

HELLO!



PAOLO SAVIANO

FULL-STACK ENGINEER

@MEETECH0



YOU MAY REMEMBER ME FROM...

HOW TO

BUILD A WORKING LED WALL

OR AT LEAST KEEP YOUR TEXT OUTSIDE THE BLACK PANELS

HOW TO

**LOSE BELLY FAT BY EATING
A LOT OF SWEETS**

~~A SUCCESS STORY~~

HOW TO

**START A TECH PRESENTATION IN A
VERY CRINGE WAY**

THE DEFINITIVE LIST OF JOKES TO KEEP YOUR AUDIENCE EMBARRASSED

OH, IT'S SO FUNNY!



AND IT'S NOT OVER!

TODAY

IS THE PREMIERE FOR...

HOW TO

**BUILD AND DEPLOY A MULTI-PURPOSE
REAL-TIME CDN WITH JANUS SERVER**

AKA THE ISSUES WE FACED AND HOW WE ADDRESSED THEM

YOU GOT IT, NO MORE FUN



DEPLOY JANUS AT LARGE SCALE

DEPLOY JANUS AT **LARGE SCALE**

**IT'S EASY
WHEN YOU KNOW
WHAT YOU ARE DOING**

MULTI-PURPOSE?

DIFFERENT SCENARIOS

| ATOLLO

| BIG ISLAND

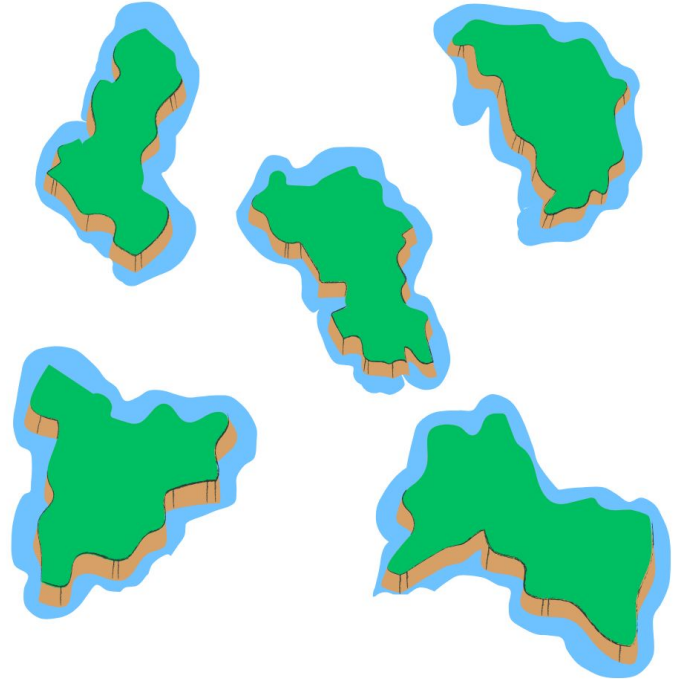
| ARCHIPELAGO

DIFFERENT SCENARIOS

HUNDREDS OF SMALL SESSIONS | ATOLLO

| BIG ISLAND

| ARCHIPELAGO



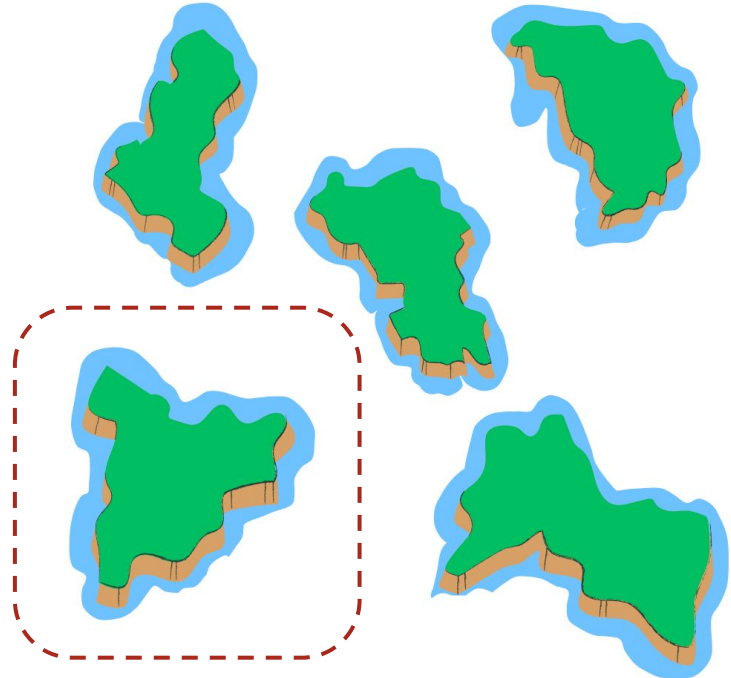
DIFFERENT SCENARIOS

HUNDREDS OF SMALL SESSIONS | ATOLLO

| BIG ISLAND

| ARCHIPELAGO

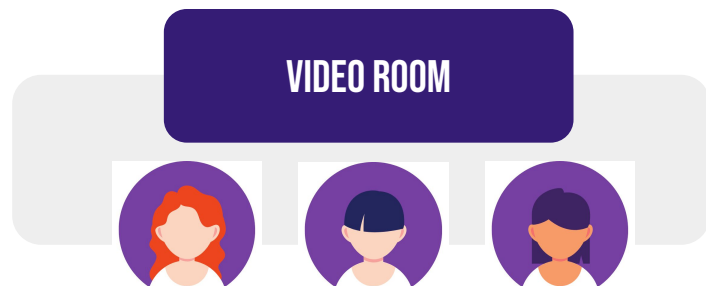
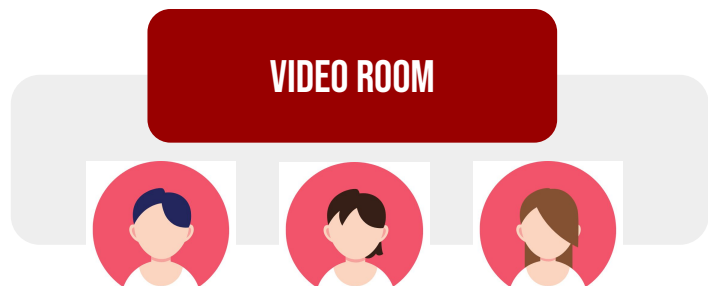
A FEW PARTICIPANTS
ALL SPEAKING



DIFFERENT SCENARIOS

ATOLLO

**ISOLATED
MULTIPLE SESSIONS AT ONCE
RESOURCE OPTIMIZATION
ORCHESTRATION**



DIFFERENT SCENARIOS

| ATOLLO

MANY USERS IN THE SAME SESSION | BIG ISLAND

| ARCHIPELAGO



DIFFERENT SCENARIOS

| ATOLLO

MANY USERS IN THE SAME SESSION | BIG ISLAND

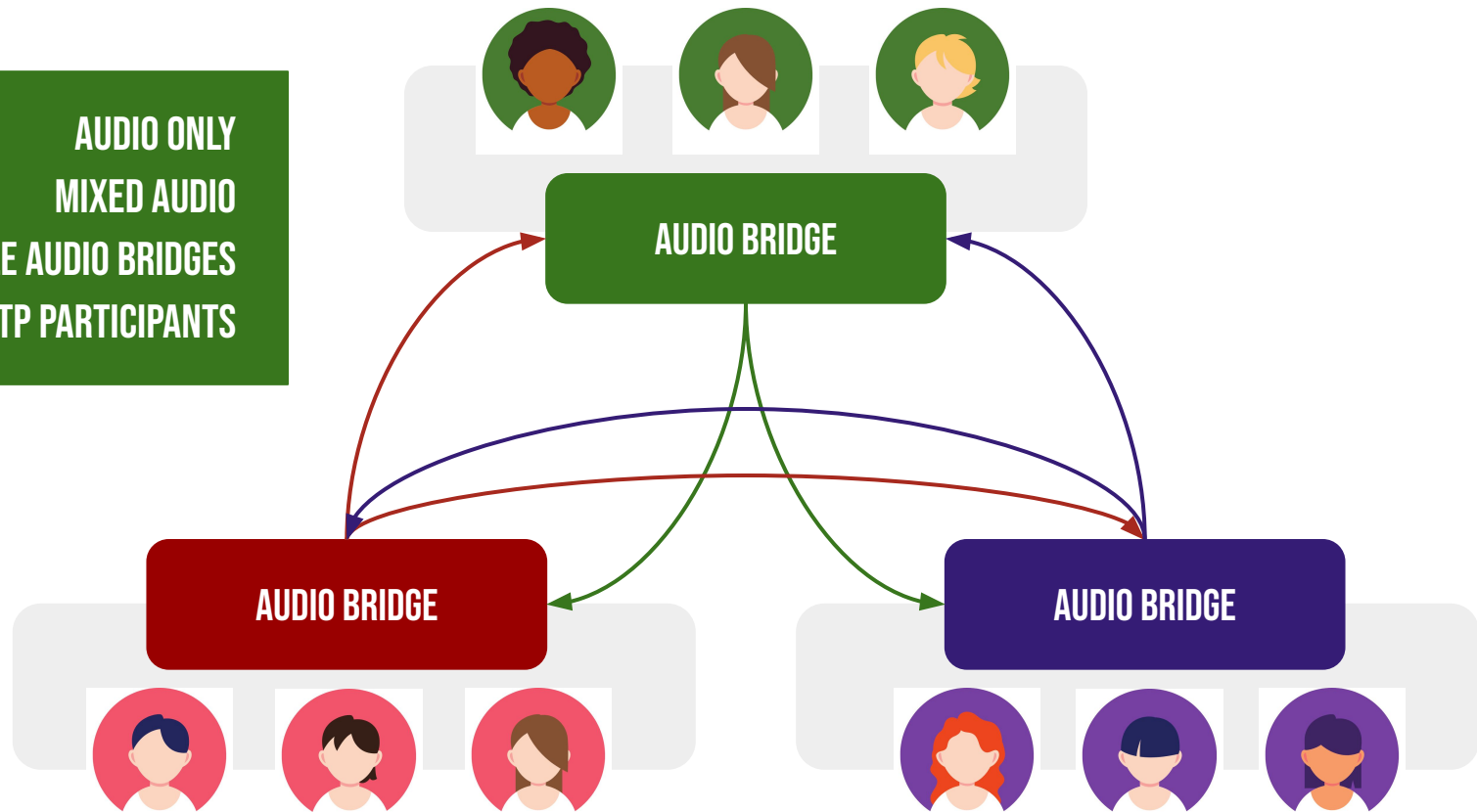
| ARCHIPELAGO

A LOT OF PARTICIPANTS
ALL POTENTIAL SPEAKERS
DIFFERENT PLUGINS INVOLVED

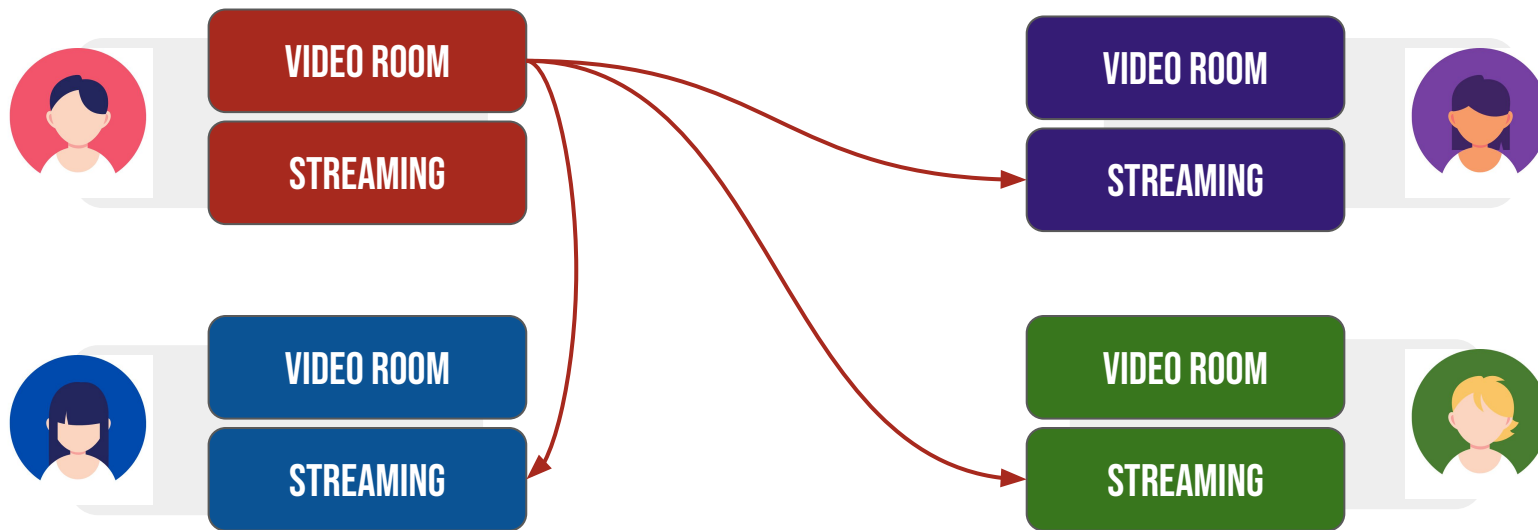


DIFFERENT SCENARIOS **BIG ISLAND**

AUDIO ONLY
MIXED AUDIO
MULTIPLE AUDIO BRIDGES
RTP PARTICIPANTS

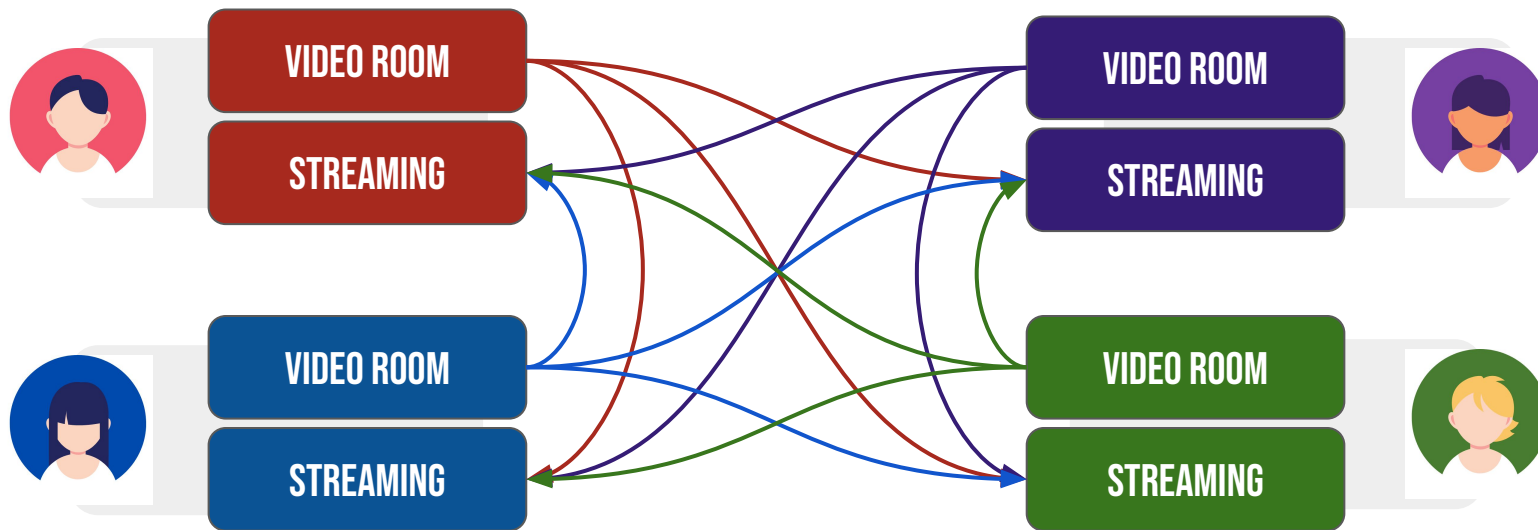


DIFFERENT SCENARIOS **BIG ISLAND**



SUPPORTING VIDEO - MEDIA MESH - STACK PER USER

DIFFERENT SCENARIOS **BIG ISLAND**



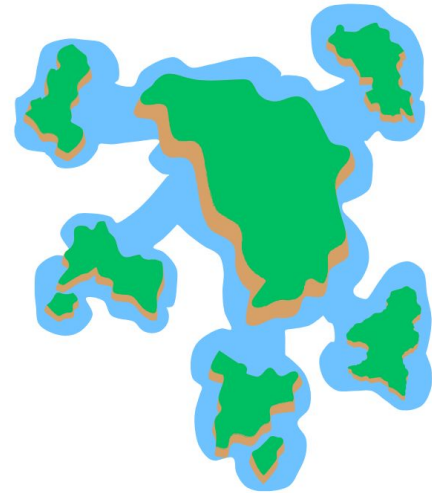
SUPPORTING VIDEO - MEDIA MESH - STACK PER USER

DIFFERENT SCENARIOS

| ATOLLO

| BIG ISLAND

A SESSION WITH A LOT OF VIEWERS | ARCHIPELAGO



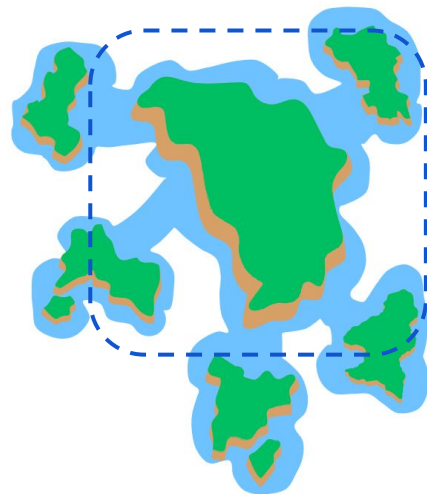
DIFFERENT SCENARIOS

| ATOLLO

| BIG ISLAND

A SESSION WITH A LOT OF VIEWERS | ARCHIPELAGO

A FEW SPEAKING USERS
A SINGLE AUDIO BRIDGE
A SINGLE VIDEO ROOM



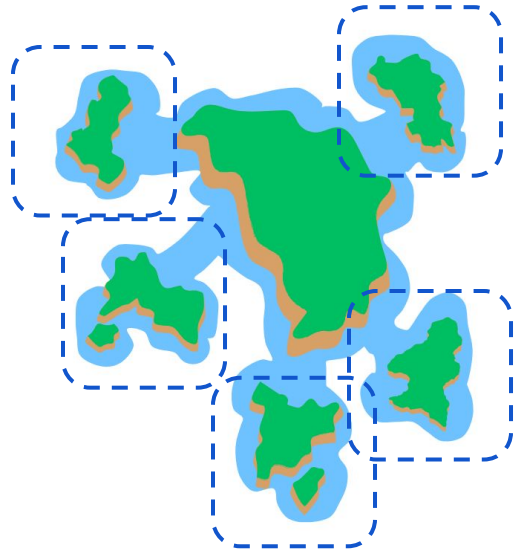
DIFFERENT SCENARIOS

| ATOLLO

| BIG ISLAND

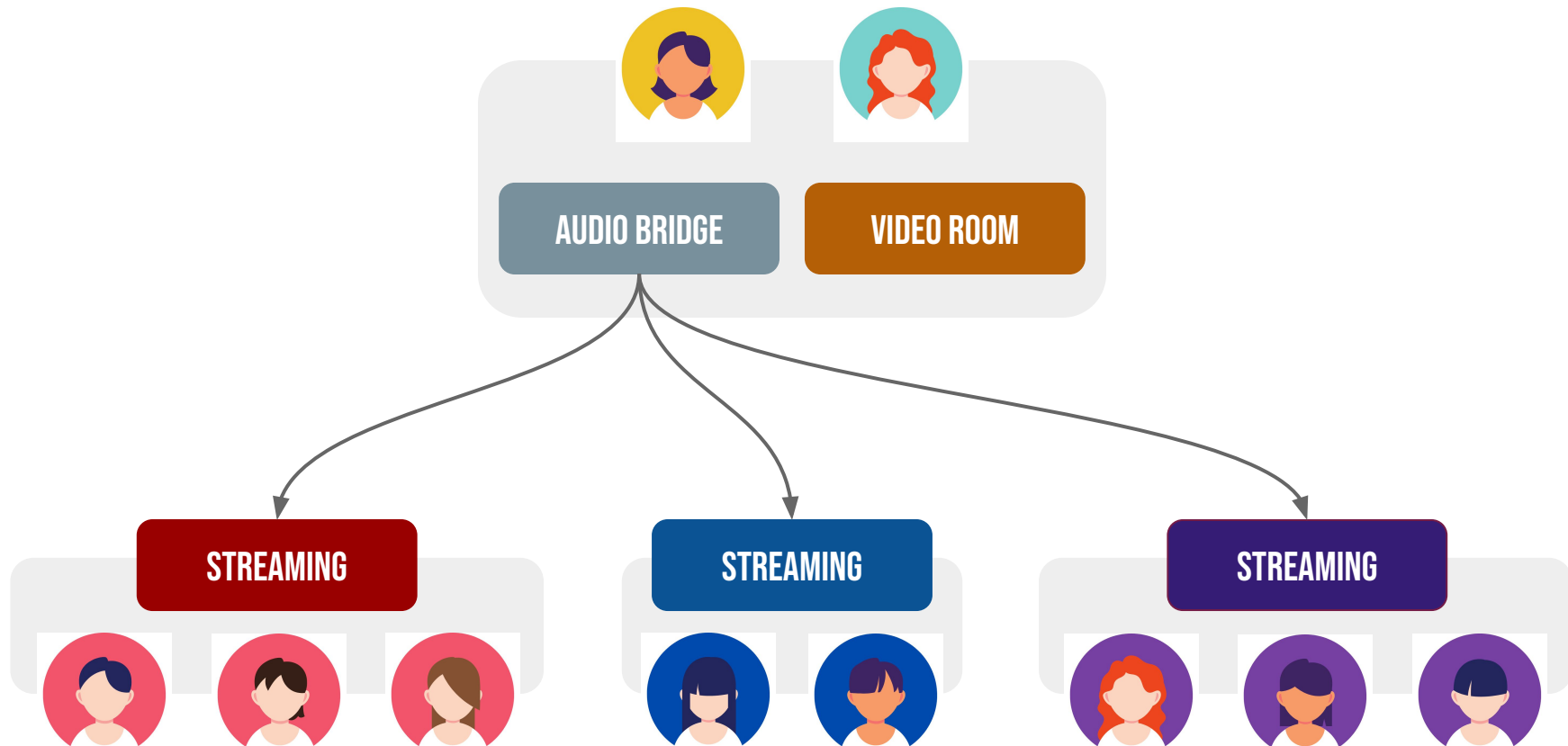
A SESSION WITH A LOT OF VIEWERS | ARCHIPELAGO

A LOT OF VIEWERS
MULTIPLE STREAMINGS



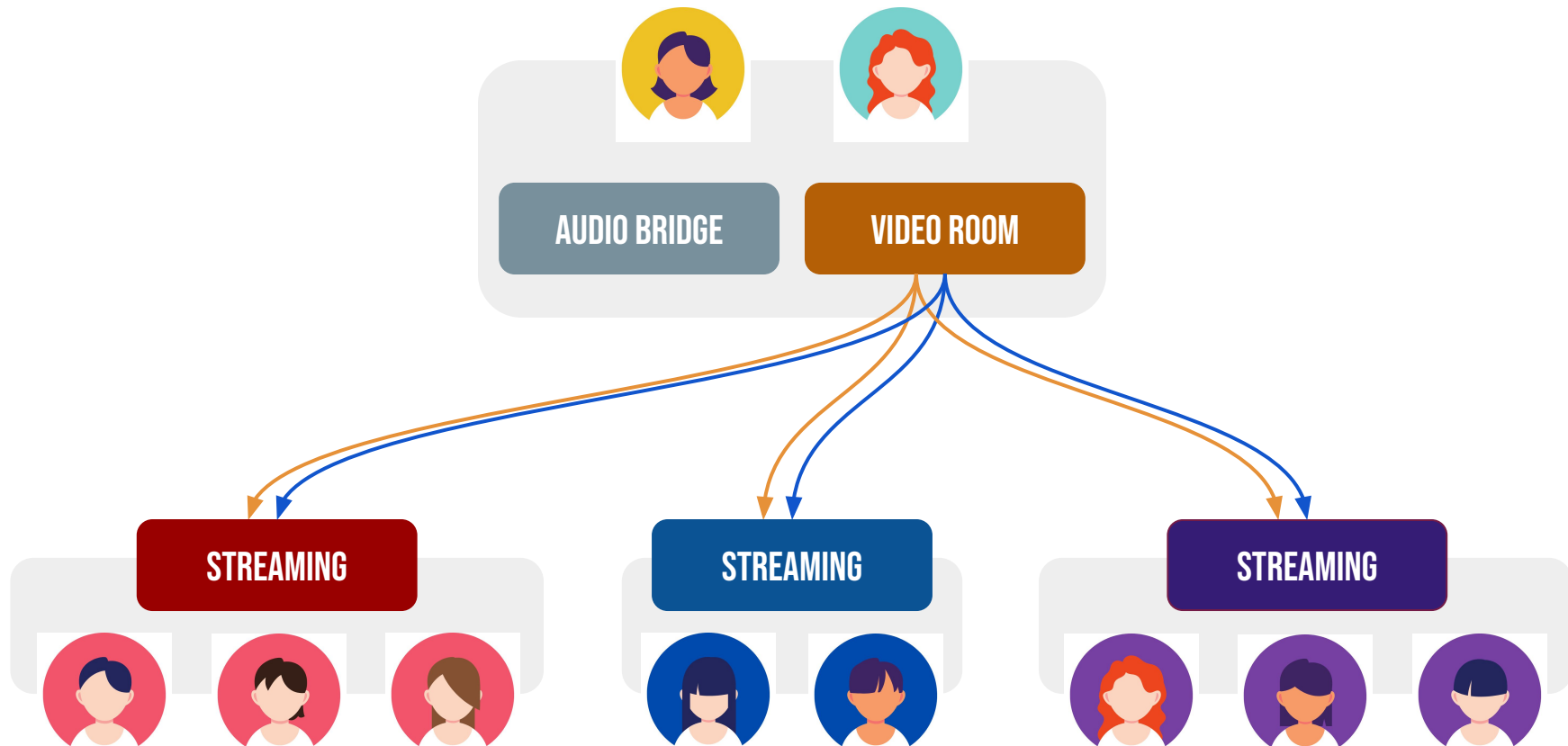
DIFFERENT SCENARIOS

ARCHIPELAGO



DIFFERENT SCENARIOS

ARCHIPELAGO



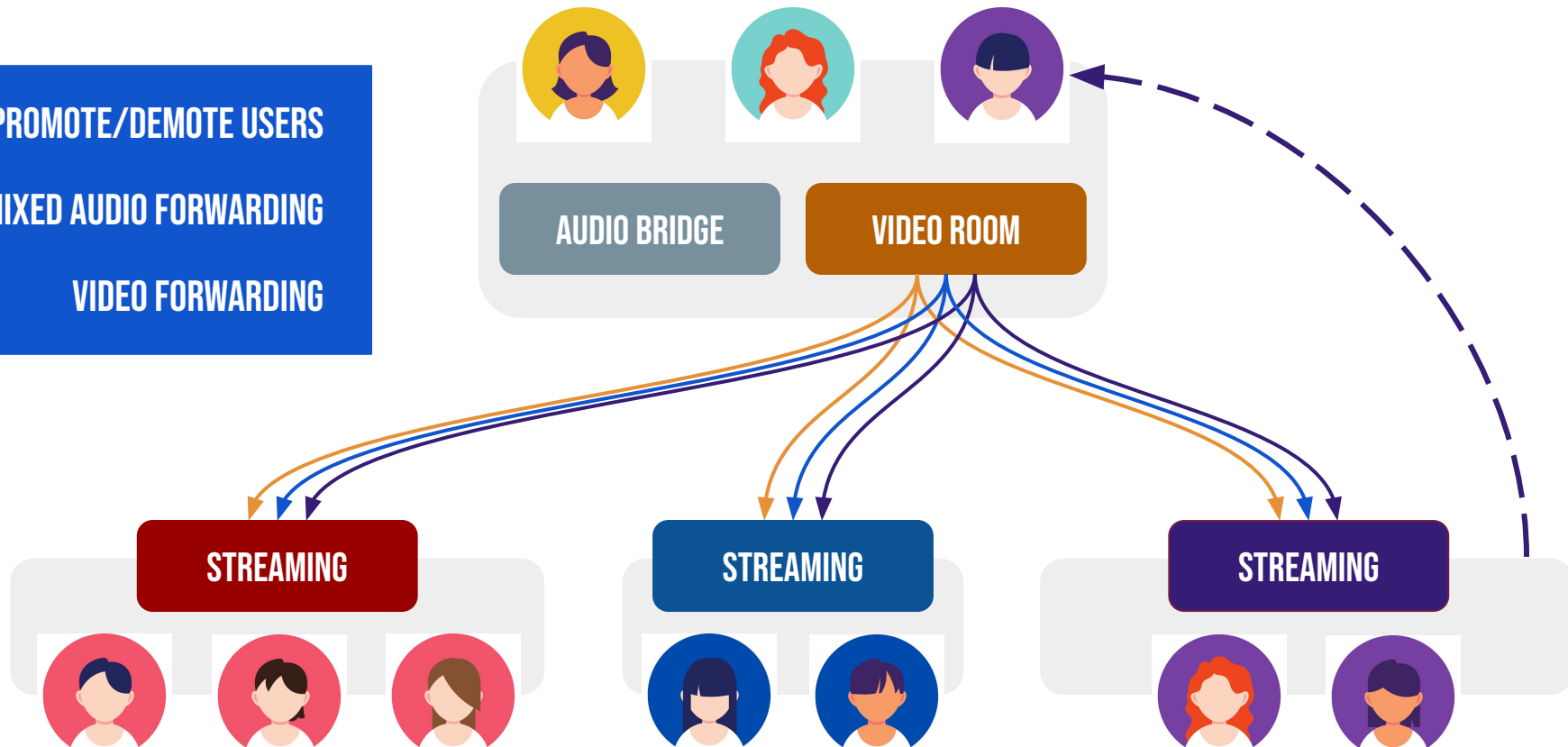
DIFFERENT SCENARIOS

ARCHIPELAGO

PROMOTE/DEMOTE USERS

MIXED AUDIO FORWARDING

VIDEO FORWARDING



DON'T THEY FIT YOU YET?

WE CAN MIX THEM!

WDYM BY MULTI-PURPOSE?

WDYM BY MULTI-PURPOSE?

1

**CLIENTS SHOULD BE
UNAWARE OF TECHNICAL DETAILS**

THEY DON'T CARE ABOUT WHICH SCENARIO THEY'RE USING

A SET OF COMMON REQUESTS TO FULFILL DIFFERENT OPERATIONS

NO SPECIFIC IMPLEMENTATION ON CLIENT SIDE

WDYM BY MULTI-PURPOSE?

2

**DIFFERENT KINDS OF RESOURCES ARE
MANAGED COMMONLY**

A SHARED WAY TO CONNECT DIFFERENT PLUGINS

AN AGGREGATION FOR DIFFERENT PLUGINS STATUS

A PROTOCOL/SYNTAX FOR STATUS UPDATES

WDYM BY MULTI-PURPOSE?

3

**WHAT YOU NEED IS
WHAT YOU GET**

AN OVERLAY NETWORK THAT MAPS NODES

AN ORCHESTRATOR ABLE TO BUILD THAT NETWORK

A LOT OF DUTIES

A SUPERSET OF
COMMANDS TO
HIDE DIFFERENCES

?

A WAY TO DEFINE
THE NODES
STATUS

?

A WAY TO SHARE
DATA BETWEEN
ENTITIES

?

AN ENTITY
RESPONSIBLE FOR
ORCHESTRATION

?

A LOT OF DUTIES

JANODE

**A WAY TO DEFINE
THE NODES
STATUS**

?

**A WAY TO SHARE
DATA BETWEEN
ENTITIES**

?

**AN ENTITY
RESPONSIBLE FOR
ORCHESTRATION**

?

A LOT OF DUTIES

JANODE

DATA COLLECTION

**A WAY TO SHARE
DATA BETWEEN
ENTITIES**

?

**AN ENTITY
RESPONSIBLE FOR
ORCHESTRATION**

?

A LOT OF DUTIES

JANODE

DATA COLLECTION

ETCD

**AN ENTITY
RESPONSIBLE FOR
ORCHESTRATION**

?

A LOT OF DUTIES

JANODE

DATA COLLECTION

ETCD

THE BROKER

DIFFERENT NODES



DIFFERENT NODES

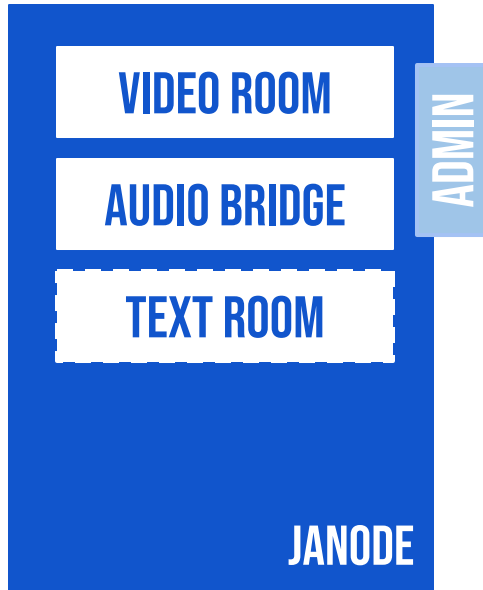
OPAQUE CLIENT API

ABLE TO FORWARD RTP

IT CAN ACT AS AN INGRESS/EGRESS FOR RTCDN



DIFFERENT NODES



OPAQUE CLIENT API

ABLE TO FORWARD RTP

IT CAN ACT AS AN INGRESS/EGRESS FOR RTCDN

IT CAN BE EXTENDED



DIFFERENT **NODES**

CAPABLE OF RECEIVING RTP STREAMS

IT CAN ACT AS AN EGRESS NODE FOR RTCDN

BETTER PERFORMANCE FOR LARGE NUMBERS OF USERS



A LOT OF DUTIES

JANODE

**A WAY TO DEFINE
THE NODES
STATUS**

?

**A WAY TO SHARE
DATA BETWEEN
ENTITIES**

?

**AN ENTITY
RESPONSIBLE FOR
ORCHESTRATION**

?

A LOT OF DUTIES

JANODE

DATA COLLECTION

**A WAY TO SHARE
DATA BETWEEN
ENTITIES**

?

**AN ENTITY
RESPONSIBLE FOR
ORCHESTRATION**

?

SHARING THE STATUS

THE NODE PRESENTATION

THE NODE STATUS

THE PLUGIN DATA

SHARING THE STATUS

THE NODE PRESENTATION

THE NODE STATUS

THE PLUGIN DATA

NODE ID

ADDRESS/PORT

NODE TYPE

SHARING THE STATUS

THE NODE PRESENTATION

THE NODE STATUS

THE PLUGIN DATA

CPU USAGE

MEMORY USAGE

CURRENT WEIGHT

SHARING THE STATUS

THE NODE PRESENTATION

THE NODE STATUS

THE PLUGIN DATA

CONTEXT

HANDLERS

PUBLISHERS

ACTIVE FORWARDERS

(FOR THE VIDEO ROOM PLUGIN)

SHARING THE STATUS

THE NODE PRESENTATION

THE NODE STATUS

THE PLUGIN DATA

CONTEXT

MOUNTPPOINTS

VIEWERS

(FOR THE STREAMING PLUGIN)

A LOT OF DUTIES

JANODE

DATA COLLECTION

**A WAY TO SHARE
DATA BETWEEN
ENTITIES**

?

**AN ENTITY
RESPONSIBLE FOR
ORCHESTRATION**

?

A LOT OF DUTIES

JANODE

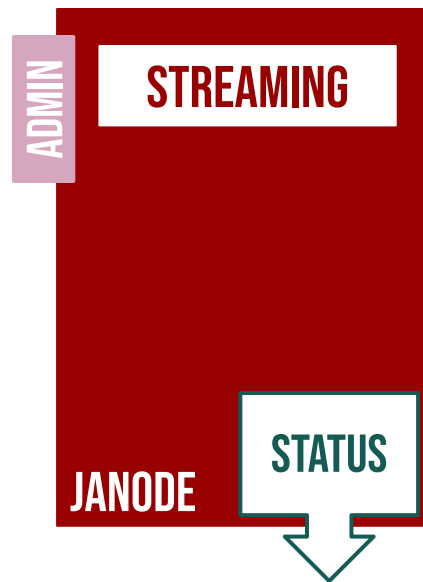
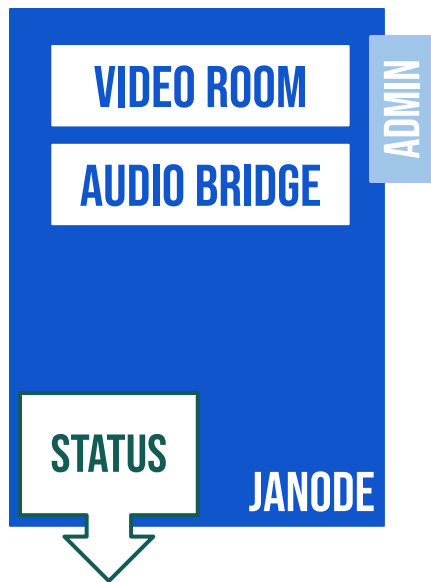
DATA COLLECTION

ETCD

**AN ENTITY
RESPONSIBLE FOR
ORCHESTRATION**

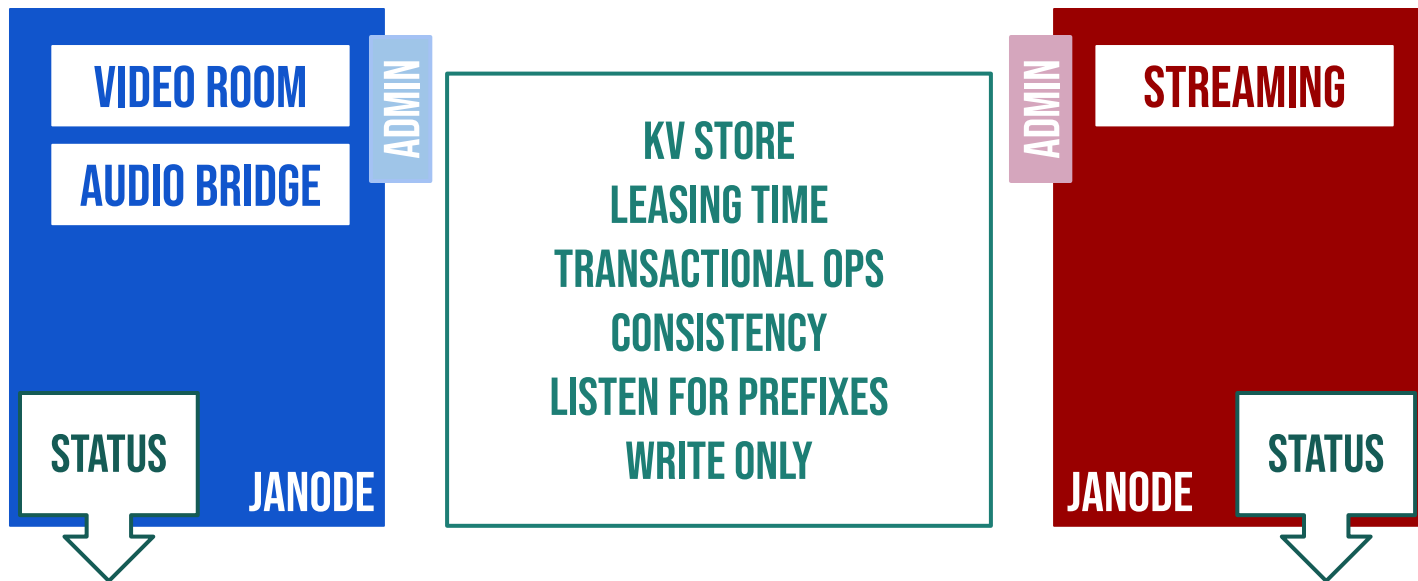
?

SHARING THE STATUS



ETCD

SHARING THE STATUS



SHARING THE STATUS

READER

WAITS FOR A KEY WITH PREFIX **JN**

HITS **JN** - PARSES THE **ID (NODE-1)** AND THE **TYPE (VR)**

LOOKS FOR THE KEY **VR:NODE-1:ADDRESS**

LOOKS FOR THE KEY **VR:NODE-1:CPU**

LOOKS FOR THE KEY **VR:NODE-1:MEM**

LOOKS FOR THE KEY **VR:NODE-1:WEIGHT**

WRITER

WRITES **VR:NODE-1:ADDRESS** = 10.10.10.10:5060

WRITES **VR:NODE-1:CPU** = 10

WRITES **VR:NODE-1:MEM** = 25

WRITES **VR:NODE-1:WEIGHT** = 30

WRITES **JN:NODE-1** = VR

A LOT OF DUTIES

JANODE

DATA COLLECTION

ETCD

**AN ENTITY
RESPONSIBLE FOR
ORCHESTRATION**

?

A LOT OF DUTIES

JANODE

DATA COLLECTION

ETCD

THE BROKER

THE BROKER

IT IMPLEMENTS A SET OF NODE WRAPPERS

WRAPPERS ARE STORED INTO FAST SEARCHABLE STRUCTURES

EACH WRAPPER IS RESPONSIBLE FOR ITS STATUS AND API

LINKED WRAPPERS BUILD A VIRTUAL MAP

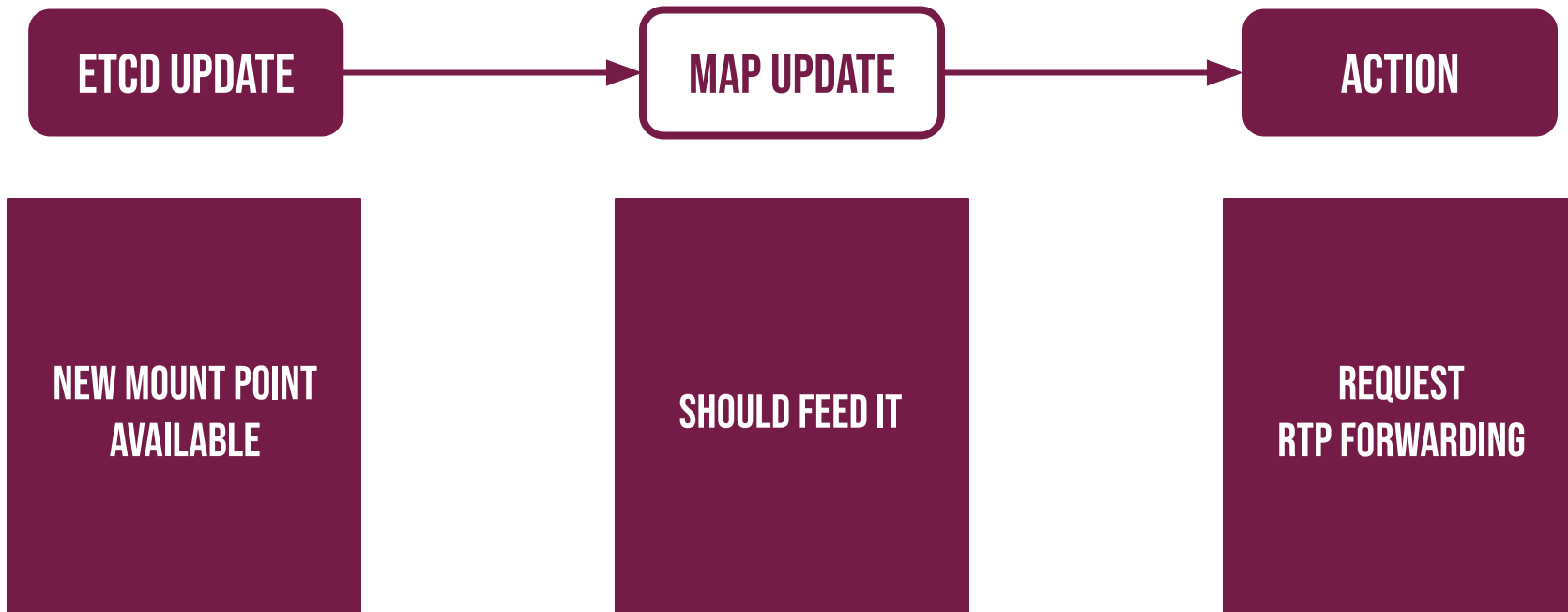
MAP CHANGES ON ETCD UPDATES AND CAN TRIGGER ACTIONS



THE BROKER



THE BROKER





THE BROKER

NO LOCAL DATA PERSISTENCE

IT ACCEPTS FUNCTIONAL REQUESTS - HTTP API

EACH REQUEST TRIGGERS A DECISION

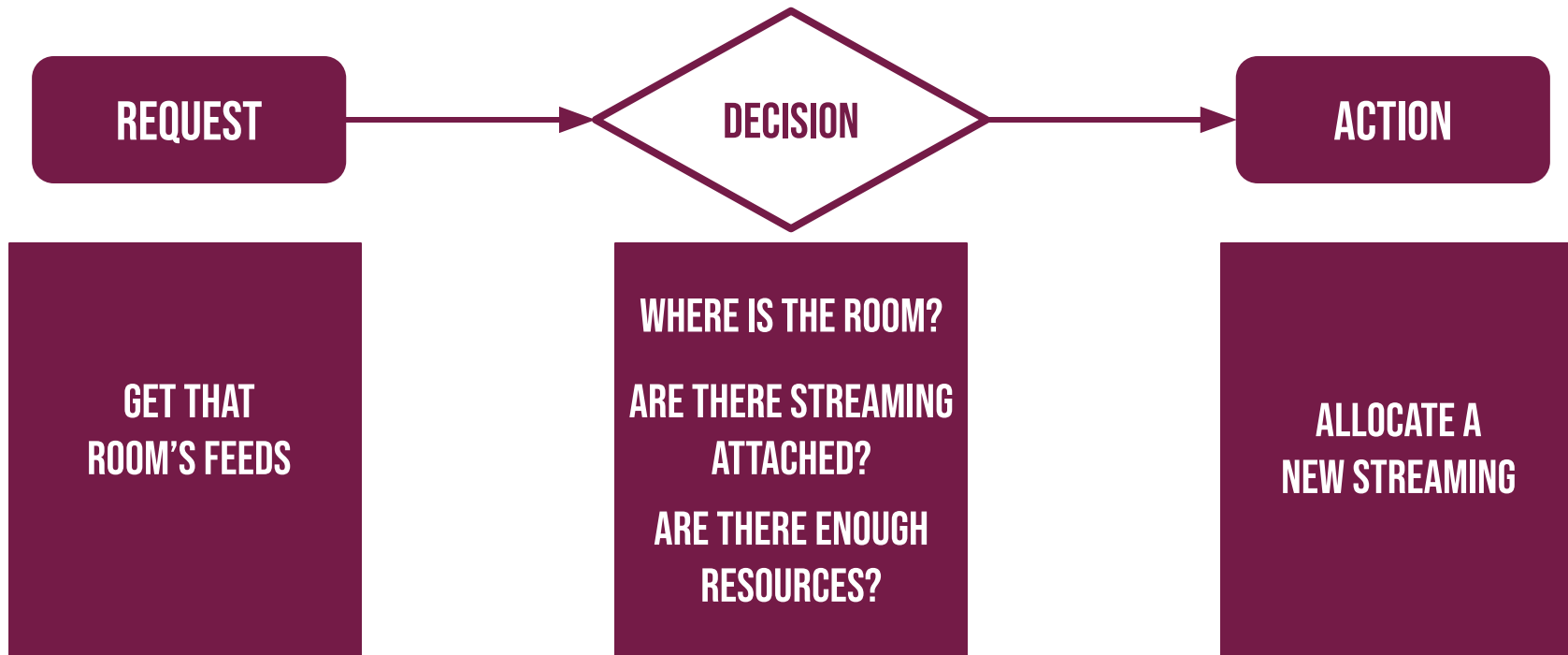
THE DECISION IS FOLLOWED UP BY AN ACTION

IT'S THE ONLY ENTITY THAT KNOWS THE OVERALL TOPOLOGY

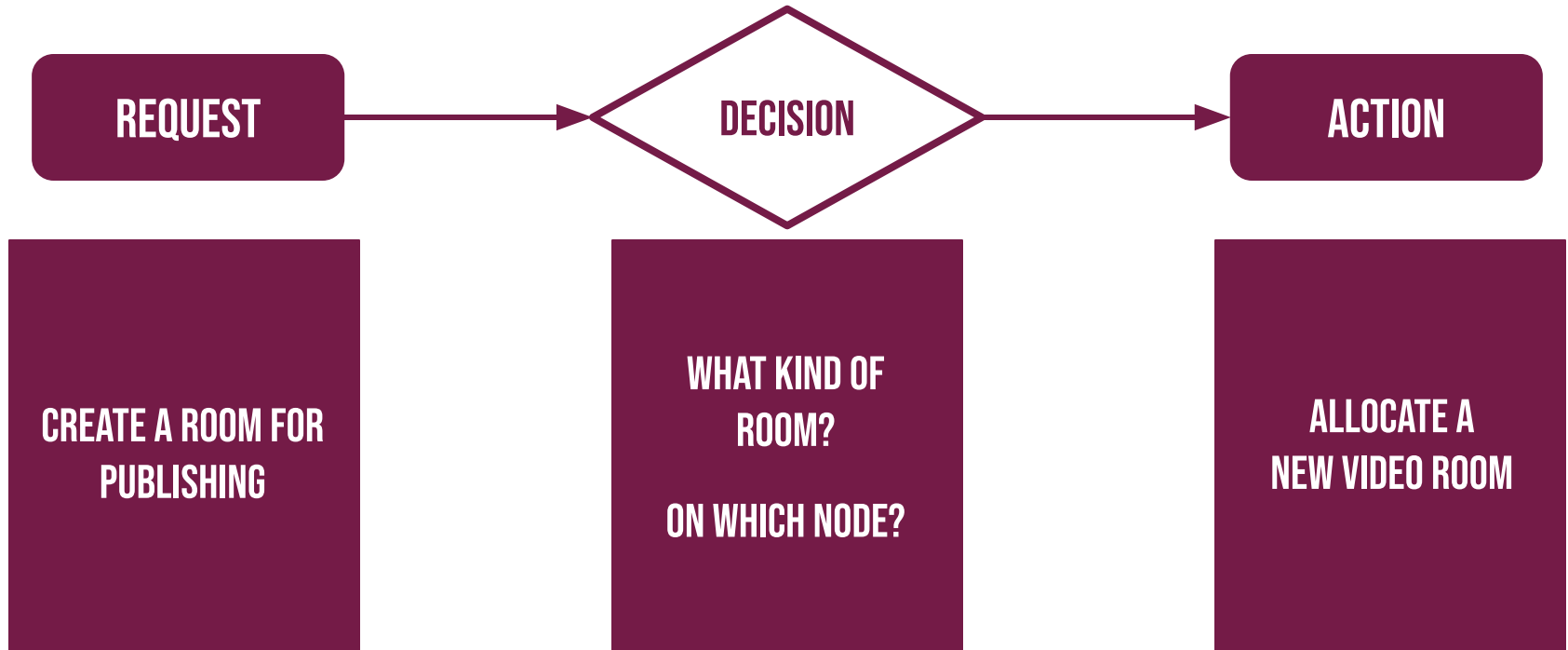
THE BROKER



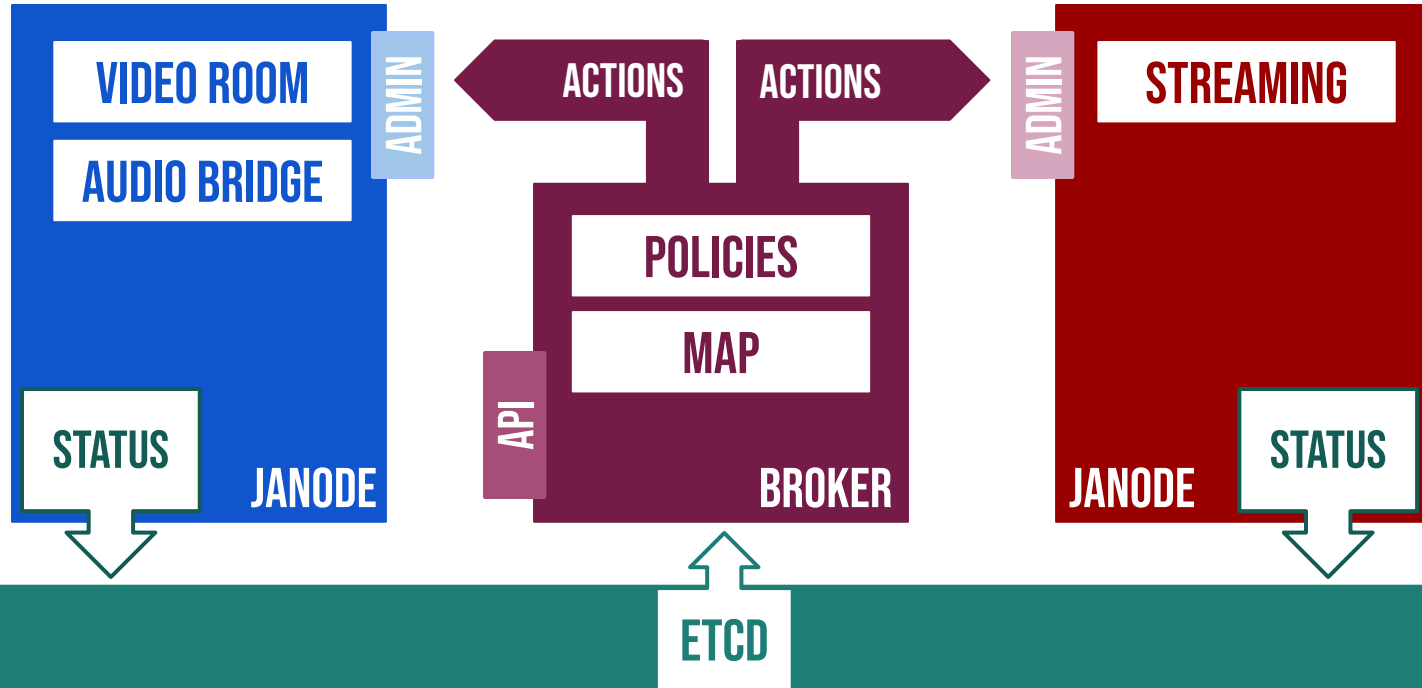
THE BROKER



THE BROKER



WRITE THE DATA, READ THE DATA



FAULT TOLERANCE

SOMETIMES THINGS CAN GET WORSE

FAULT TOLERANCE

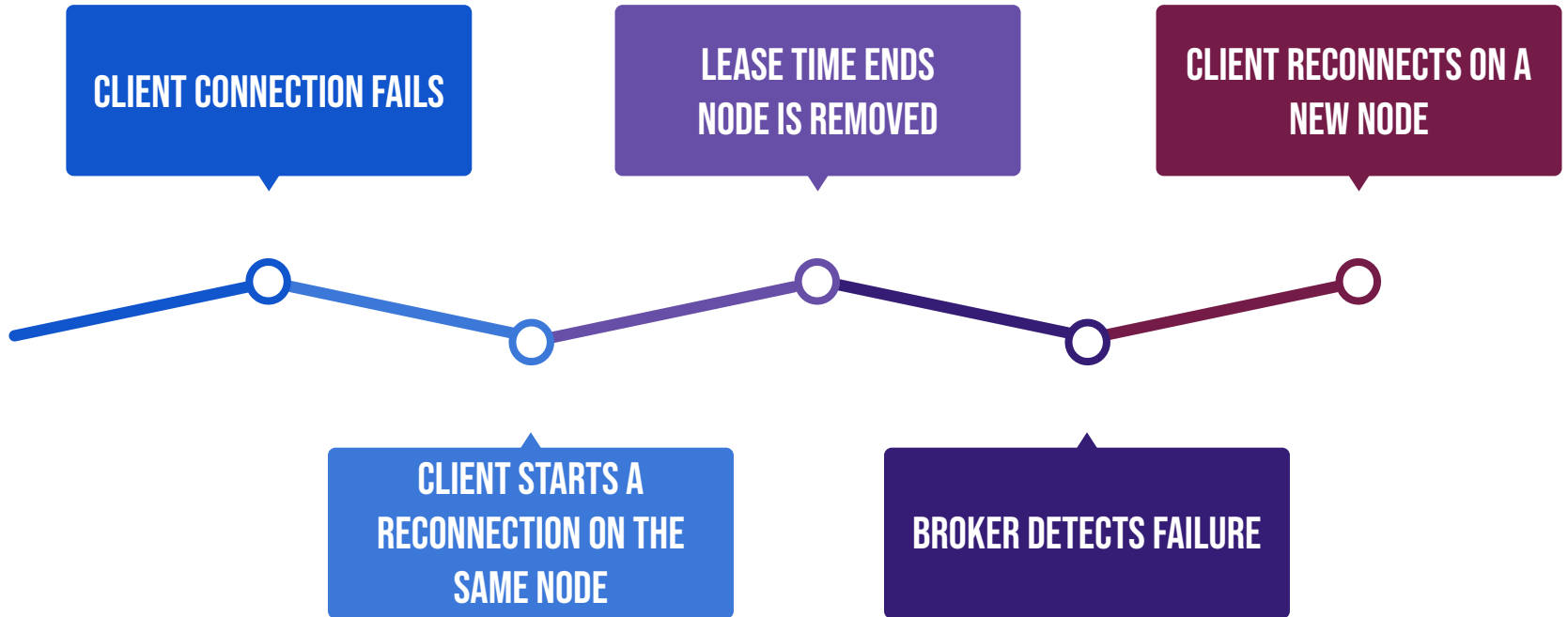
CAUTION

**MAYBE SIGNS HADN'T
WORKED PROPERLY**

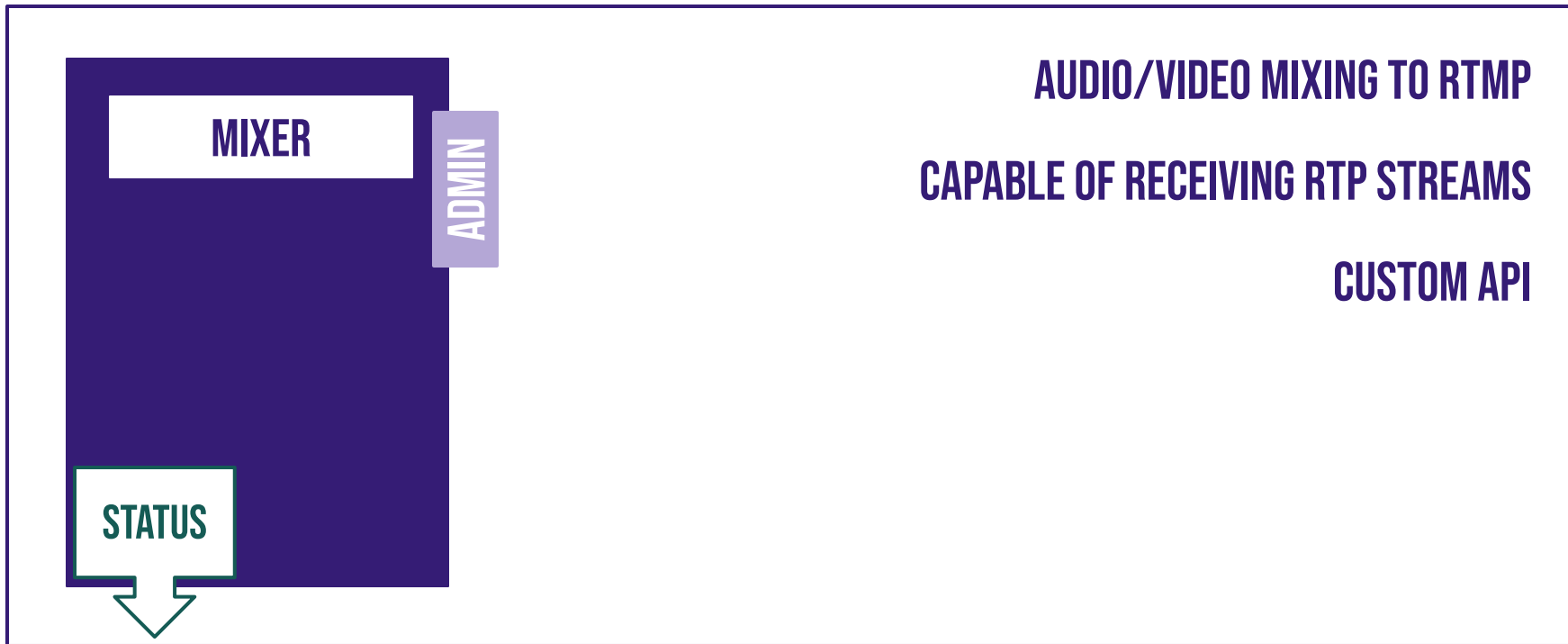


**DO NOT
UNPLUG**

FAULT TOLERANCE



EXTENDING THE INFRASTRUCTURE



EXTENDING THE INFRASTRUCTURE

A.I. MODULES

ADMIN

STATUS

REAL-TIME MEDIA PROCESSING

LIVE MEDIA ENRICHMENT

CAPABLE OF SENDING/RECEIVING RTP STREAMS

TRANSCRIPTION, SUMMARIZATION, FACE RECOGNITION



A REAL WORLD EXAMPLE



I E T F[®]

+180 SESSIONS PER WEEK

UP TO 10 SIMULTANEOUS SESSIONS

HANDLING BOTH ONSITE AND REMOTE USERS

LIVE TRANSCRIPTION, MEDIA MIXING

+1K UNIQUE PARTICIPANTS

MIXING ATOLLO & ARCHIPELAGO

Satisfaction

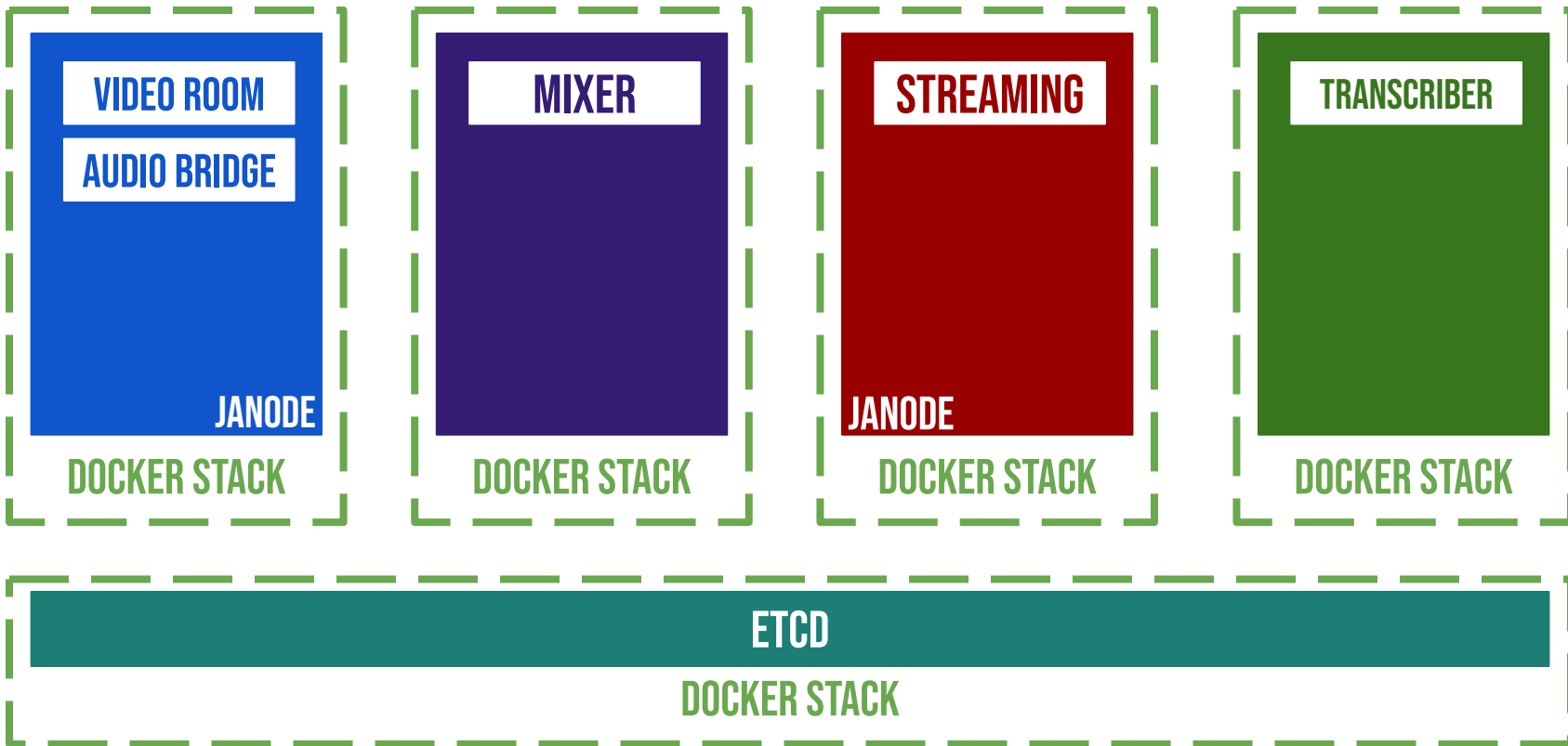
Overall satisfaction is 4.24, down on recent meetings but still a good result. With some key exceptions, the satisfaction scores remain high, reflecting the various improvements made since we returned to onsite meetings.

The table below shows the satisfaction scores for the last six meetings, along with colour coded indicators for the five point scale above: excellent (●), good (●), acceptable (●), poor (●), very poor (●)

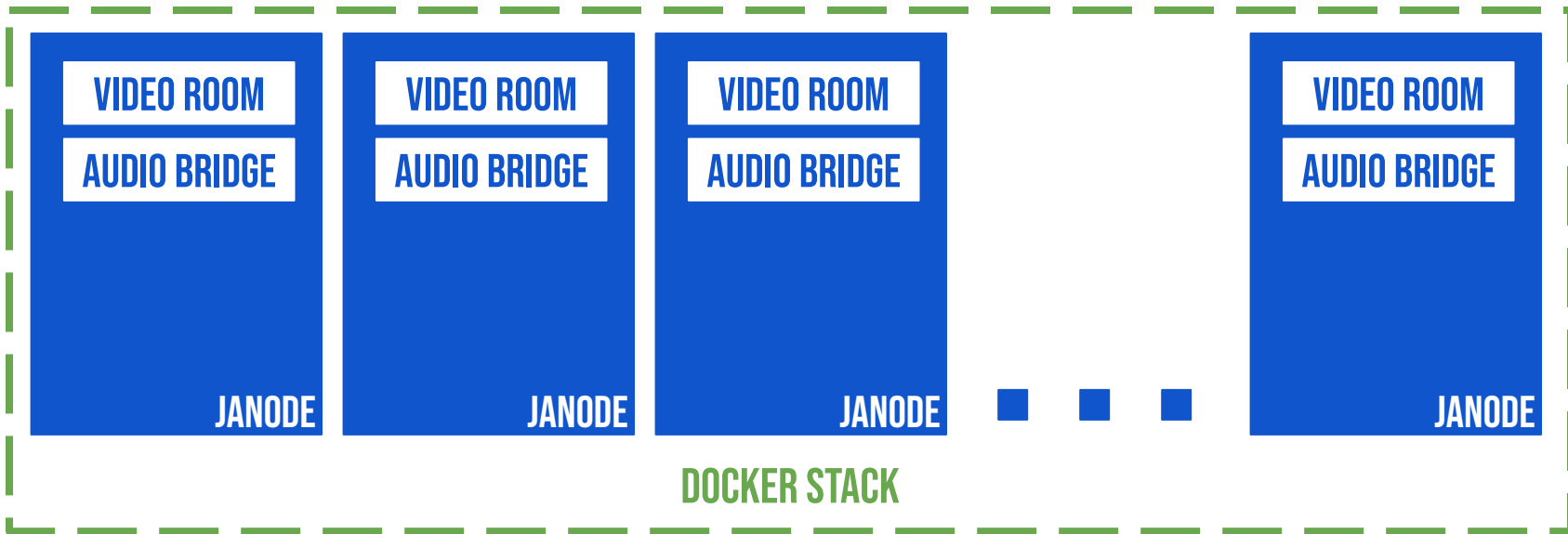


PARTICIPATION MECHANISMS	
Meetecho	4.50 ●
Gather	-
Zulip	3.86 ●
Jabber	-

ONE DOCKER TO RULE THEM ALL



ONE DOCKER TO RULE THEM ALL



...REPLICATING EACH NODE

APPLICATION MICROSERVICES

DATABASE

DOCKER STACK

NGINX

DOCKER STACK

AUTH-GATEKEEPER

DOCKER STACK

USER BACKEND

DOCKER STACK

ADMIN BACKEND

DOCKER STACK

SLIDE PROCESSOR

DOCKER STACK

APPLICATION MICROSERVICES

CONTROLLER

DOCKER STACK

RECORDINGS

DOCKER STACK

CHAT SERVICE

DOCKER STACK

MONITORING

DOCKER STACK

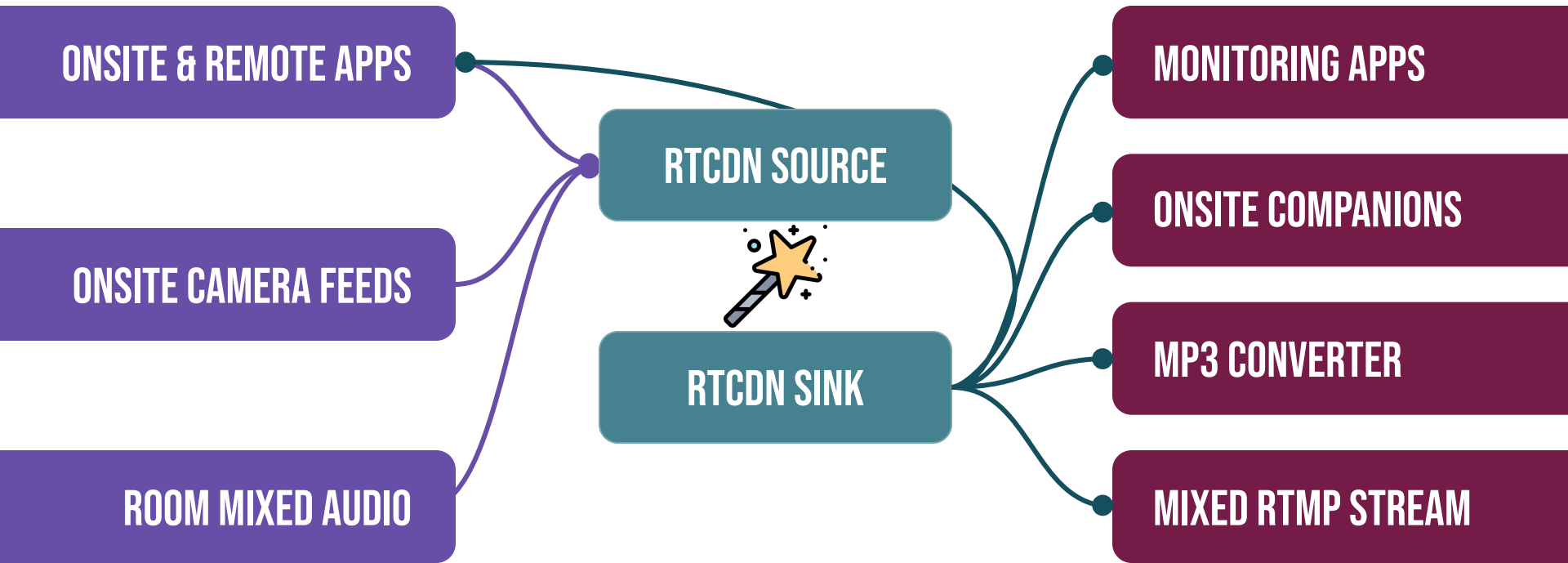
...

DOCKER STACK

ANYTHING ELSE!

DOCKER STACK

MULTIPLE INGRESS - EGRESS



ISSUES THAT CAME UP

PUBLISHING AUDIO DELAY

TOPOLOGY ASSESSMENT TAKES TOO LONG

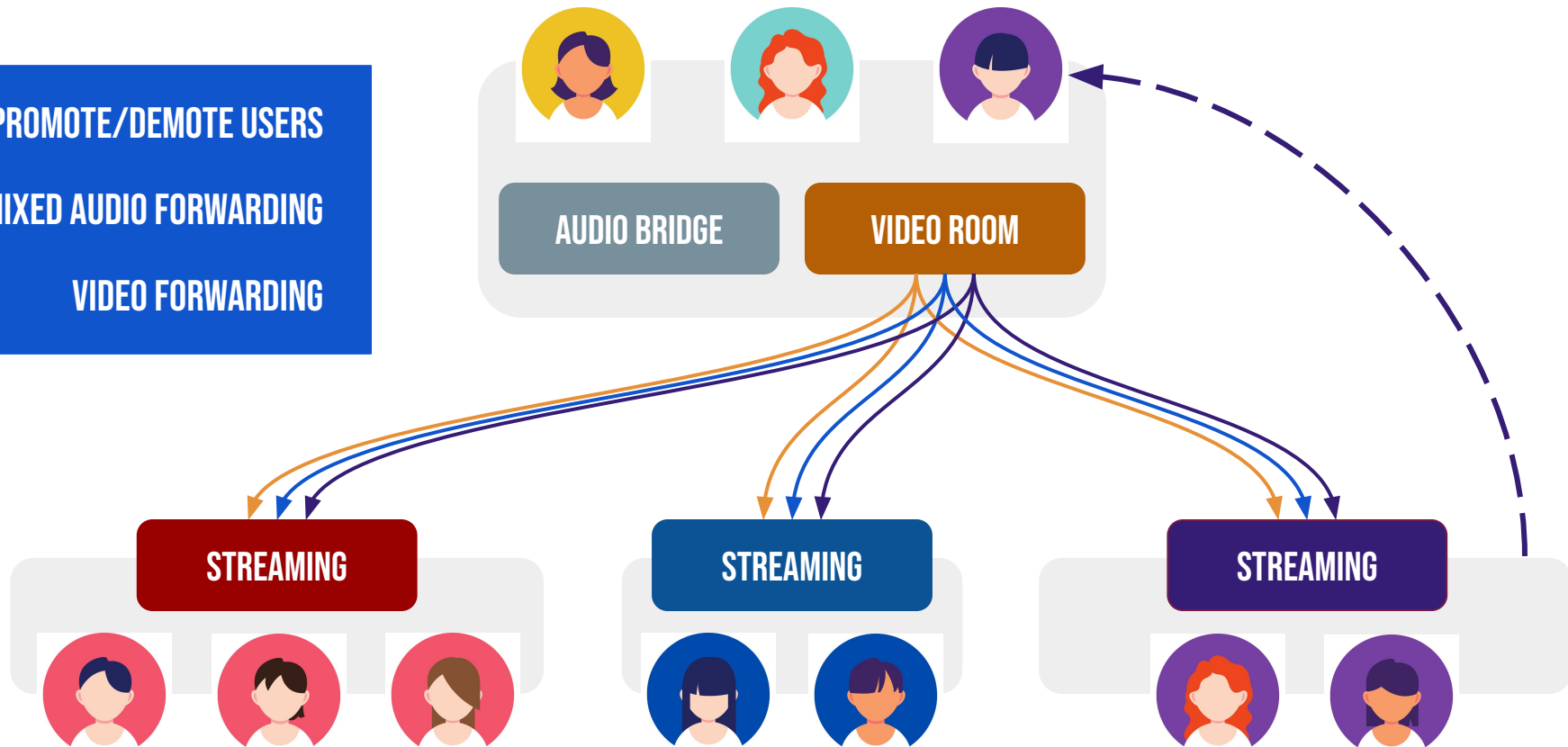
DIFFERENT SCENARIOS

ARCHIPELAGO

PROMOTE/DEMOTE USERS

MIXED AUDIO FORWARDING

VIDEO FORWARDING



ISSUES THAT CAME UP

PUBLISHING AUDIO DELAY

USERS ALWAYS ATTACHED TO AUDIO BRIDGE

CLIENT SIDE AUDIO ENCODER SHUTDOWN

ISSUES THAT CAME UP

PUBLISHING AUDIO DELAY

USERS ALWAYS ATTACHED TO AUDIO BRIDGE

CLIENT SIDE AUDIO ENCODER SHUTDOWN

AUDIO SUSPENDED MODE

ISSUES THAT CAME UP

SESSION OPENING BURST

THEY CAN OVERCOME THE TOPOLOGY ELASTICITY

ISSUES THAT CAME UP

SESSION OPENING BURST

ADDING A WARM-UP OPTION

THAT ALLOCATES MORE RESOURCES IN ADVANCE

ISSUES THAT CAME UP

SCALE DOWN

ABANDONING USERS CAUSE SPARSE GRAPH

ISSUES THAT CAME UP

SCALE DOWN

**REORGANIZE TOPOLOGY WHEN USAGE
IS BELOW A THRESHOLD**

NEXT STEPS

MONITORING & LOGGING

PLUGGABLE BROKER POLICIES

MORE A.I. MODULES

GEOLOCALIZATION

CLIENT SIDE SDK

MULTISTREAM

THE SLIDE IS OVER!

**PLEASE CLAP YOUR HANDS
AND ASK NO QUESTIONS!**

