

MCMA

Media Cloud and Microservice Architecture

Jump start your media infrastructure in the cloud

<https://tech.ebu.ch/groups/mcma>



EBU

OPERATING EUROVISION AND EURORADIO



FileCatalyst[®]
reinventing file transfer



DALET

Why MCMA?

- Cloud infrastructure is complex and overwhelming
- Simple things are simple, scaling is difficult, management is challenging
- Cloud is not optimized for Media workflow
- Media services interactions are specialized
- Cloud providers services are structured differently
- Cloud underline processing services come with great power and require great responsibilities
- Cost of services becomes an issue for rigid infrastructures
- Cloud services functionalities and capabilities change rapidly

Why MCMA-AI?

- There is a lot of expectations around Artificial Intelligence
- Artificial Intelligence is directly associated to “micro-services”
- MCMA wants to take benefit of the AI hype to further promote the use of service-based architectures, building on earlier FIMS results

MCMA’s message is clear:

**You may be rightly attracted by AI
but it will be useless if not integrated in your operational workflows !**

OPINIONATED TOOLING

- Several universities make the claim that, when deciding where to put sidewalks, they first let students wear paths through the grass. This told them where to pave and ensured the best use of their walkways.
- You can think of these well worn paths in cloud architecture as a procedure, or design, that gets repeated over and over again, to the point that it should just become boilerplate. Rather than everyone composing the same 99% of code, we can generate that code, and focus on the 1% that is unique.
- Opinionated tooling is designed to guide you down a path that is considered a best practice. Additionally, since best practice is the default, the amount of unique code we maintain is dramatically reduced.



Take control of you infrastructure

- Choose **where** :
 - Select your cloud provider(s)
 - Same design model can be applied to your on-premise infrastructure
- Choose **what** :
 - Select between different services to meet a cost or performance goal
 - Expand capabilities by easily leveraging new services
- Choose **how** :
 - Provide choice of development technology (Node.js, DotNet Core)
 - Leverage Open Source component for configuration and deployment
- Choose **who** :
 - Let non cloud experts start with enterprise ready infrastructure
 - Only implement what is specific to your scenario
- Choose **when** :
 - Enable you to simply expand and provision your infrastructure as needed

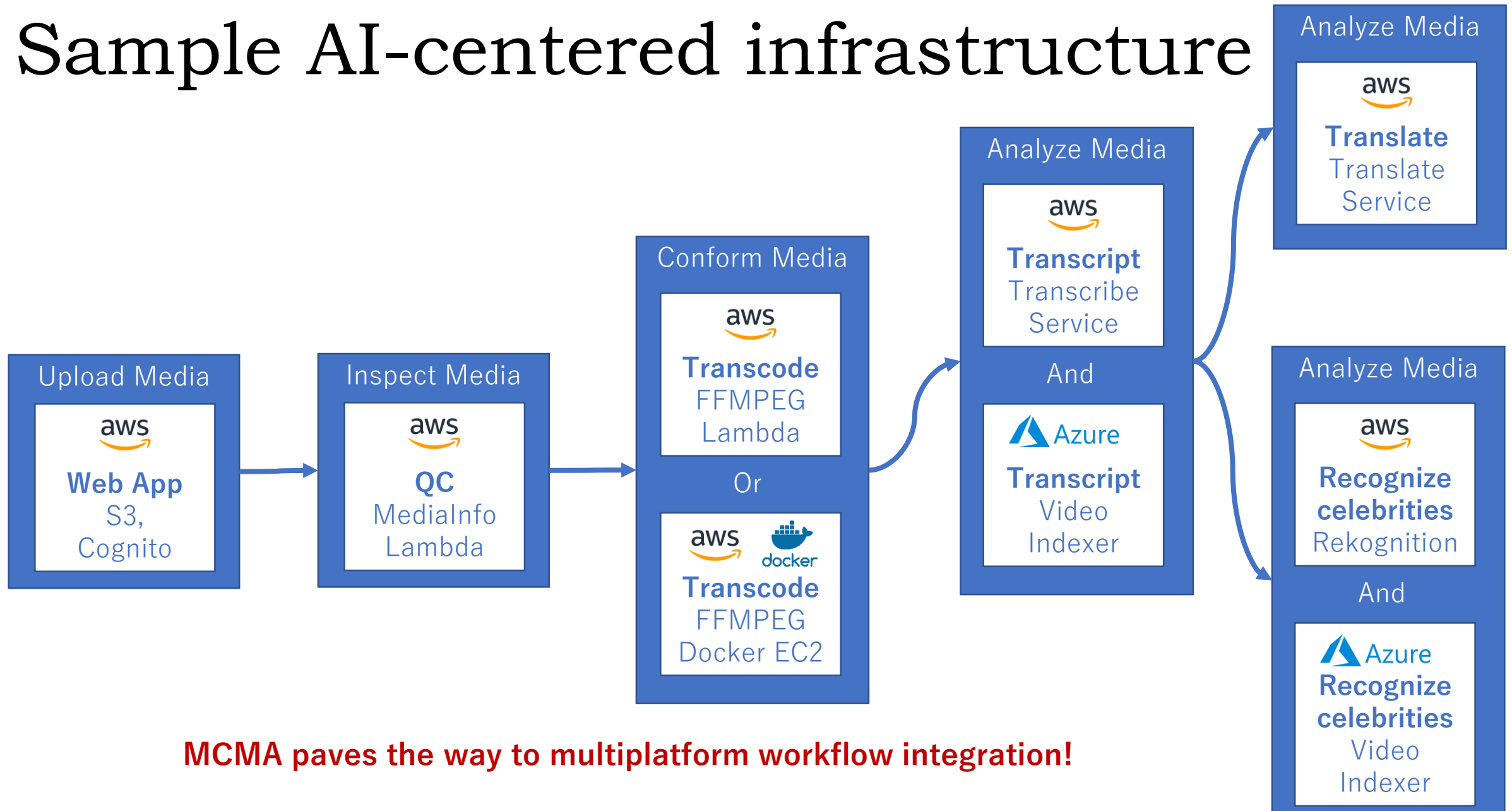
Design considerations

- Limit learning curve
- Share resources like reusable code
- Repeatable patterns
- Easily configure and deploy
- Developer friendly
- Follow opensource mentality

Best practices and implementation

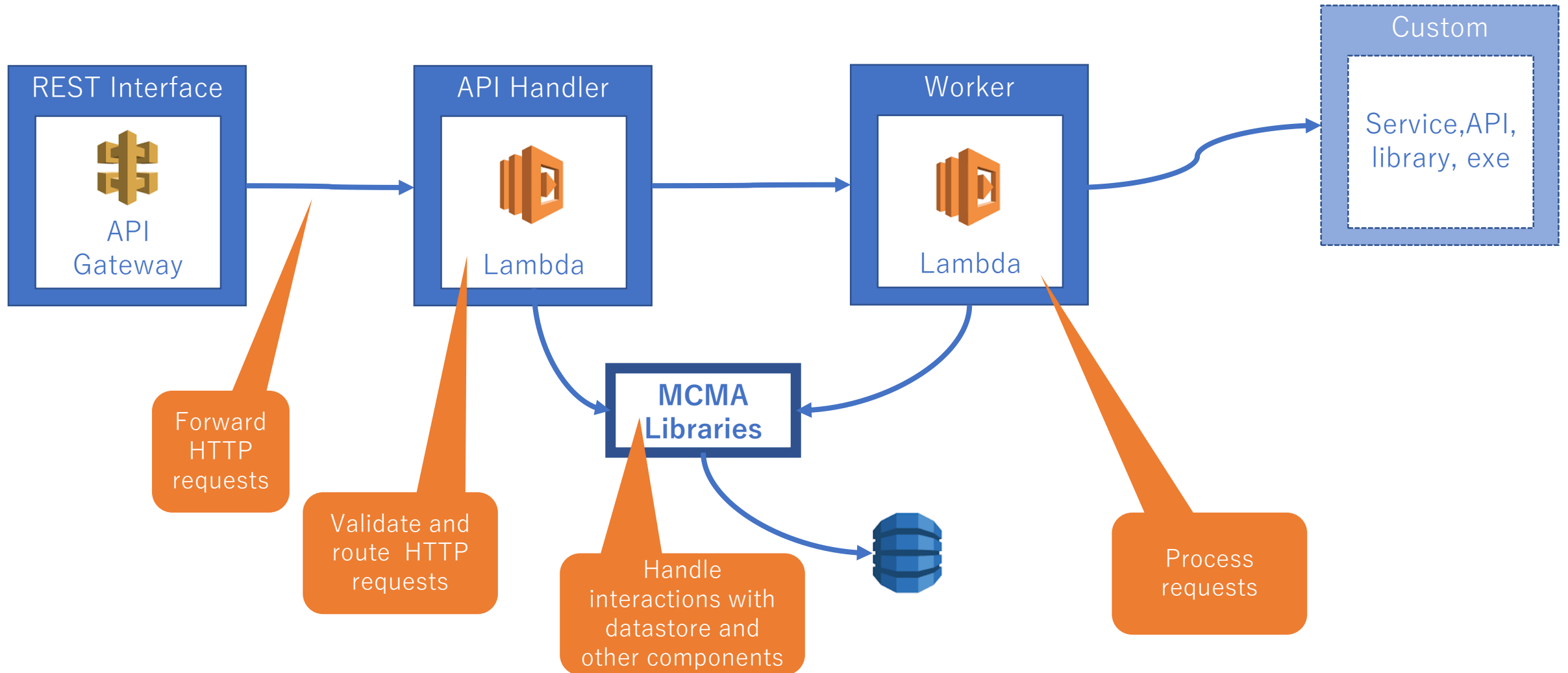
- Job management and monitoring
- Service sequencing
- Long running transactions support
- Event based communication pattern
- Service registration and discovery
- Standardized REST based data repository

Sample AI-centered infrastructure



MCMA paves the way to multiplatform workflow integration!

MCMA Common Service Pattern



Basic Information on MCMA

FIMS > MCMA

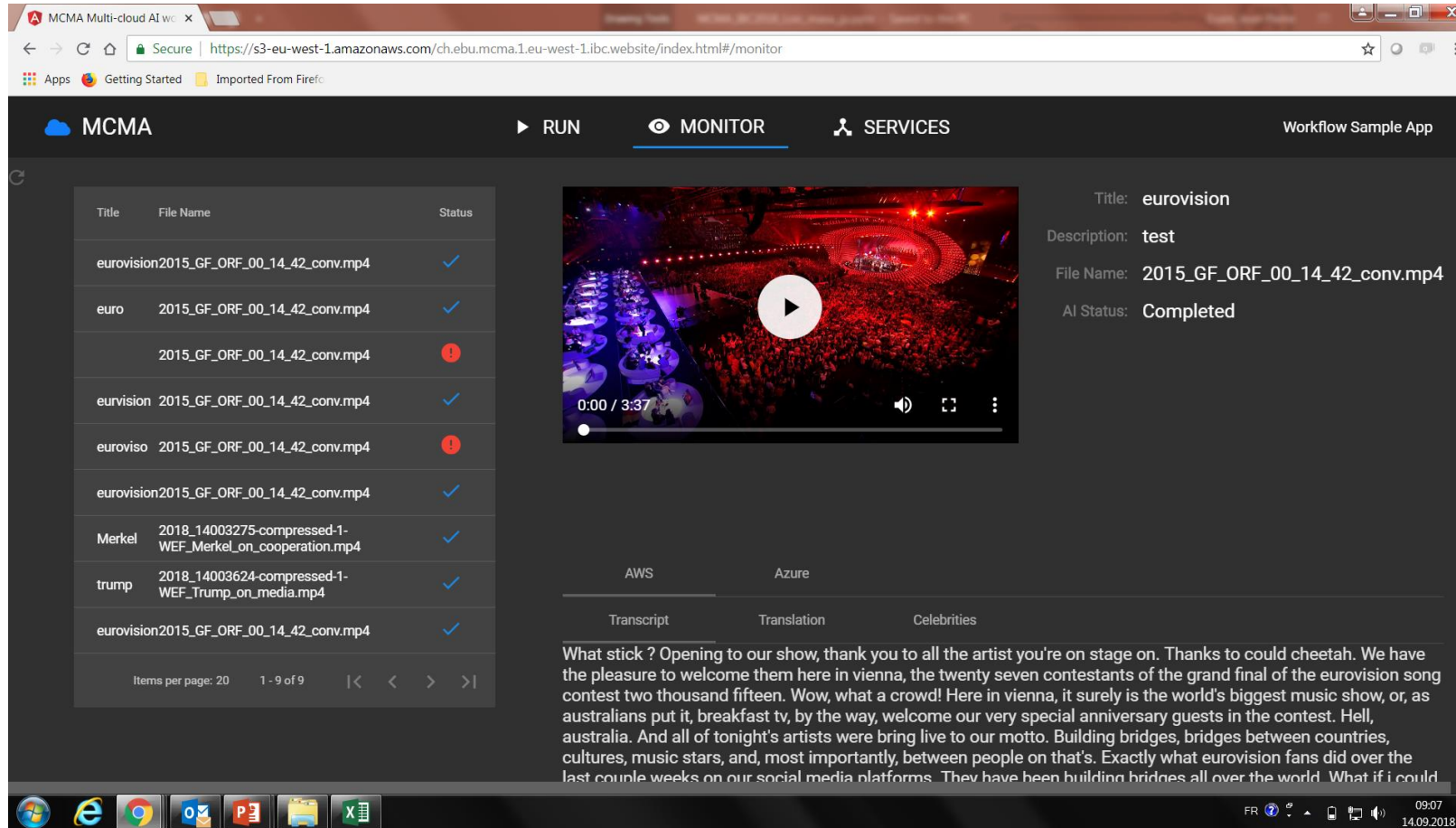
- MCMA builds on, and continues, the services developed as part of the Framework for Interoperable Media Services (FIMS).
- MCMA is a project of the EBU Strategic Programme on Media Information Management and Artificial Intelligence .

Objectives

- Develop a set of simplified [REST APIs](#) with minimum payload to allow integrating workflows combining microservices in the cloud with other in-house services and processes.
- Share [libraries](#) containing glue code between the high level APIs and low level (e.g. cloud) platforms.

>> The demonstration using the REST APIs and the libraries will be shown here !

Cognito app – AWS speech to text



The screenshot shows the MCMA Multi-cloud AI website monitoring interface. The browser address bar displays the URL: `https://s3-eu-west-1.amazonaws.com/ch.ebu.mcma.1.eu-west-1.abc.website/index.html#/monitor`. The interface includes a navigation bar with 'MCMA', 'RUN', 'MONITOR', and 'SERVICES' tabs, and a 'Workflow Sample App' label. A table on the left lists audio files with their titles, file names, and status indicators. A central video player shows a Eurovision Song Contest performance. To the right of the video, metadata is displayed: Title: eurovision, Description: test, File Name: 2015_GF_ORF_00_14_42_conv.mp4, and AI Status: Completed. Below the video, there are tabs for 'AWS' and 'Azure', and a section for 'Transcript', 'Translation', and 'Celebrities'. The transcript text is partially visible at the bottom of the screen.

Title	File Name	Status
eurovision2015_GF_ORF_00_14_42_conv.mp4		✓
euro	2015_GF_ORF_00_14_42_conv.mp4	✓
	2015_GF_ORF_00_14_42_conv.mp4	!
eurvision	2015_GF_ORF_00_14_42_conv.mp4	✓
euroviso	2015_GF_ORF_00_14_42_conv.mp4	!
eurovision2015_GF_ORF_00_14_42_conv.mp4		✓
Merkel	2018_14003275-compressed-1-WEF_Merkel_on_cooperation.mp4	✓
trump	2018_14003624-compressed-1-WEF_Trump_on_media.mp4	✓
eurovision2015_GF_ORF_00_14_42_conv.mp4		✓

Items per page: 20 1 - 9 of 9

Transcript
Translation
Celebrities

What stick ? Opening to our show, thank you to all the artist you're on stage on. Thanks to could cheetah. We have the pleasure to welcome them here in vienna, the twenty seven contestants of the grand final of the eurovision song contest two thousand fifteen. Wow, what a crowd! Here in vienna, it surely is the world's biggest music show, or, as australians put it, breakfast tv, by the way, welcome our very special anniversary guests in the contest. Hell, australia. And all of tonight's artists were bring live to our motto. Building bridges, bridges between countries, cultures, music stars, and, most importantly, between people on that's. Exactly what eurovision fans did over the last couple weeks on our social media platforms. They have been building bridges all over the world. What if i could

Credits: Eurovision Song Contest

Cognito app – Azure celebrity detection

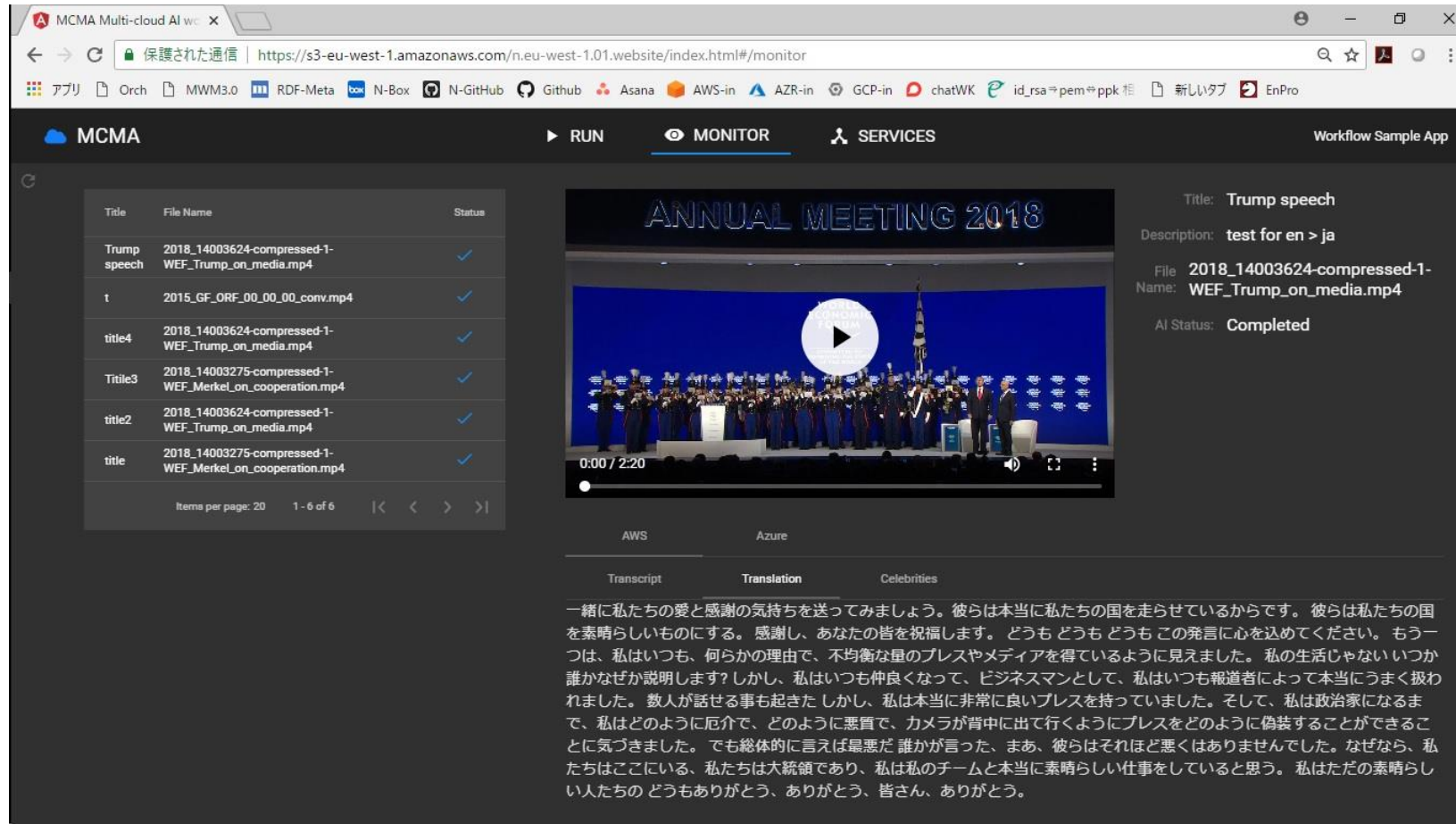
The screenshot displays a web application interface for monitoring AI processing. The browser address bar shows the URL: `https://s3-eu-west-1.amazonaws.com/ch.ebu.mcma.1.eu-west-1.abc.website/index.html#/monitor`. The interface is divided into several sections:

- File List:** A table with columns for Title, File Name, and Status. It lists several video files, including 'eurovision2015_GF_ORF_00_14_42_conv.mp4', 'euro 2015_GF_ORF_00_14_42_conv.mp4', and 'Merkel 2018_14003275-compressed-1-WEF_Merkel_on_cooperation.mp4'. Status icons (blue checkmarks and red exclamation marks) indicate the processing progress.
- Video Player:** A central video player showing a scene from the Eurovision Song Contest. The progress bar indicates 0:00 / 3:37.
- AI Status:** Metadata for the current video, including Title: 'eurovision', Description: 'test', File Name: '2015_GF_ORF_00_14_42_conv.mp4', and AI Status: 'Completed'.
- Celebrity Detection:** A detailed view for the detected celebrity, Alice Tumler. It includes her name, title 'Television Presenter', and a description: 'Alice Tumler is an Austrian television presenter.' A small portrait photo of Alice Tumler is shown on the right. Below the description, there are 'Appearances' with time stamps: 0:00:13.96, 0:00:29, and 0:00:56.72.

The Windows taskbar at the bottom shows the system tray with the date and time: 09:08 14.09.2018.

Credits: Eurovision Song Contest

Cognito app – AWS translation to Japanese



The screenshot displays the MCMA Multi-cloud AI workflow monitor interface. The browser address bar shows the URL: <https://s3-eu-west-1.amazonaws.com/n.eu-west-1.01.website/index.html#/monitor>. The interface includes a navigation bar with 'MCMA', 'RUN', 'MONITOR', and 'SERVICES' tabs. A table on the left lists processed files with their titles, file names, and status (all marked as completed with blue checkmarks).

Title	File Name	Status
Trump speech	2018_14003624-compressed-1-WEF_Trump_on_media.mp4	✓
t	2015_GF_ORF_00_00_00_conv.mp4	✓
title4	2018_14003624-compressed-1-WEF_Trump_on_media.mp4	✓
Title3	2018_14003275-compressed-1-WEF_Merkel_on_cooperation.mp4	✓
title2	2018_14003624-compressed-1-WEF_Trump_on_media.mp4	✓
title	2018_14003275-compressed-1-WEF_Merkel_on_cooperation.mp4	✓

The main content area features a video player showing a scene from the 'ANNUAL MEETING 2018' with a large play button overlay. To the right of the video, the following metadata is displayed:

- Title: Trump speech
- Description: test for en > ja
- File Name: 2018_14003624-compressed-1-WEF_Trump_on_media.mp4
- AI Status: Completed

Below the video player, there are tabs for 'AWS', 'Azure', 'Transcript', 'Translation', and 'Celebrities'. The 'Translation' tab is active, displaying a Japanese translation of the speech:

一緒に私たちの愛と感謝の気持ちを送っていきましょう。彼らは本当に私たちの国を走らせているからです。彼らは私たちの国を素晴らしいものにする。感謝し、あなたの皆を祝福します。どうも どうも どうもこの発言に心を込めてください。もう一つは、私はいつも、何らかの理由で、不均衡な量のプレスやメディアを得ているように見えました。私の生活じゃないいつか誰かなぜか説明します? しかし、私はいつも仲良くなって、ビジネスマンとして、私はいつも報道者によって本当にうまく扱われました。数人が話せる事も起きたしかし、私は本当に非常に良いプレスを持っていました。そして、私は政治家になるまで、私はどのように厄介で、どのように悪質で、カメラが背中に出て行くようにプレスをどのように偽装することができることに気づきました。でも総体的に言えば最悪だ 誰かが言った、まあ、彼らはそれほど悪くはありませんでした。なぜなら、私たちはここにいる、私たちは大統領であり、私は私のチームと本当に素晴らしい仕事をしていると思う。私はただの素晴らしい人たちの どうもありがとう、ありがとう、皆さん、ありがとう。

Credits: World Economic Forum

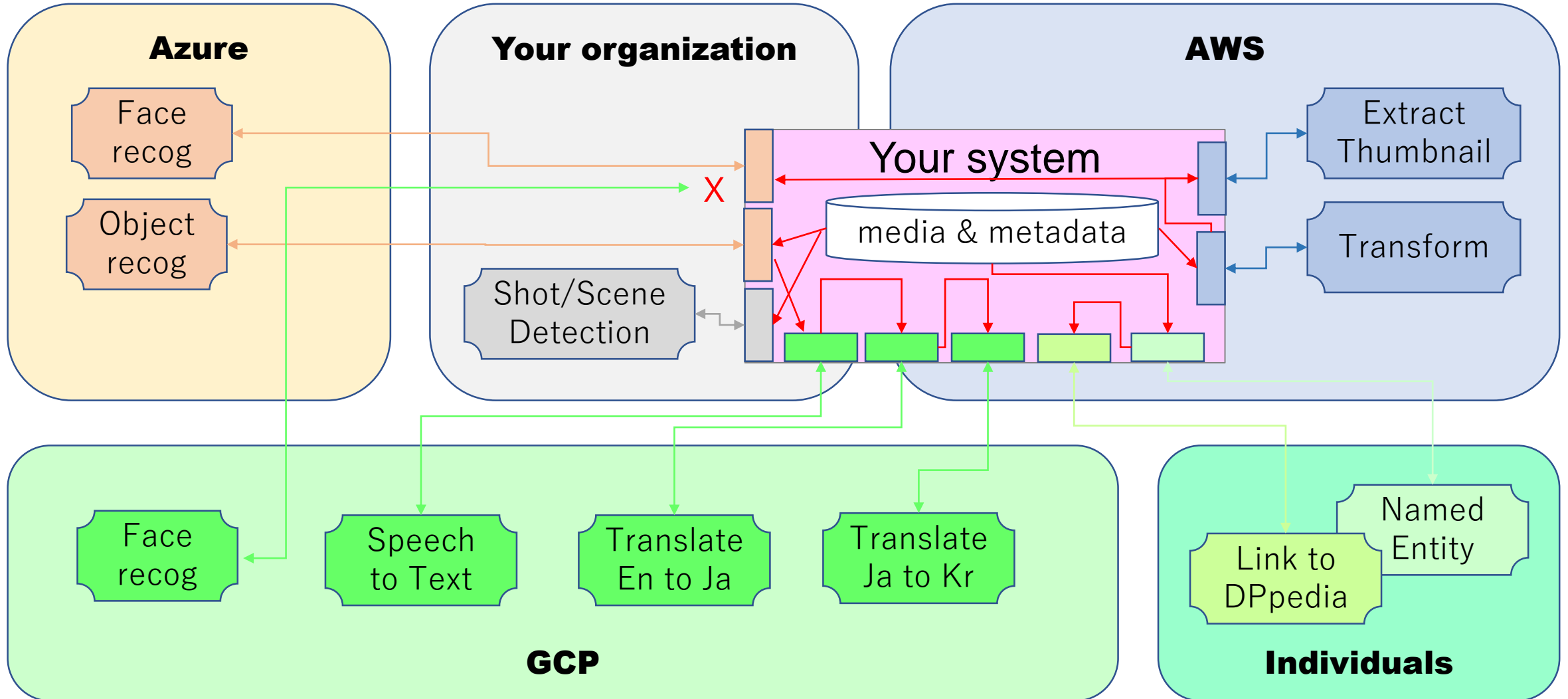
AWS step functions, workflow and state machine

The screenshot displays the AWS Step Functions console interface. The top navigation bar includes the AWS logo, 'Services', 'Resource Groups', and user information. The main content area is divided into several sections:

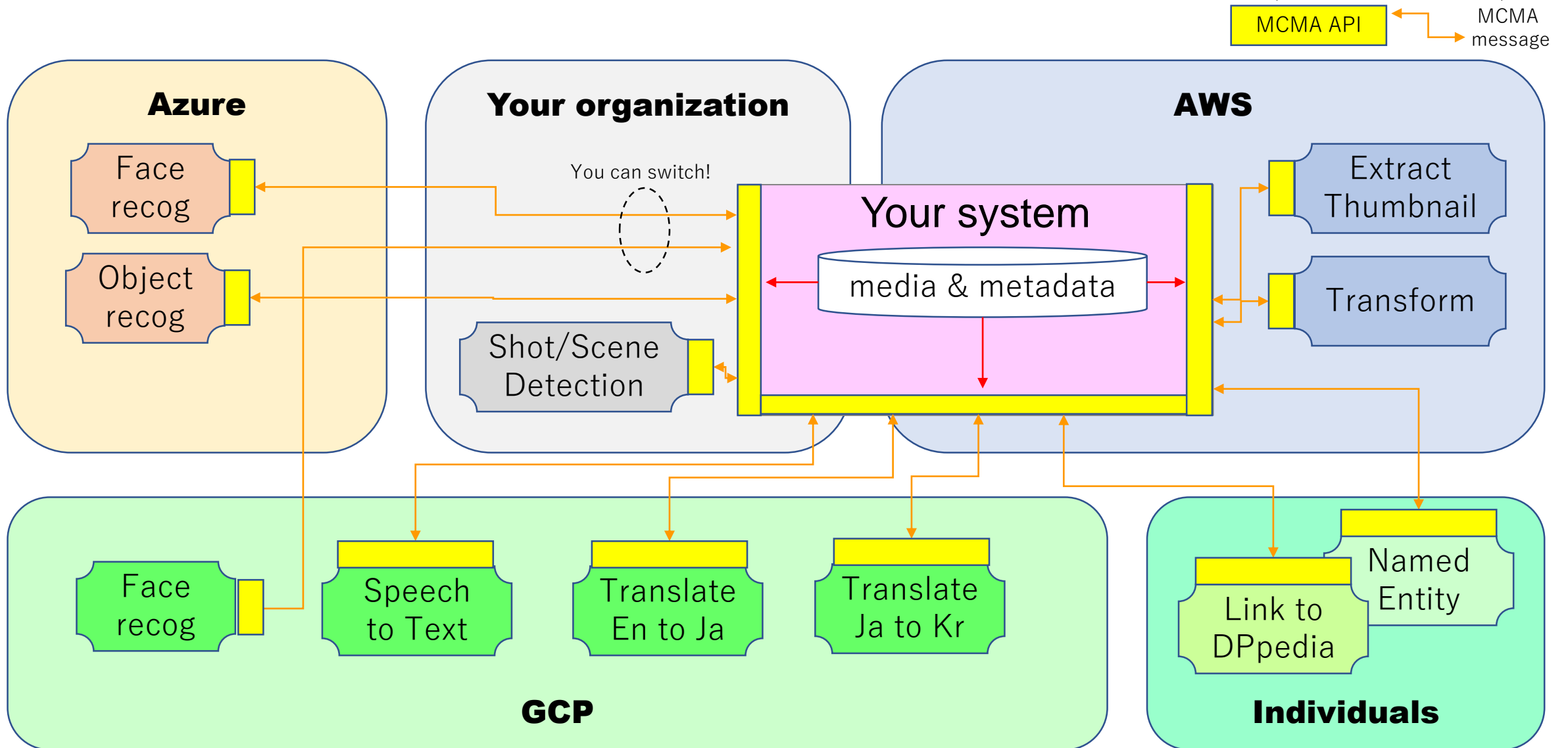
- Input** and **Output** sections at the top.
- Visual workflow** section showing a state machine diagram with various steps and transitions. A legend indicates: Success (green), Failed (red), Cancelled (orange), and In Progress (blue).
- Code** section for viewing the underlying code.
- Step details** section with the instruction: "Select a step to view its details."
- Execution event history** section containing a table with the following columns: ID, Type, Step, Resource, Elapsed Time (ms), and Timestamp.

The bottom of the image shows a Windows taskbar with various application icons and a system tray displaying the date and time as 09:04 on 14.09.2018.

Media Services Environment (now)



Media Services Environment (with MCMA)



MCMA Github Repository

ebu/mcma-libraries

<https://github.com/ebu/mcma-libraries>

core libraries (Node.js, .NET, Java etc,)

- Contains the model (e.g. classes, types, message contents) and helper functions and utilities to create and communicate properly formed messages
- mcma-core-nodejs (mcma-core.js)

cloud provider specific libraries (AWS, Azure, GCP etc.)

- Abstracts the particularities of a specific cloud to a predefined REST
- mcma-aws-nodejs (dynamo-db-table.js, rest-controllers.js)

ebu/mcma-projects

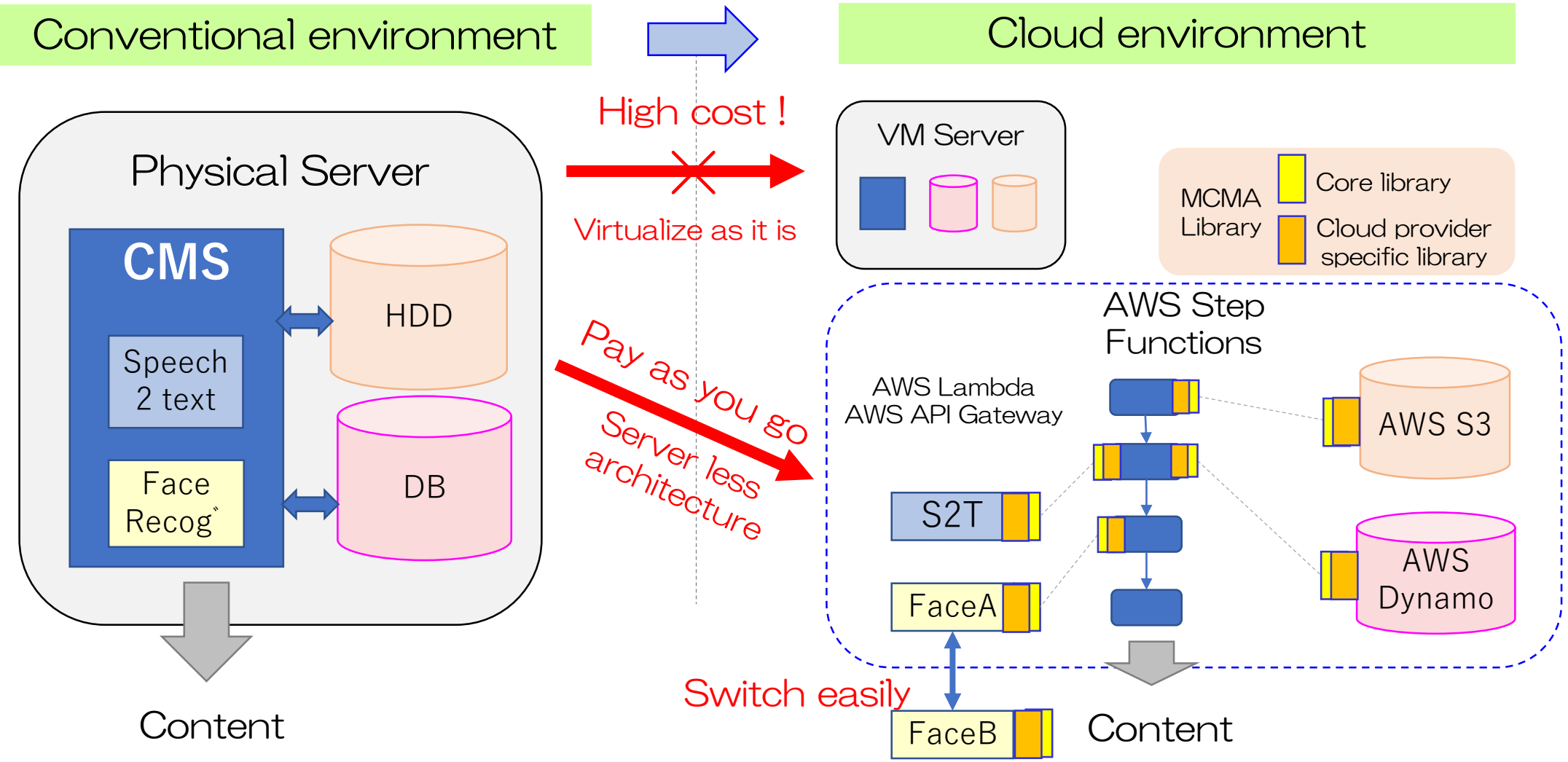
<https://github.com/ebu/mcma-projects>

multi-cloud-ai-workflow

- Demonstrates how you can leverage AI technologies from multiple cloud vendors in a single media workflow

Note that as the both are still work in progress, please checkout the [development branch](#) for the current status.

Toward to Cloud-native system



Multi-cloud-ai workflow

How to start

1. Clone this repository to your local harddrive
2. Navigate to the multi-cloud-ai-workflow folder.
3. Create a file named gradle.properties
4. Add the AWS account information to the created file & save the file.
5. Open command line in multi-cloud-ai-workflow folder.
6. Execute “gradlew deploy” and let it run.
7. If no errors, you have successfully setup the infrastructure in your AWS cloud. Go to <https://aws.amazon.com/console/> and sign in to see your cloud infrastructure.

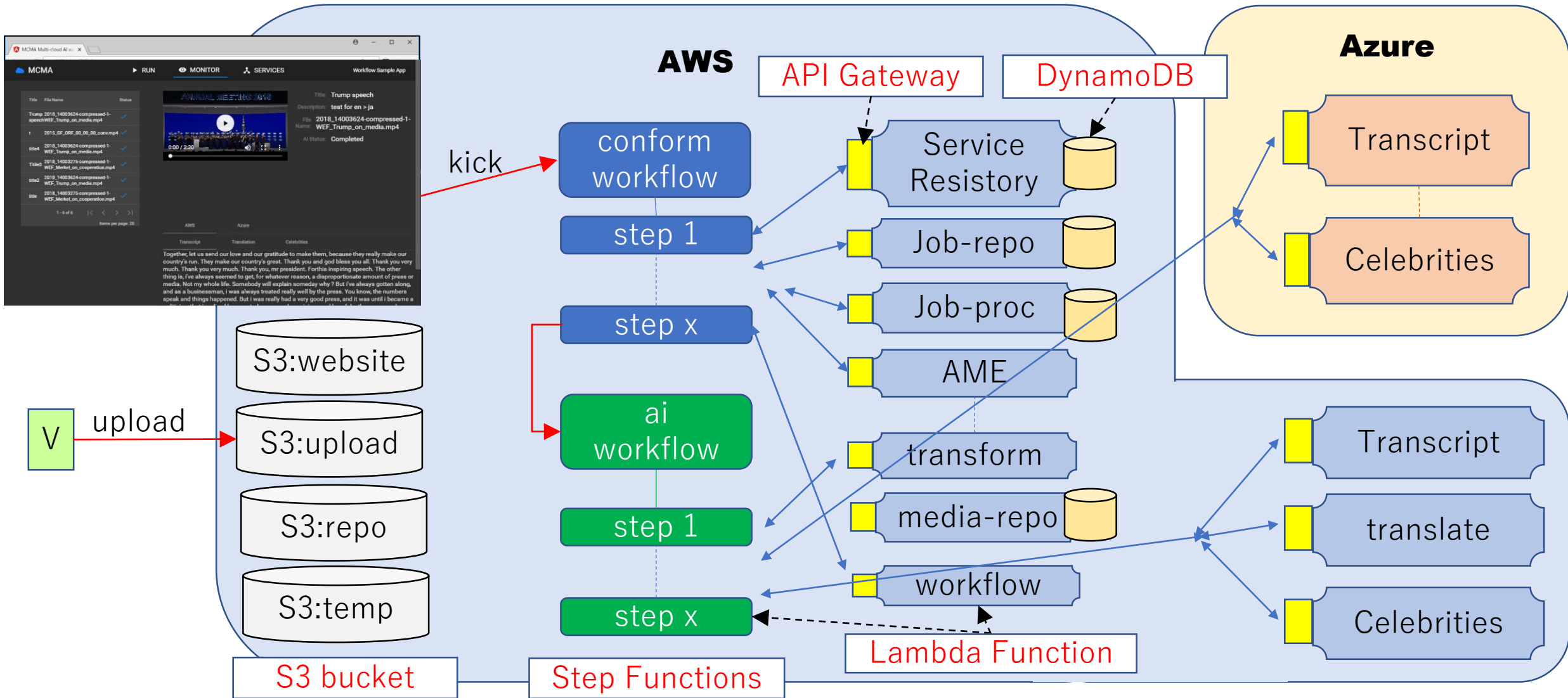
file: gradle.properties

```
environmentName=com.your-domain.mcma  
environmentType=dev
```

```
awsAccountId=<YOUR_AWS_ACCOUNT_ID>  
awsAccessKey=<YOUR_AWS_ACCESS_KEY>  
awsSecretKey=<YOUR_AWS_SECRET_KEY>  
awsRegion=<YOUR_AWS_REGION>
```

Only three steps!

What you will have after deployment



Some keywords helping you to know more details...

1. Terraform
2. Gradle
3. Node.js
4. AWS: S3
5. AWS: Lambda
6. AWS: Step Functions
7. AWS: DynamoDB
8. AWS: API Gateway
9. AWS: Transcribe, Translate, Rekognition
10. EBU Core: BMContent, BMEssence
11. Azure: Videoindexer

Service Registry

- Stores information about all available services on a REST endpoint
 - <https://service-registry/services>
 - Allows GET, POST, PUT and DELETE operations.
- Each other service only needs to know this URL to be able to find any other resource within the deployed infrastructure.



Job Repository

- Stores jobs that need to be executed on a REST endpoint
 - AllJob, AmeJob, CaptureJob, TransferJob, TransformJob, WorkflowJob
 - Allows GET, POST and DELETE operations
- On arrival of a new Job the service instantiates a JobProcess and sends it to the Job Processor Service

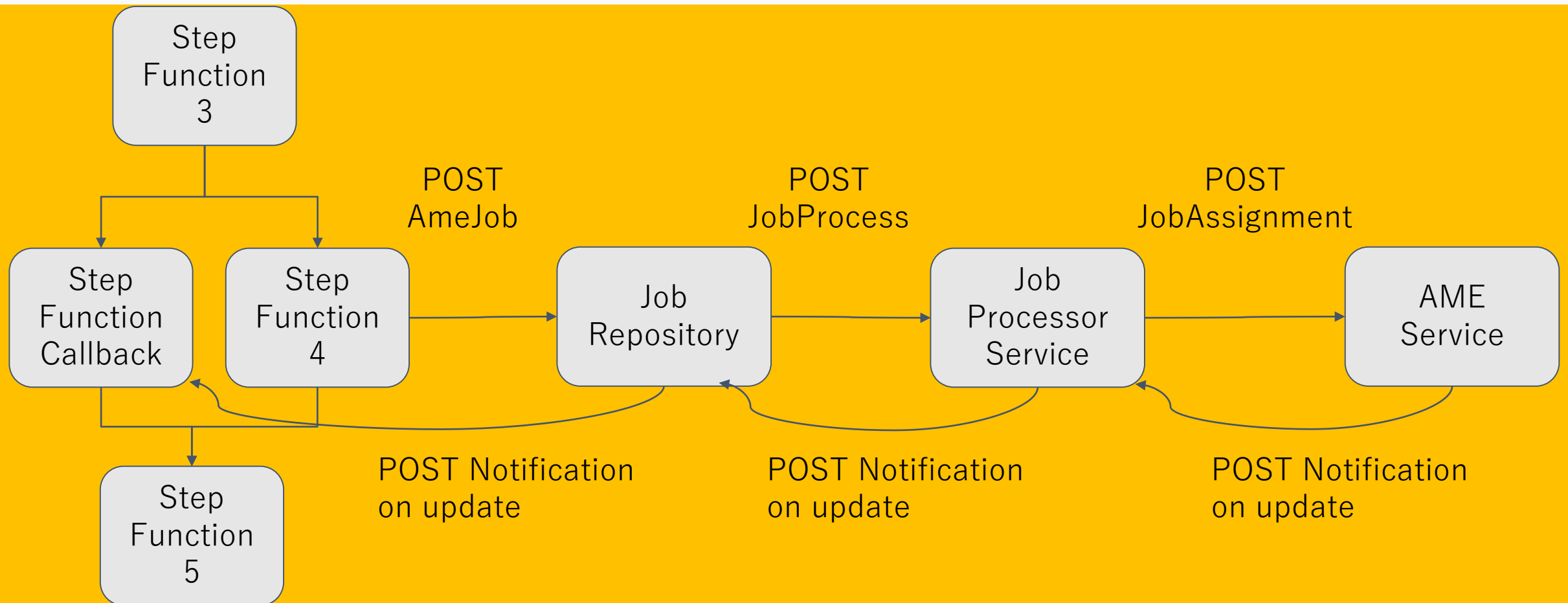


Job Processor Service

- Stores JobProcesses that manage the execution of jobs
- On arrival of a new JobProcess the service searches for a service that is capable of executing this job and sends a JobAssignment to this service



Message Flow Execution of AmeJob



Loadmap

It would be great if we can have a loadmap with timeline, but due to less resources, we cannot show it for the moment ...

But the direction from now is ;

1. Extend sharable libraries to new platforms like Google, IBM...
2. Further work on best practices on content management
 - HighRes vs. LowRes, thumbnails, audio only...
 - Continue work started with File Catalyst on content transfer between platforms
3. Test more AI tools directly relevant to business
4. ...

Join us!

MCMA is a voluntary collaborative effort

We need more resources to go faster and share more useful resources

If you are an architect, you certainly want to know more about service-based architectures (if not already convinced)

If you are a developer, system integrator, you will certainly appreciate working with other competent and motivated colleagues eager to share knowledge. This will make the learning curve smoother using best practice development software platforms.

How can you join:

1. Visit <https://tech.ebu.ch/groups/mcma>
2. Click on “join this group”
3. Alternatively contact EBU -> evain@ebu.ch