

Building AusTrakka

A platform for real-time pathogen genomics surveillance,
data sharing, and research in pathogen genomics



AusTrakka team



AusTrakka Advisory Group

- Prof Ben Howden (VIC)
- A/Prof Amy Jennison (QLD)
- Prof Vitali Sintchenko (NSW)
- Prof David Speers (WA)
- Dr Lex Leong (SA)
- A/Prof Torsten Seemann (VIC)
- Amy Black (Interim CDC)
- Dr Michel Watson (Interim CDC)
- Tuyet Hoang (Strategy and Governance Manager)



AusTrakka National Analysis Team

- Mathilda Wilmot
- Dr Caitlin Selway
- Krystalyn Martin
- Erin Flynn
- Dr Shona Chandra
- Linh Nguyen
- Dr Ceyhun Guengoer (AusTrakka Manager)



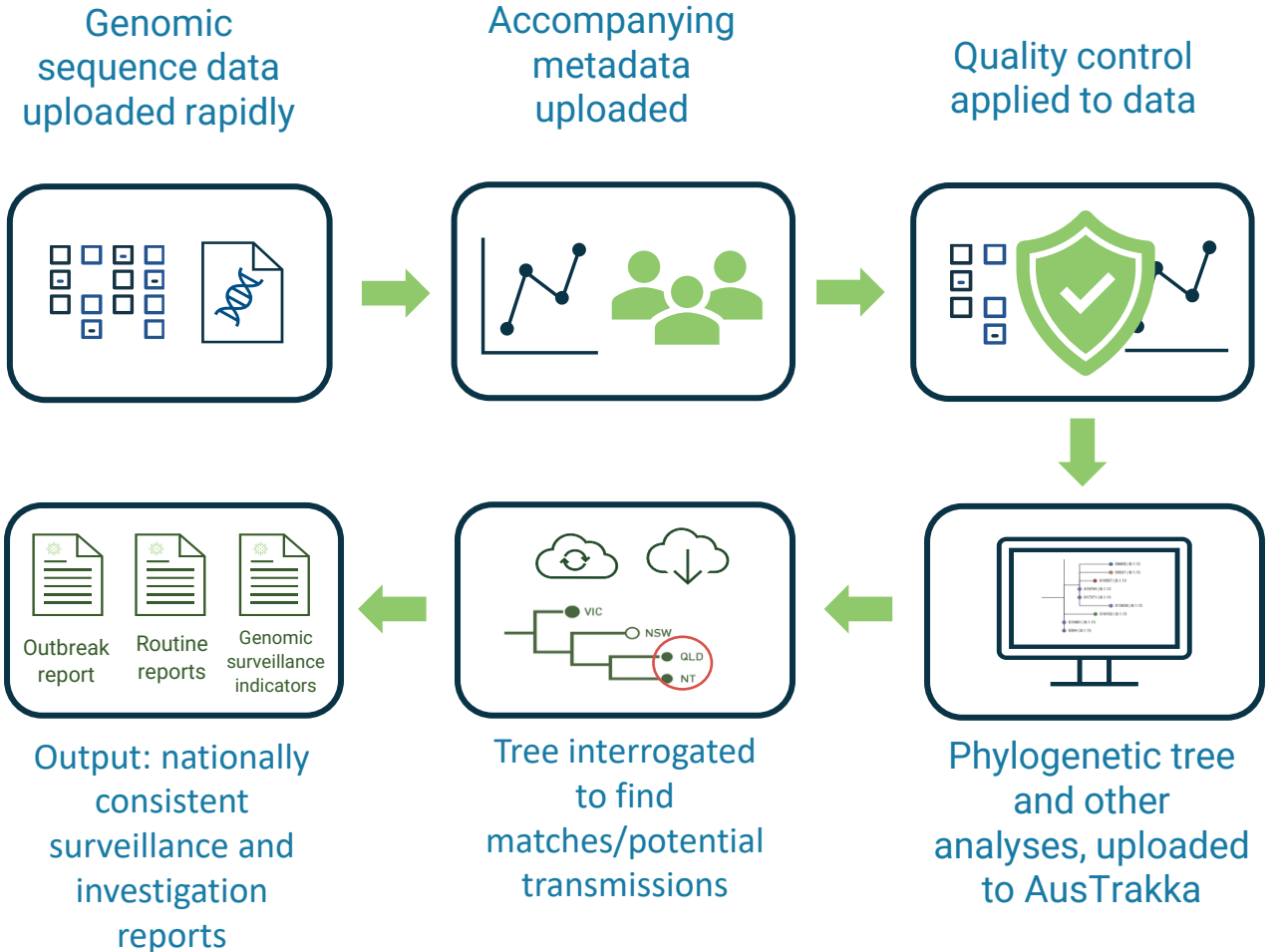
AusTrakka Development Team (University of Melbourne)

- A/Prof Torsten Seemann
- Dr Clare Sloggett
- Samuel Carswell
- Vi Phu
- Mann Sheth



What is AusTrakka?

- Australia's national real-time pathogen genomics surveillance platform
- A secure genomic data sharing, analysis and visualisation platform
- **Nationally agreed** system for data sharing and analysis, governed by the Communicable Diseases Genomics Network (CDGN)
- Overseen by advisory body and supported by a national analysis team
- Endorsed by national committees (CDGN, CDNA, PHLN and AHPPC) as a national public health tool



What are the outputs?



AUSTRAKKA
Real-time pathogen genomics surveillance

CDGN
Communicable Diseases Genomics Network

AUSTRAKKA NATIONAL VOC REPORT – Update 95

ABC NEWS HEALTH Latest updates Vaccine tracker Ask a question

How did AusTrakka help reveal the origin of the Victorian outbreak?

When the Delta variant was detected in Melbourne last week, the team ploughed through the sequences stored in the database to try and find a match in Victoria.

"We could not find a match anywhere in the country that might explain the source of this disease," Professor Howden said.

CDGN
@CDGN_Australia

#AusTrakka has been adapted to suit tracking needs as they arise. The platform can now track #SARSCoV2 #VariantsOfConcern across the #pathogen #genomic data shared in Australia @claresloggett @AusBiocommons

Comment | [Open Access](#) | [Published: 14 February 2022](#)

AusTrakka: Fast-tracking nationalized genomics surveillance in response to the COVID-19 pandemic

[Tuyet Hoang](#), [Anders Gonçalves da Silva](#), [Amy V. Jennison](#), [Deborah A. Williamson](#), [Benjamin P. Howden](#) & [Torsten Seemann](#)

[Nature Communications](#) **13**, Article number: 865 (2022) | [Cite this article](#)

AUSTRAKKA
Real-time pathogen genomics surveillance

CDGN
Communicable Diseases Genomics Network

AusTrakka National Genomic Analysis Report

Reporting period: 2022-2-14 to 2022-03-13

Australian Government
Department of Health

COMMUNICABLE DISEASES INTELLIGENCE

2021 Volume 45
<https://doi.org/10.33321/cdi.2021.45.35>

COVID-19 Australia: Epidemiology Report 45

Reporting period ending 4 July 2021

COVID-19 National Incident Room Surveillance Team

AusTrakka: Quick Tour



Home / Projects / Demo

Demo project

Summary **Samples** Trees Plots Members Proformas Datasets

Filters Showing 68 of 87 samples.

Field Condition Value + RESET

cgMLST Equals 11

Seq_ID	Owner_group	State	Date_coll	Coverage	Serotype	cgMLST	Epidemiological_exposure
DemoSample2	DemoOrg-Owner	AU-NSW	2022-02-17	44.978599541890866	Enteritidis	11	Swimming
DemoSample3	DemoOrg-Owner	AU-NSW	2022-01-12	99.94705462410538	Enteritidis	11	Travel to Bali
DemoSample4	DemoOrg-Owner	AU-WA	2022-01-24	2.4997877723077377	Enteritidis	11	
DemoSample5	DemoOrg-Owner	AU-QLD	2022-03-18	43.37688651957572	Enteritidis	11	
DemoSample7	DemoOrg-Owner	AU-NSW	2022-02-11	57.2762617993122	Enteritidis	11	Linked to chicken investigation
DemoSample8	DemoOrg-Owner	AU-VIC	2022-01-27	96.29226149194442	Enteritidis	11	
DemoSample9	DemoOrg-Owner	AU-TAS	2022-01-17	65.4299281200574	Enteritidis	11	
DemoSample10	DemoOrg-Owner	AU-WA	2022-01-13	17.709016370652808	Enteritidis	11	

25 << < Viewing: 1 to 25 of 68 > >>

Clare Sloggett

Documentation Support Logout

AusTrakka: Quick Tour



AUSTRAKKA <<

- Dashboard
- Projects
- Organisation
- Upload
- Fields

Clare (non-admin)

- Documentation
- Support
- Logout

Home / Projects / Demo / Trees / 2 / Versions / 3

Search
...

Demo tree - 2022-10-31 10:31

Tree & Navigation ^

Version
2022-10-31 10:31

Type
Rectangular

GO TO ROOT

JUMP TO SUBTREE

PARENT BACK FORWARD

State
cgMLST

- DemoSample11
- DemoSample69
- DemoSample47
- DemoSample28
- DemoSample71
- DemoSample45
- DemoSample52
- DemoSample81
- DemoSample12
- DemoSample49
- DemoSample61
- DemoSample68
- DemoSample17
- DemoSample55
- DemoSample48
- DemoSample75
- DemoSample46
- DemoSample83
- DemoSample33
- DemoSample3
- DemoSample13
- DemoSample18

50.325

State

- AU-ACT
- AU-NSW
- AU-NT
- AU-QLD
- AU-SA
- AU-TAS
- AU-VIC
- AU-WA

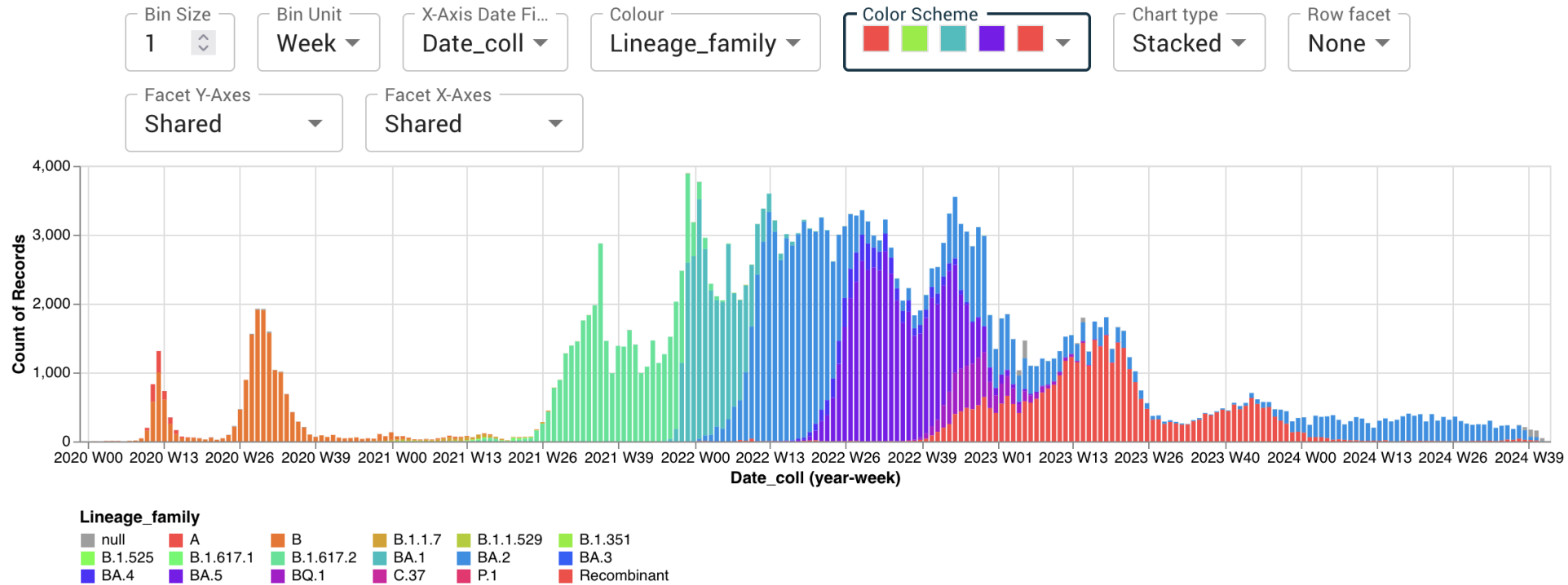
cgMLST

- 11
- 180
- 190
- 1925
- 1972
- 3304
- 4310
-

AusTrakka: Quick Tour



SARS-CoV-2 epi curve



Filters

Showing 266163 of 266163 samples.

Field

Condition

Value

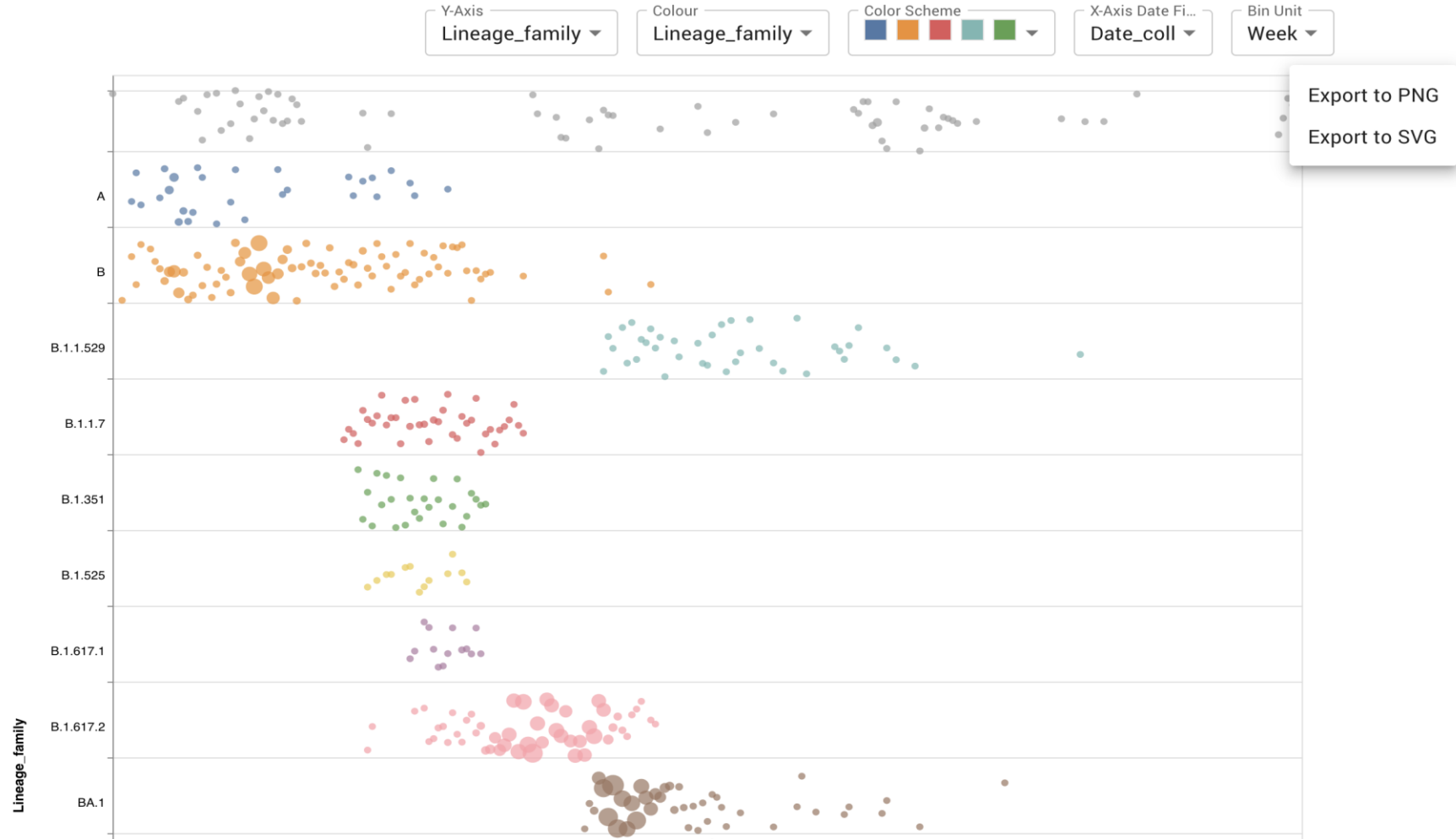


RESET

AusTrakka: Quick Tour


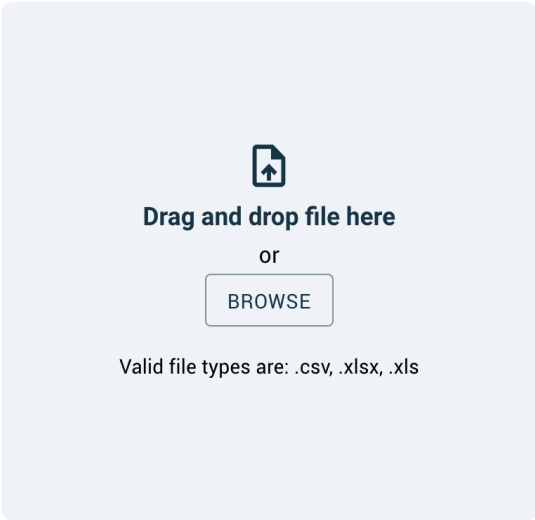


SARS-CoV-2 cluster timeline diagram





AusTrakka: Quick Tour



 << Home / Upload / Metadata
Upload Metadata
Please use the supplied proforma to submit metadata for samples. Metadata can be submitted in tabular format, either in CSV or Excel (xlsx) format. Files should have extensions .csv, .xlsx or .xls. If not using the proforma directly, ensure that column names in your CSV or Excel file match those in the proforma. [View upload instructions](#)
Select proforma
Proforma ▼
Select metadata file


Valid file types are: .csv, .xlsx, .xls

Select upload options
 Validate only
Do not upload metadata, just see validation errors and warnings. This is not a full dry run: it will validate correctness of data against allowed values and types, but will not give a preview of data changes.
 Blank cells will delete
Use blank cells in your CSV / XLSX file to indicate that the current cell content should be deleted. If this is not selected, blank cells in the upload will be ignored.
 Update existing samples
Add or update metadata for existing samples. If this is selected, you cannot include new samples in the upload, but may use proformas that do not include Owner_group.
[UPLOAD METADATA](#) 


Clare Sloggett

AusTrakka: Quick Tour



```
Usage: austrakka [OPTIONS] COMMAND [ARGS]...
```

A cli for interfacing with AusTrakka.

Options:

```
--uri TEXT [env var: AT_URI; required]
--token TEXT [env var: AT_TOKEN; required]
--log-level [TRACE|DEBUG|INFO|SUCCESS|WARNING|ERROR|CRITICAL]
[env var: AT_LOG_LEVEL; default: INFO;
required]
--skip-cert-verify BOOLEAN Skip verification of certificate [env var:
AT_SKIP_CERT_VERIFY; default: False;
required]
--use-http2 BOOLEAN Use HTTP2 (experimental) [env var:
AT_USE_HTTP2; default: False; required]
--skip-version-check BOOLEAN Skip check for new AusTrakka CLI version
[env var: AT_SKIP_VERSION_CHECK; default:
False; required]
--log TEXT Outputs logs to a temporary file
--version Show the version and exit.
-h, --help Show this message and exit.
```

Commands:

```
analysis Commands related to analyses
auth Commands related to auth
dashboard Commands related to defining a dashboard
field Commands related to metadata fields
fieldtype Commands related to metadata field types
group Commands related to groups
iam Commands related to role based access control
metadata Commands related to metadata submissions
org Commands related to organisations
plot Commands related to plots
proforma Commands related to metadata pro formas
project Commands related to projects
sample Commands related to samples
seq Commands related to sequences
tree Commands related to trees
user Commands related to users
```

```
Usage: austrakka seq add [OPTIONS] COMMAND [ARGS]...
```

Commands to upload sequences

Options:

```
-h, --help Show this message and exit.
```

Commands:

```
fasta-asm Upload FASTA assembly sequences to AusTrakka
fasta-cns Upload consensus FASTA sequences to AusTrakka.
fastq-ill-pe Upload paired-end Illumina FASTQ data to AusTrakka
fastq-ill-se Upload single-end Illumina FASTQ data to AusTrakka
fastq-ont Upload Oxford Nanopore FASTQ data to AusTrakka
```

```
Usage: austrakka project [OPTIONS] COMMAND [ARGS]...
```

Commands related to projects

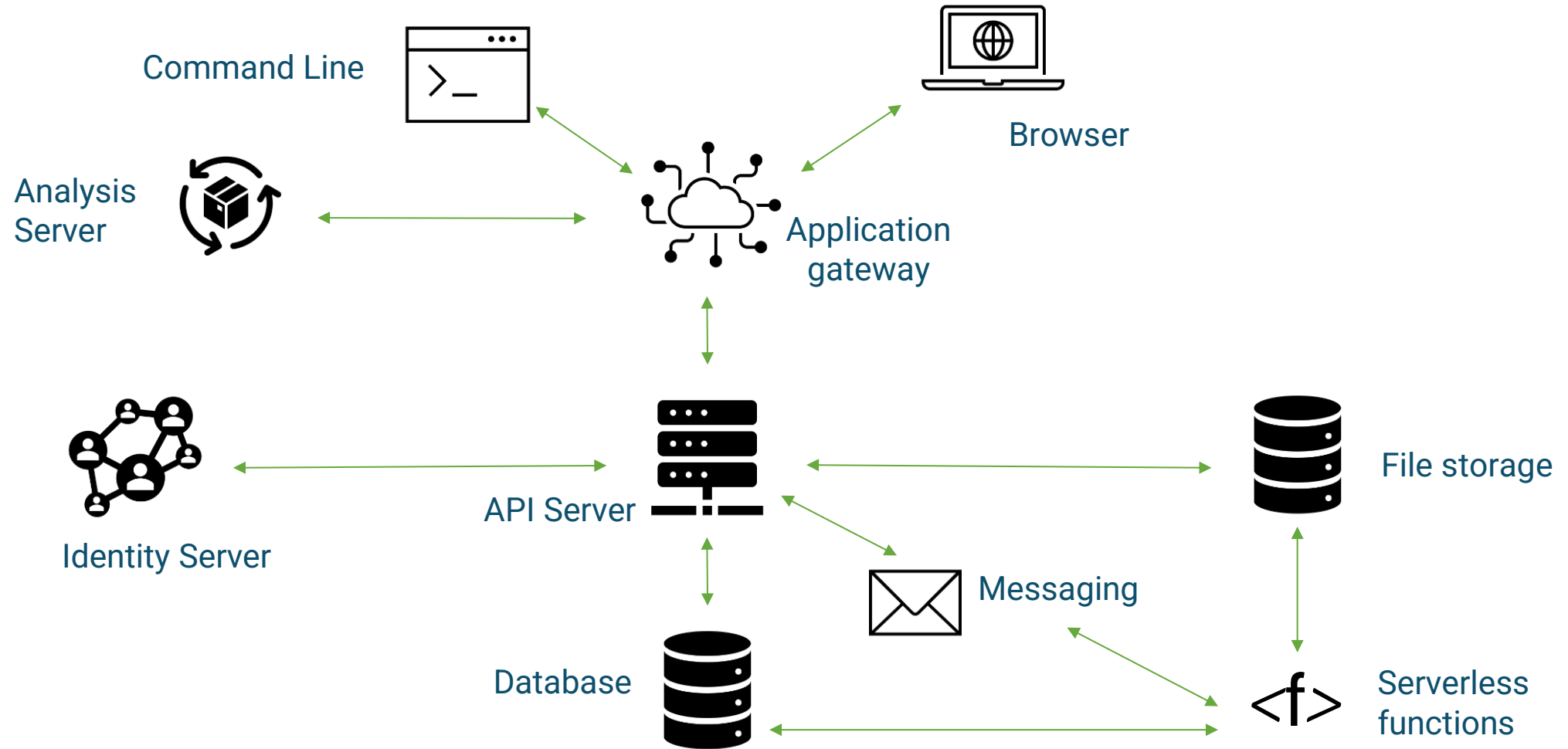
Options:

```
-h, --help Show this message and exit.
```

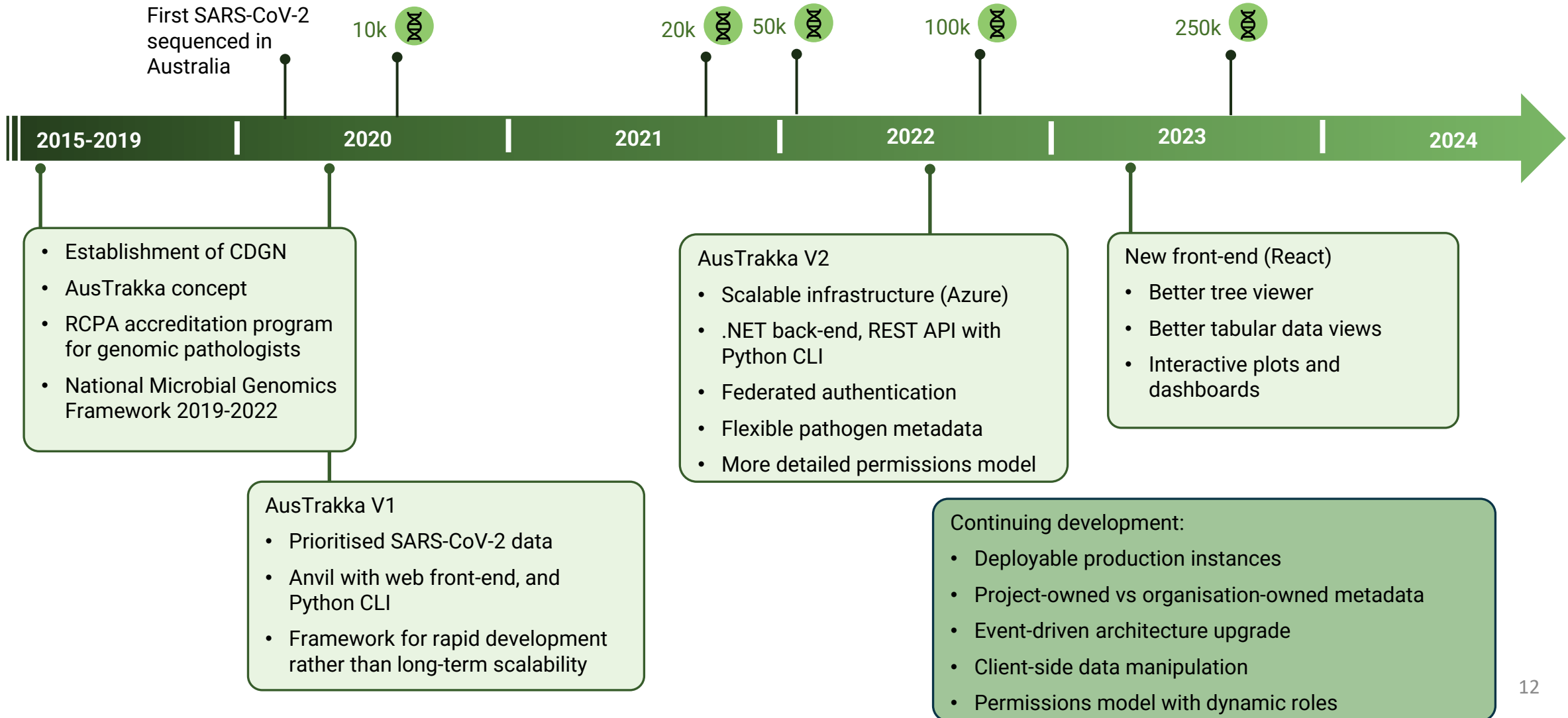
Commands:

```
dataset Commands to manage project datasets
field Commands to manage project fields
list List projects in AusTrakka
metadata Commands to query for metadata views for a project,...
provision Commands to manage project view provisions.
settings Show project settings
```

Architecture



Development timeline



Development challenges and priorities

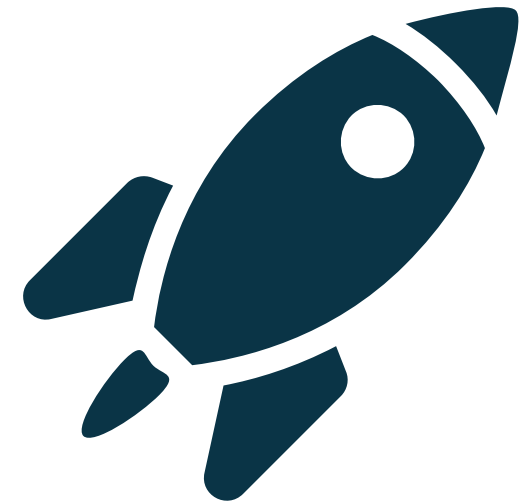


- Data scale
- Visualisation – new and enhanced
- Support for investigations vs ongoing development
- Metadata correctness and validation
- Data-sharing complexities
- Architectural decisions and cloud running costs

Future development

Event-driven notifications

Dynamic roles &
permissions model;
transparency and control



Shift towards platform-
agnostic architecture

Job-running UI

Acknowledgements

Partners and Stakeholders



Academic partners



CDGN public health and affiliated laboratories



Public Health Units



Funding partners



International partners



National committee groups



Aus Government Agencies



THANK YOU

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