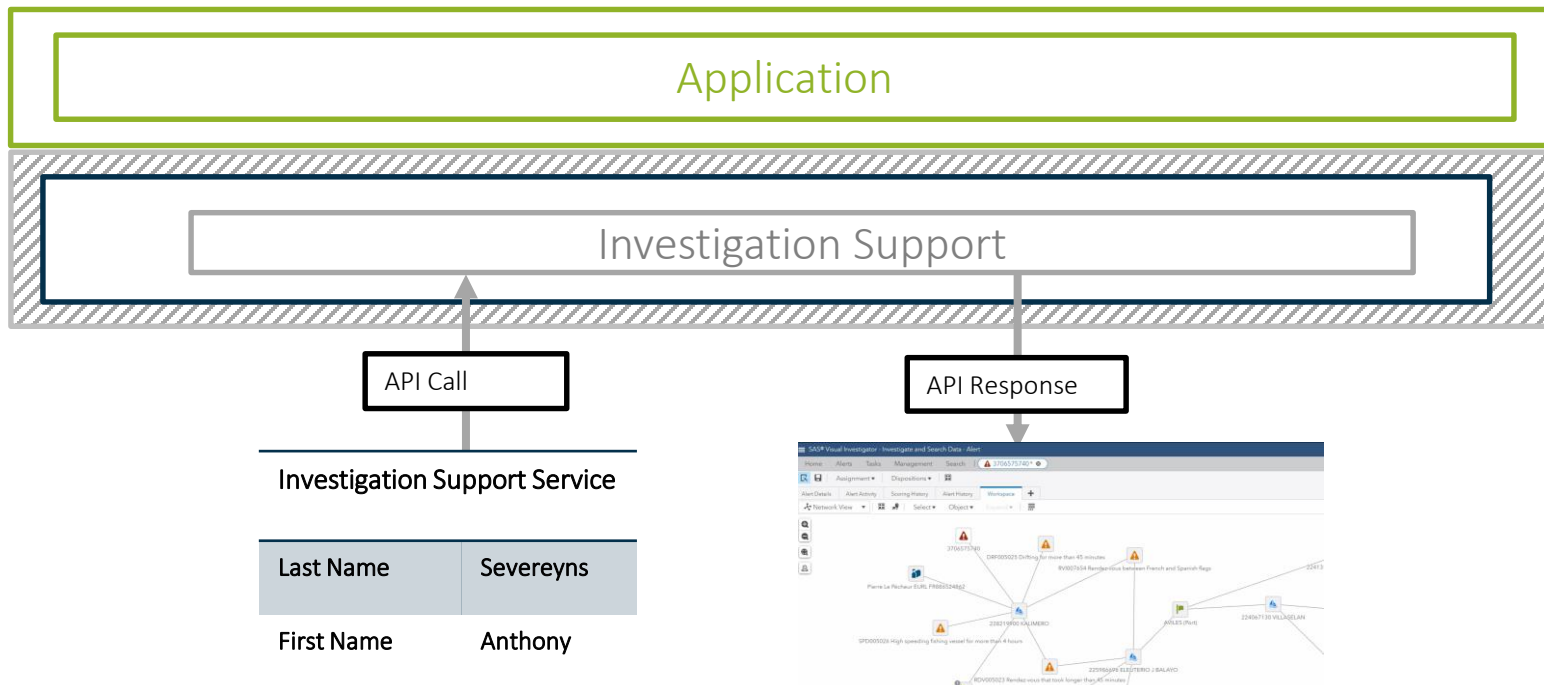
Name	Address	IP	Passport Number	E-Mail	Visa Reference	Phone Number	License Plate	CC Number
Eva Smith	3, Maple Tree Avenue	192.168.1.2	ZV58966	e.smith@xyz.com	89567-63		1 - ZIV - 88	
Anthony Severeys	3, Maple Tree Avenue	192.168.1.2	AK66634	sever@zyx.nl	89632-11	+44 5896 4477		XXXX- XXXX - XXXX - 4586

Support integration



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Support integration



ETIAS
EES
CRRS
ESP
MID ...

1. Machine Learning
2. Data Quality and Data Management
3. Decision and Investigation support

Specific Services

Data retrieval

Intelligent decisions

Statistical reporting

Entity Resolution

Social Network Analysis

Risk scoring

- Conceptual Model
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Specific Services

Data retrieval

Statistical reporting

Social Network Analysis

Out of the Box Services

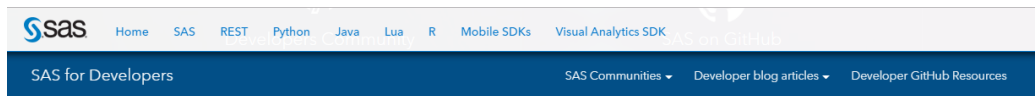
List of Services

Execution status

Availability status

SAS RESTful API



<http://developer.sas.com/>



Code libraries and APIs for building apps with SAS

SAS Viya adds to the SAS platform by providing application and enterprise developers, data scientists, and analysts with access to SAS services. SAS Viya allows you to integrate open source languages and agile technology with the capabilities of SAS analytics.

Select a topic below to access documentation, downloads and code samples.

 SAS Viya uses PROC CAS to run CAS actions in SAS Cloud Analytic Services.	 REST APIs for any client language to access SAS analytics, data and services.	 Python APIs for using SAS Viya CAS actions.	 R APIs for using SAS Viya CAS actions.
 Java APIs for using SAS Viya CAS actions.	 Lua APIs for using SAS Viya CAS actions.	 iOS and Android SDKs to create mobile apps that access content in SAS Viya.	 Visual Analytics SDK: embed insights in your web pages and web apps.

- Interoperable
- Service Oriented
- Flexible
- Evolutive

SAS RESTful API

<http://developer.sas.com/apis/rest/>

SAS

SAS Viya REST APIs

- Getting Started
- Visualization
- Compute
- Text Analytics
- Data Management
- Decision Management
- Core Services

Getting Started

- Introduction
- Configuring Your SAS Environ...
- Authentication and Access To...
- Collections
- Links
- Pagination
- Sorting
- Filters
- Conditional Operations

Getting Started

Introduction

SAS Viya REST APIs are organized around REST principles. The APIs are based on resource-oriented URLs, use HTTP authentication and HTTP verbs, and return HTTP response codes to indicate API errors. All of these features help you integrate the APIs into your applications and scripts in a standard way. With SAS Viya REST APIs, you can create and access SAS resources using any client technology, making it easy to integrate the capabilities of SAS Viya into your business processes or to extend and customize SAS Viya to meet specific requirements.

APIs are grouped for convenience into the following API categories:

API Category	Description
Visualization	Provide access to reports and report images
Compute	Act on SAS compute and analytic servers, including Cloud Analytic Services (CAS)
Text Analytics	Provide analysis and categorization of text documents
Data Management	Enable data manipulation and data quality operations on data sources
Decision Management	Provide access to machine scoring and business rules
Core Services	Provide operations for shared resources such as files and folders

Configuring Your SAS Environment for API Use

The SAS Viya platform includes a rich set of REST APIs for developers to use to build applications or create scripts. To fully integrate these apps or scripts with the application environment at your site, your SAS administrator must first set up the SAS environment to facilitate application integration.

Code samples

```
var headers = {
  'Content-Type': 'application/vnd.sas.microanalytic.modules+json',
  'Accept': 'application/vnd.sas.microanalytic.modules+json'
};

$.ajax({
  url: '/microanalyticScore/modules',
  method: 'post',
  headers: headers,
  success: function(data) {
    console.log(JSON.stringify(data));
  }
})
```

Body parameter

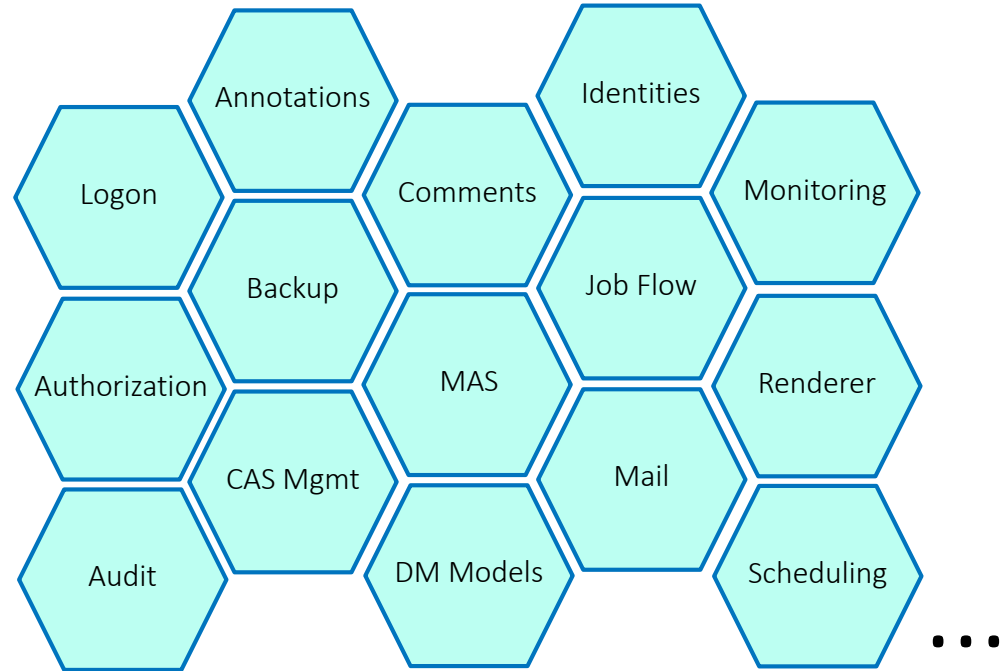
```
{
  "id": "string",
  "description": "",
  "scope": "public",
  "type": "text/vnd.sas.source.ds2",
  "source": "string",
  "properties": []
}
```

- Documented
- Open and Public
- Supported
- Maintained

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- Microservices integration

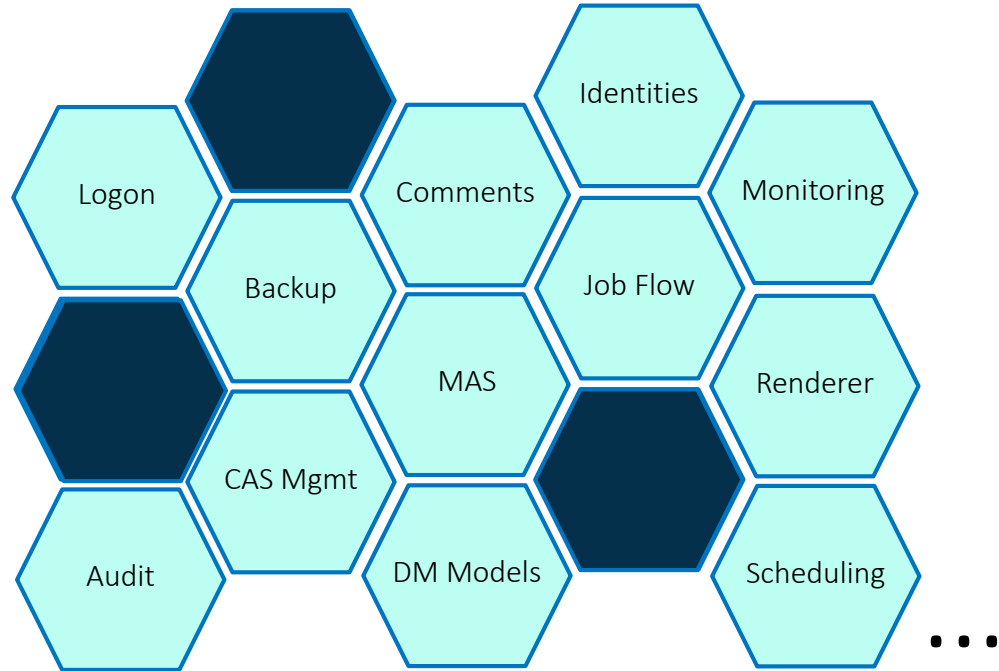
Microservices Architecture

- Small focus
 - Independent role
 - Independent update
 - 180+
-
- Each can be called independently*
 - Each can call an other*



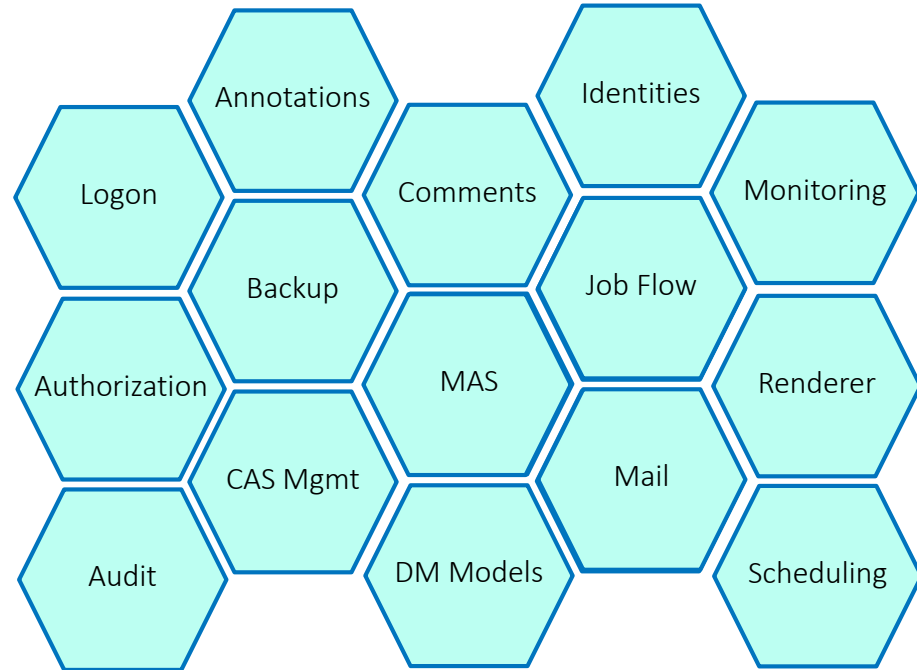
Microservices Architecture – DEVELOP

- Few are always needed
 - Functions can be delegated
 - Not installed / Not activated
-
- Not required to maintain full audit trails, full access/authorization, backups, etc.
-
- Business containers



Microservices Architecture - RUNTIME

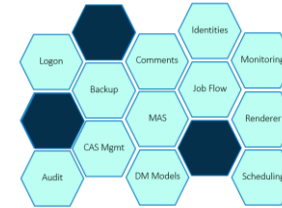
- Very limited number of services deployed
- Can call any other service
- Lightweight
- Fast
- Simple
- Performance Containers



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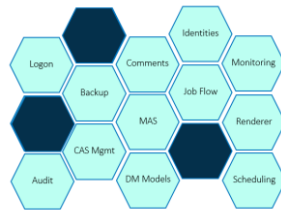


Specific Services

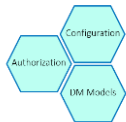
Out of the Box Services



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CRRS
ESP
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Services



Develop business specific services
Delegate central microservices

Execute specific services
Run fundamental microservices

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Conclusion

Requirements for interoperability

- Services Oriented Architecture
 - Develop services vs Execute services
 - Deployment / DevOps paradigm
- Software
 - Micro services architecture fit in SOA organization
- Architecture
 - Built for one application, leveraged by many
 - Open to call and respond to any systems now and in the future