resonate

Our Technology

Why, What, How and Where

Purpose and Audience

This is a brief introduction to Resonate's technology landscape aimed to help volunteers feel a little more at home and find a place to get started.

It tries to provide a 'big picture' of our technology starting with a little recap of context, the 'why', the purpose of Resonate… and the implications of that for our technology

It then covers the 'what' Resonate technology needs to do to to fulfil that purpose, and..

the 'how' and 'where' we do that today (our current architecture) and how we will do that in future (the target architecture) along with all the links to the various github repositories and working documents in our Basecamp.

Hope that helps! Please add comments / suggestions and edits to this deck so that it's better and more complete for the next reader!

The Why

A little context and background

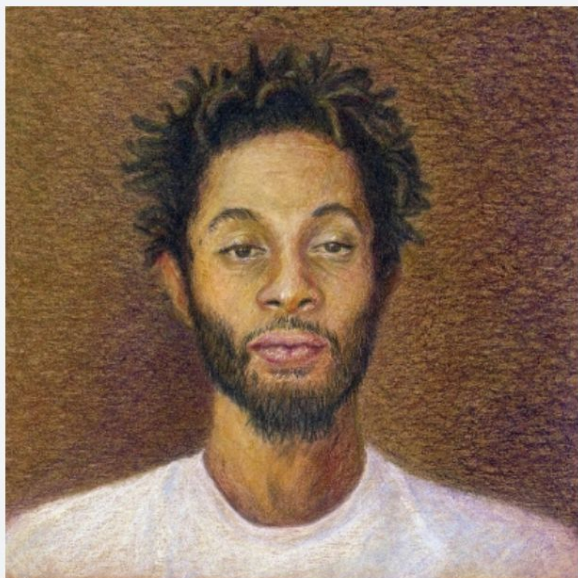## Browse

Artists

Labels

New

Library

Favorites

Owned

History

Top Favorites
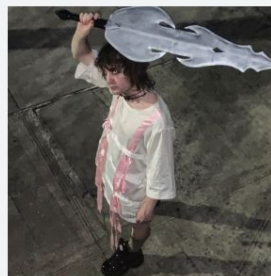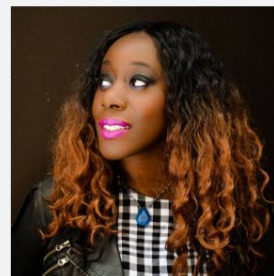
Staff Picks

Support

random   search

Featured Artists

OCnotes

Anomie

Dasychira

Madame So

Marco Betta

Elsa Hewitt

Leon Foster Thomas

Featured Bands

Vectors
Silk Road Assassins

Why are we doing this?

Play Fair: To enable trusted and fair peer-to-peer value creation and sharing between artists, listeners and curators in music-streaming *without* the value extraction and economic distortion seen in the mainstream, centralised music-streaming subscription platforms.

Peace and Community: "Musicians play a powerful role in local community building, which in turn contributes to global peacemaking"*. Musicians need to develop and disseminate their art and need legal, technology, and business skills. Global mega-streaming has brought attention to a few, leaving behind the many small artists and independent labels. Inequality and unreliability of internet access is a cause of further division.

Because we can, together, open source: To reduce the dependence of local communities, especially co-operatives, on ever more powerful and dominant corporate cloud architectures, we think we can build out our service in a co-operative ecosystem based on open-source technologies.

Access to Play: To ensure equality and affordability of access to a global music streaming community when poor countries, disadvantaged minorities and stateless communities are often excluded by Western/Northern-dominated music streamers and poor internet access.

Why Now?
The Covid-19 pandemic has caused a crisis for artists globally as their mainstay performance income has collapsed, yet the boost to the income of centralised streaming platforms has not been passed on fairly. Smaller independent artists, especially those in emerging economies are even more disadvantaged by limited and sometimes censored access to the technologies of the dominant streaming platforms. The global listening public are becoming more aware of the problem, as seen in the #BrokenRecord campaign on Twitter.

The Co-op

A co-operative is a kind of company that allows everyone involved to be a co-owner; everyone gets to share in decisions and profits.

We think this "one member, one share, one vote" system is democratic, and supports community in a crucial way.

Resonate is a co-op because we believe that everyone should have the opportunity to own their platform, not just mega-rich stars.

Everyone involved has a say in how the company runs.

Profits

Resonate will share any and all profits with consumers (listeners) and workers (musicians, labels, staff and volunteer contributors).

Members will be able to trade their profits for more streams and downloads and/or withdraw as cash.

Changing the way that streaming works for music communities everywhere

Needs	Today's Pain	Play Fair with Resonate
As an Artist I want to share my music and stories with others in the community and be fairly rewarded for streams of my work.	I can upload to the major 'mega-streaming' platforms with help from friends, but few in the community can access it. I rely on local broadcast radio and DJ's. Mega-streaming is very impersonal… it's not a 'community' in the human sense. I don't see any streaming income from my work. My music is buried by the 'big AI', but I'm well known and respected locally. I can't afford to promote to 'playlisters'. Maybe I will be 'discovered' somehow?	It's easy to upload my music to the community cloud using the upload tool. I know it's easy for listeners to hear my work. Resonate is a *community* platform where artists, listeners and curators engage and build mutual trust, through shared music and discussion. Music is treated as Art and interaction, not 'commodity content'. As a member, I own a part of this and have a say, and a vote when it matters. I can see all my plays and earnings. Resonate 'active listeners' and curators care about new music and will seek it out in the community. Our curators may also be influencers on the mainstream mega-streaming platforms. Stream 2 Own gives me a decent reward.
As a new / occasional visitor / explorer I want it to be easy to listen to local music or stories, for a short trial listen, unauthenticated	I can't get access, because it's unreliable, with constant 'brown-outs', or it is blocked or censored, or I simply can't afford the local bandwidth charges. I don't like the sign up and ads on the so-called 'free' services.	Our community keeps an instance of the community streaming server and a local network up and running so long as we have power or solar. Our public community catalogue is always there and we also have some of the stuff we all like downloaded earlier from other community clouds. We sync when we can. The player is simple and works on almost everything. There's an API.
As a new listener I want to be able to use some existing ID provider credentials (eg phone provider) but I also want the option to be 'pseudonymous' especially for my activist work.	When I sign up with these music streaming services they push me to link up with my social media accounts and groups. I don't trust those other big, centralised social media platforms. I'm worried that my ID information is being correlated. Will my government know about me and my friends?	I can sign up as a member, providing the minimum of legally-required information and I receive greeting / on-boarding information, including access to the global community forum, where I can find my local community group. I can easily and securely access and maintain my personal membership data and transaction history and I can recover it via my network of trusted friends if my credentials are lost or compromised
As a member / supporter I want to be sure that my subscription payments translate into real income for artists at rates better than the 'mega-streamers' offer.	When I find a new emerging artist and listen a lot I realise (#BrokenRecord) they will get *nothing* from streaming. The only way I can support them is by donation or Bandcamp. But I can't afford to buy from *everybody* I like… it's not *fair*.	Stream-2-Own is a fair way of measuring and paying for my global streaming. I can 'buy now' to accelerate funding to artists I really like. I own all my listening and payment history. No one else makes money out of it without asking. As a member, I own a part of this and have a say, and a vote when it matters.

Scaling Up - Growth!

Plays

Beta Service Today	2000 artists 13000 tracks	Very low	Few active listeners, but 13k signups
New Launch	2000++ artists 13000++ tracks	120K per month	7.5K listening

RAPID
GROWTH
NEEDED!

Why - Technology Goals and Principles (1)

#	Title	Statement	Rationale	Implications (examples)
1	Easy to visit	Make it easy for anyone to visit and listen for sample plays	Growth!	Allow unauthenticated visits for preview plays. Plentiful / easy social media interaction / integration.
2	Easy to Join	Make it easy for new joiners	Growth and co-op income!	Simple, well-signposted signup pathways and easy payment options.
3	Trusted - Probity, Security and Compliance	We protect and maintain the integrity of our service and member information against threats, taking a risk-based approach. We act with probity and transparency.	We must comply with applicable regulations in jurisdictions where consistent with our co-operative values.	Keep control of safe and secure ID handling in our ecosystem. Handle member funds and payments securely and accurately. Comply with GDPR, AML / KYC and Auditability.
4	Trusted - Privacy	Ask only for information necessary to provide the service and always ask for permission before disclosure. No selling of user information.	Build and retain the trust of the community. Comply with GDPR. Differentiates us.	User is 'self-sovereign' in ID information. Allow members to easily and securely maintain/remove their membership data. Secured API's. Encrypt and protect at rest and in transit.
5	Developer Friendly	Make it easy for developers to find, join and get oriented so that they can engage in a satisfying and productive way.	Affordability of development. Motivation, diversity and energy of the Resonate team.	As simple as possible for client coding and support for our developer volunteers and make it easy for third party devs to link to / build on our service

Why - Technology Goals and Principles (2)

#	Title	Statement	Rationale	Implications (examples)
6	Ecosystem Friendly	The ecosystem platform and will be at the centre of a co-operative and technical API ecosystem, not a 'monolith'.	An ecosystem approach is essential for growth and innovation	API centric approach with well published and maintained developer materials and support. Microservices. API management.
7	Human Centric	We prioritise human interactions between members and use technology to augment rather than replace the human element.	Differentiates us. Humanises the co-op.	We will innovate and use tech like AI and ML in the service of members (e.g. music discovery) and increasing productivity, where appropriate.
8	Collaborative Governance	We make rational transparent decisions between alternatives, based on agreed principles and processes.	Co-operative principles. Better decision-making	Architecture and Development governance processes to be created and followed. Transparency and best value (e.g. open source, commodity IT)
9	Open Source, W3C standards	We prefer open source components and everything we do is open, where security permits.	The commons. Better code. Better collaboration.	PWA apps before proprietary, OIDC/OAUTH2 for identity, RESTful API's, Docs and repos on GitHub
10	Green IT	We prefer IT infrastructure services that are renewable powered and consider environmental impact in our IT decisions.	Human solidarity and survival.	Select renewable-powered data centres for hosting. Avoid inefficient technologies.

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The What

The *services* that are needed to deliver the 'why'

High Level Services, Context and Scope (Simplified)

Visitor   Listener   Artist   'Staff'

E1	Ext IDP
E2	Ext Content
E3	Ext Contacts

R1	Player
R2	Website
R9	Authorization

R6	Trackserver Content
R3	User
R8	Forum & Gov

| R5 | Payment |
| R4 | Membership and Partners |

| R13 | Search and Discovery |
| R7 | Uploader |

R12	Security
R10	Reporting
R11	Management and Dev

—————— Collaboration

· · · · · · · · Pseudonymous / unauth browse preview

– · – · – · – Content transfer client
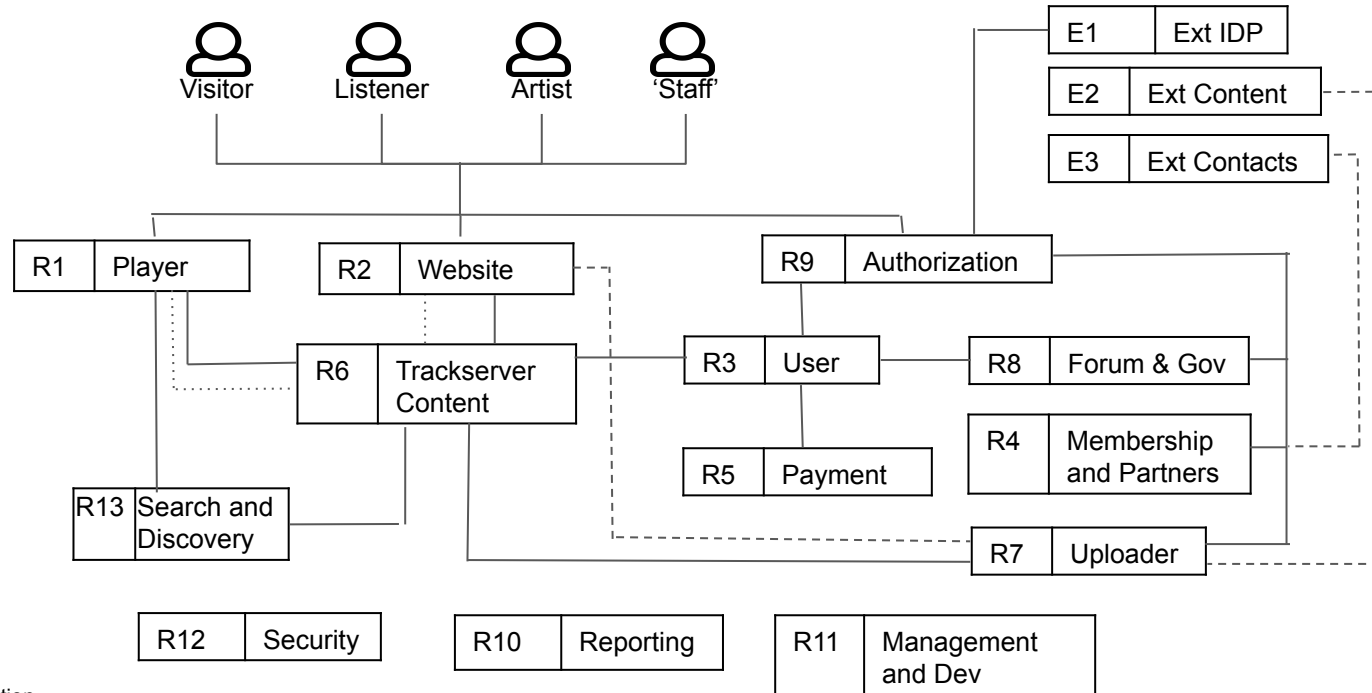
Resonate Service Catalogue

Ref	Name	Responsibility	Key Information	Key Collaborations
R1A	Player	Play content, free or paid plays	Listener	R6,R9
R1B	Discovery and Search	Discovery, Search and Playlisting	Listener	R6,R9
R2	Website	Coop and artist information content provision, signup (with GDPR permission) and profile	Content/Post, Music Maker, Coop Membership	R3,R4,R6,R9
R3	User	User account balance and paid play history	Listener, Plays, Track	R5,R6,R8,R9
R4	Membership and Partners	Membership class database, transactions and partner relationship management	Coop Membership, Transactions, Volunteer/Partner	R8,R9,E3
R5	Payment	Manage external payment service interfaces	Payment	R3
R6A	Trackserver Streamer	Respond to requests to deliver streams and content	Listener, Track	R1,R2,R3,R7
R6B	Trackserver Discovery	Respond to REST requests to explore and update content, track groups and metadata	Listener, Track, Track Group	R1,R2,R3,R7
R7	Uploader	Receive, catalogue and manage uploaded content	Music maker, Upload, Track	R6,R9,E2
R8	Forum & Gov	Community membership communications and community governance, including voting	Coop Membership	R3,R9,R4
R9	Authorisation	Respond to oauth/oidc authorisation/authentication requests and issue access tokens	Coop Membership, Listener, Music Maker	R1,R2,R3,E1,R8,R4,R7
R10	Reporting	Statistics, Audit and interface to Coop Accounts	Plays (and most others)	Many
R11	Management and Dev	Operational management, configuration console and dev lifecycle	Coop Membership (admins)	Many
R12	Security	Management of access control, data security, privacy and integrity	Coop Membership (admins), all roles and tx	Many
R13	Search & Discovery	Handle / create search requests, metadata queries, navigate	Listener, Track	R1,R6B
E1	Ext IDP	External identity provider	User ID data, tokens	R9
E2	Ext Content	External media content provision (e.g. artist tracks)	Track, Upload	R7
E3	Ext Contacts	External partner information	Volunteer/Partner	R4

Typical Information Resources

Coop Membership
- Full legal name (for both natural and legal persons)
- Member representative (legal persons)
- Full membership correspondence address
- DOB (natural persons must be 16 or over)
- Company / Business / Coop etc Registration Number (legal persons)
- Email address
- Alternate Email address
- Member ID (in addition to their User ID)
- Primary Share Class
- Other Classes
- Membership Contribution Status (Paid, Grace, Unpaid)
- Membership Share Renewal Date
- For each class
- Par Value
- Supporters Shares Balance
- Class voting status

Listener
- Name
- Nicename/alias
- Email address
- Alternate Email address
- User ID
- Payment/Repayment Reference
- GDPR status and date

Share Transaction
- Member ID
- Date and time
- Number of shares transferred to or from user (positive or negative respectively)
- Class of shares
- Method of transfer (purchase, gift, annulment, etc)
- Qualifying volunteer contribution value
- Qualifying volunteer contribution detail / reference

Music Maker
- Name
- Nicename/alias
- Email address
- Roles
- Qualifying track play ref
- Label Ref
- Distributor Ref
- Alternate Email address
- User ID
- Payment/Repayment Reference
- Disclaimer Status & Date
- GDPR status and date

Volunteer / Partner
- Member ID
- Role(s)
- Social Media Link(s)
- Capabilities
- Disclaimer Status & Date
- GDPR status and date

Other datasets (not a complete list)

Track & Metadata	Upload	Event Log
Plays	Payment	Content / Post

Note: datasets not normalised - data items mostly shown associated with key roles for clarity

The How and Where

How the services are implemented today, what is planned for them and where you can find out more

Resonate Component Architecture - Overview

Current

The Resonate service at June 2020 is incomplete and stalled in development, with live service volunteer effort unable to keep up with new memberships, labels, artists and uploads. The Wordpress site is complex and unwieldy to use for profiles.

Wordpress plugins 'ultimate member' and 'stripe' and mailchimp outdated / risky to maintain

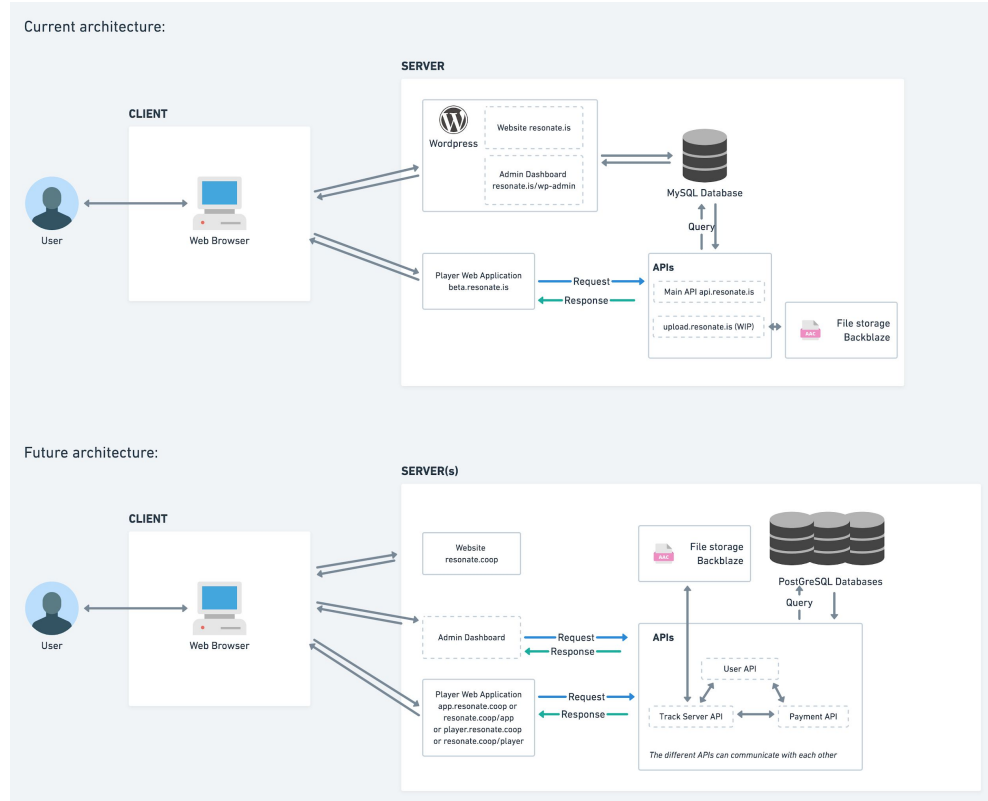Poor integration with Discourse (not shown in this diagram)

Incomplete implementation of OAUTH2 (partial authentication, no roles) multiple logins. Partial introduction of Postgres DB - overnight Rsync between MySQL and Postgres
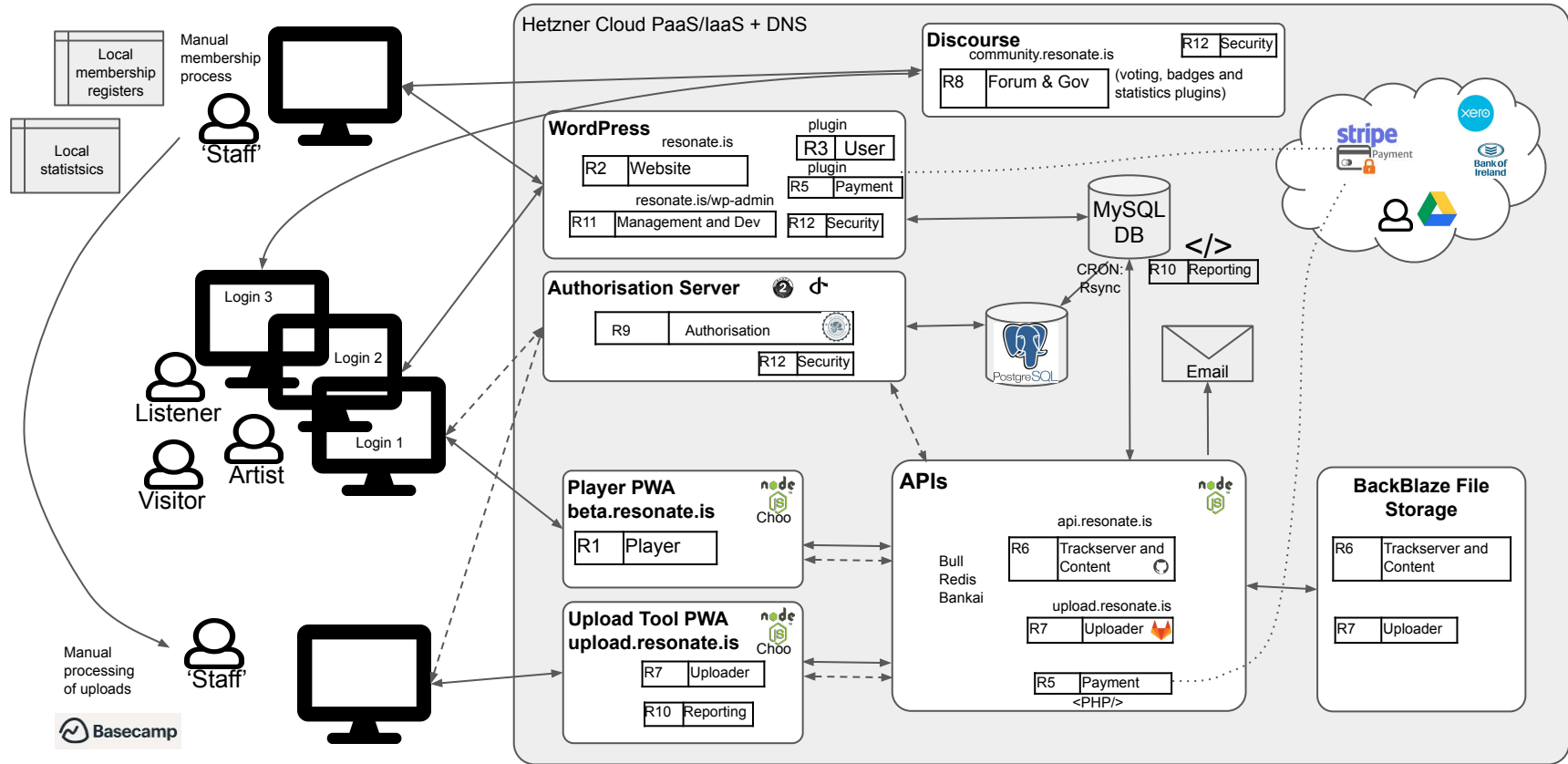
Future

In the future state, the WordPress service will have been retired and replaced by a static website and a series of self-service apps (progressive web apps written in Node.js)) for the player and for transactional access to the core service, which will be a cluster of scalable golang services presenting API's: the user API, the TrackServer API and the Payments API. These core services interact with RPC, with a request-response (RESTful styled) external facade that supports the apps. Db access will be abstracted via a go ORM.

Not shown in the diagram is an oauth2 server to permit OIDC authentication and role-based interaction between the services with the minimum exposure of user information and allowing for 'ecosystem' use of Resonate identity and possible new id services.

Finally, good integration with Discourse (not shown in this diagram) for community credentials, events

Current architecture:

SERVER

CLIENT

User

Web Browser

Wordpress

Website resonate.is

Admin Dashboard resonate.is/wp-admin

MySQL Database

Query

Player Web Application beta.resonate.is

Request

Response

APIs

Main API api.resonate.is

upload.resonate.is (WIP)

File storage Backblaze

Future architecture:

SERVER(s)

CLIENT

User

Web Browser

Website resonate.coop

File storage Backblaze

PostGreSQL Databases

Query

Admin Dashboard

Request

Response

APIs

User API

Player Web Application app.resonate.coop or resonate.coop/app or player.resonate.coop or resonate.coop/player

Request

Response

Track Server API

Payment API

The different APIs can communicate with each other

Resonate Component Architecture - Current

Resonate Component Architecture - Future
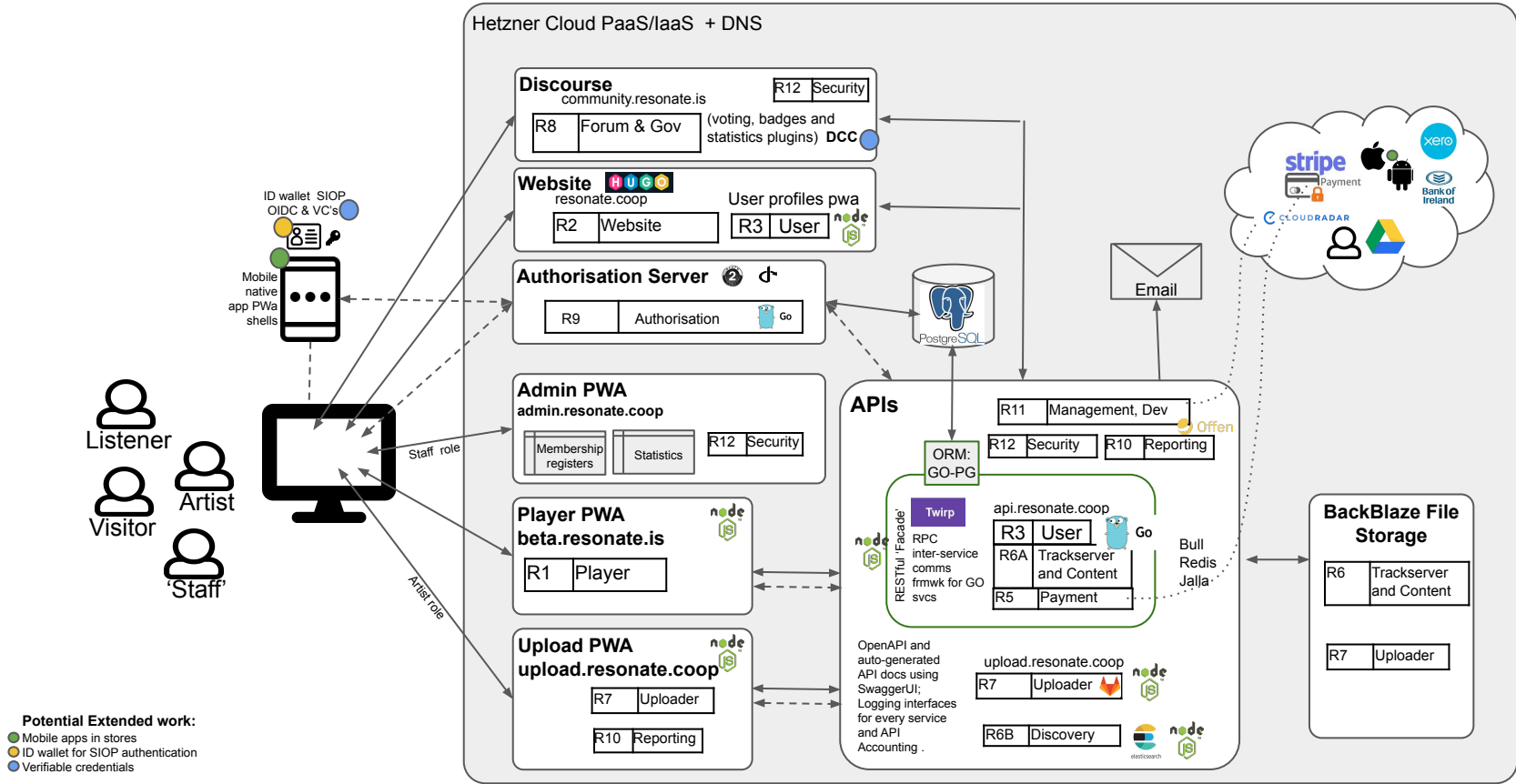
Development Stacks

Front End

- [Choo](#) (tiny javascript framework) We rely a lot on modules from the [choo ecosystem](#). (see nanohtml, nanocomponent, nanobus)
- Hugo ([new static website](#))
- Tooling (lerna, gulp, postcss)
  - Web compilers: [Jalla](#), [bankai](#) Jalla is especially useful because it has a good data prefetch feature. We're using it to prerender content for rich social sharing. Also it is much faster than bankai. Unfortunately, it should not be considered stable yet since it's only a pre-release.

Back End

- Node.js (upload tool)

  [Resonate Upload Tool](#)

- Golang ([user-api](#), [oauth2 server](#))

- PHP (current API for handling tracks, plays, stripe payments and more) Partly integrated with wordpress system (users + metadata)

- Wordpress (current website)

  [Resonate - the ethical music streaming co-op](#)

Development server is accessible at
https://beta.stream.resonate.ninja/.

Resonate - Piece By Piece

The following pages take each of the services and components in turn…

- What it does
- What it links to / serves
- What tech it uses
- Who is the expert contact
- What skills are needed and how to say 'hi' and help
- Where the docs are
- Where it is in the dev plan
- Where the task list(s) are
- The design decision process & log

- Player and Playlisting
- Discovery and Search UX
- Website
- User Management, Identity and Authorisation
- Membership and Partners
- Payment Services
- Trackserver Streaming and Discovery
- Uploading Content
- Forum & Governance
- Reporting
- Management and Development
- Security and Audit
- External Content Management
- External Contacts and CRM

Core API: User Management, Identity and Authorisation

- What it does
  - Secure privacy-respecting user and member management
- What it links to / serves
  - Everything!
- What tech it uses
  - Today - mostly WordPress and its 'Gravity Forms' and 'Ultimate Member' Plugins, plus manual processes and spreadsheets
  - Future - core 'user api' (Go/TWIRP RPC) and go-oauth2 server for id and authorisation service
- Who is the expert contact
  - @Auggod @GK @NM
- What skills are needed and how to say 'hi' and help
  - See Basecamp, Contact @NM or @auggod
- Where the docs are:
  - See the User API Document
- Where it is in the dev plan
- Where the task list(s) are
- The design decision process & log

Authorisation Server ② ⅃

| R9 | Authorisation | Go |

Admin PWA
admin.resonate.coop

APIs

ORM:
GO-PG

node
JS

RESTful 'Facade'

Twirp

RPC
inter-service
comms
frmwk for GO
svcs

api.resonate.coop

| R3 | User | Go |

Bull
Redis
Jalla

PostgreSQL

OpenAPI and auto-generated API docs using SwaggerUI;
Logging interfaces for every service and API Accounting .