NEANIAS Accounting Service

Accounting Information Aggregator

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The need

- Ubiquitous challenge
  - Discover how a service is being used on the field
  - Single point of reference for KPI collection
  - Design & Validate billing schemes
  - Help define and evolve the service roadmap
- Prefer not to disrupt operation
  - Ideally, not even the codebase
- As a Service

Service Provider
- How much CPU time has one user occupied the system
- How many invocations per day by a particular user
- How much short-term storage is used by a user

Service User
- What interactions I had with a specific service
- Where did I spend my Quota

NEANIAS Accounting Service

- NEANIAS Accounting service
  - Centrally register accounting information
  - Gradually accumulate through service usage
  - Configuration and log-processing based integration
  - Authorized access and separation of data
  - Distributed and scalable across all layers
    - Data storage
    - Processing
    - Visualization
  - Offered as a Service

Usage

- Information sink
- Aggregate
- Visualize / Report
- Drive BI
- Non- disruptive
- As a Service

Technical

- Reusable
- Portable
- Scalable
- Cloud-native

Data Model

- Per Service Provider – diverse accounting needs & targets
- Data Model – Generic enough to be usable / Specific enough to be valuable

Field	Mandatory	Description
Timestamp	Yes	The timestamp of the event
Start/End Time	No	Start / End timestamps for the event
Service Id	Yes	Global unique identifier for the producing service
Resource	Yes	The resource the action accounts for
Action	Yes	The action performed on the resource
User (delegate) Id	Yes	The on whose behalf / delegate to perform the action
Measure	No	The measure being accounted e.g. time(ms), information(mb), throughput (mb/sec), unit
Value	No	The measure value / weight
Type	No	Operation towards measure calculation e.g. additive (+), subtractive (-), rebasing (0)
Comment	No	Textual comments to accompany the accounting entry

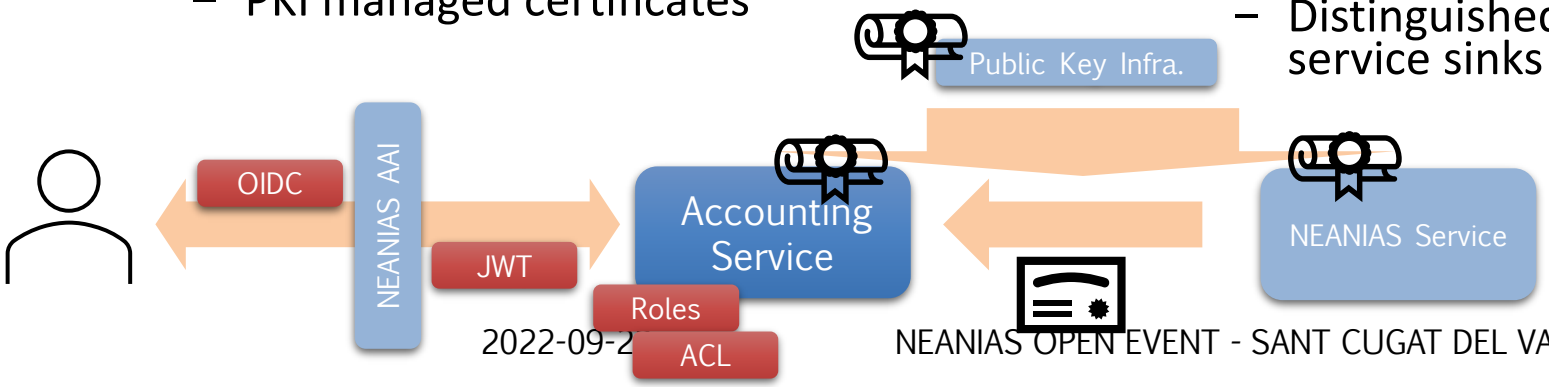
Securing the Access

AUTHENTICATION

- End-user
  - OpenID Connect
  - NEANIAS AAI – Authorization Code grant flow
- Service to Service API integrations
  - OpenID Connect
  - NEANIAS AAI – Client Credentials grant flow
- Data Aggregation
  - Using client certificates
  - PKI managed certificates

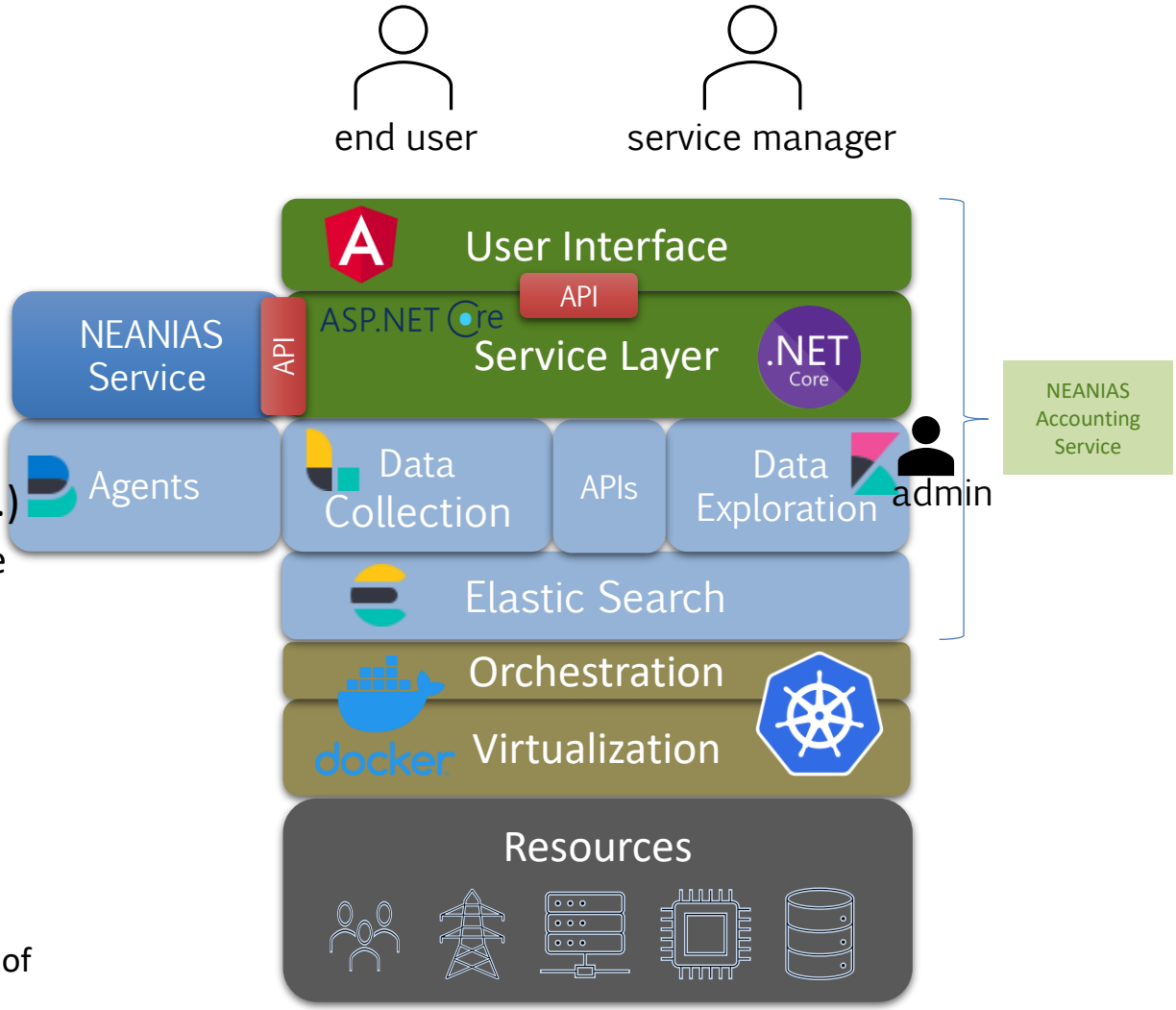
AUTHORIZATION

- End-user
  - NEANIAS AAI – RBAC
  - Service internal – resource specific ACL
  - Personal accounting content available for all authenticated users
- Service to service
  - Role & ACL based
  - Uniform approach
- Data Aggregation
  - Client certification based
  - Distinguished Name based mapping to service sinks

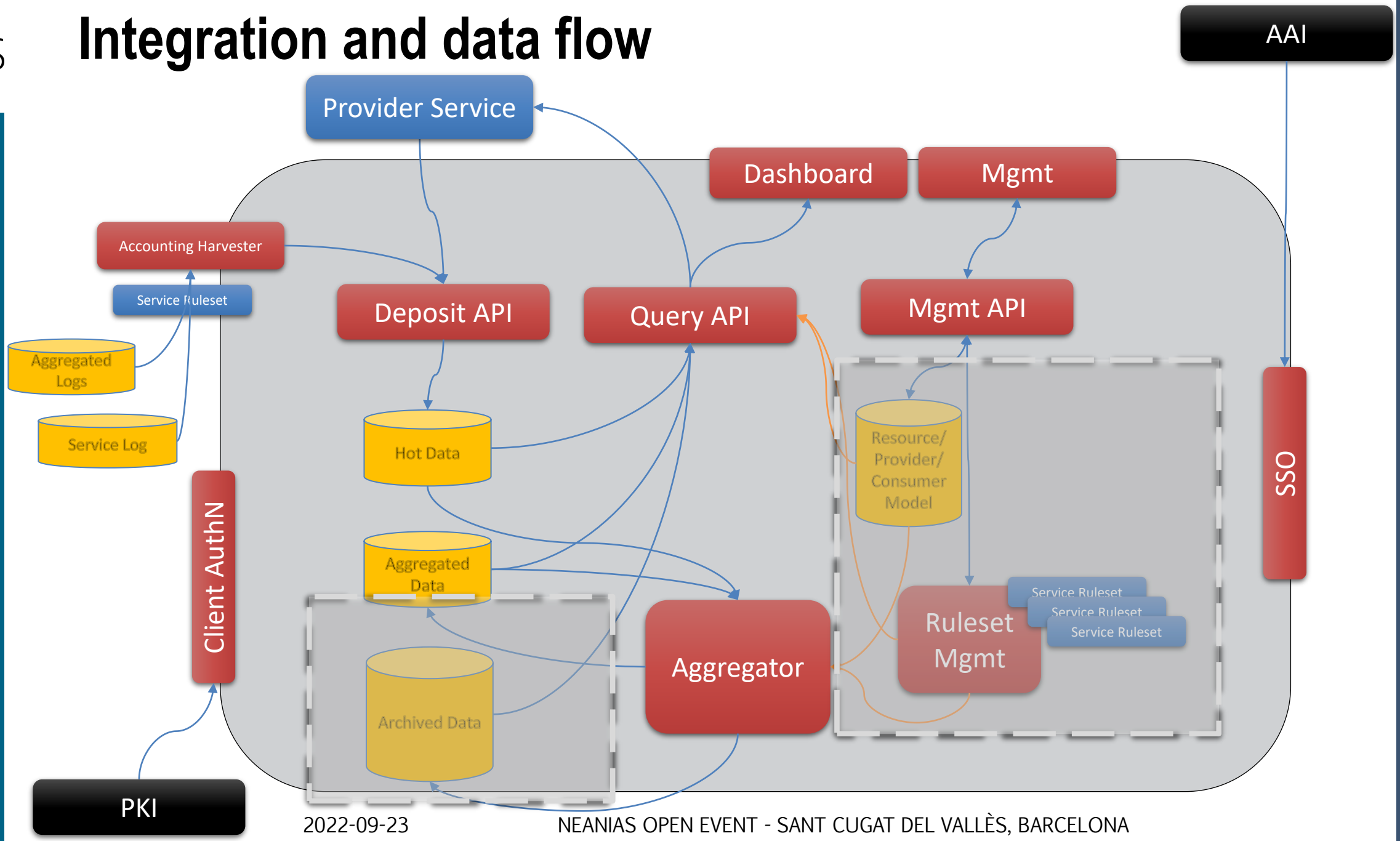


Technology Overview

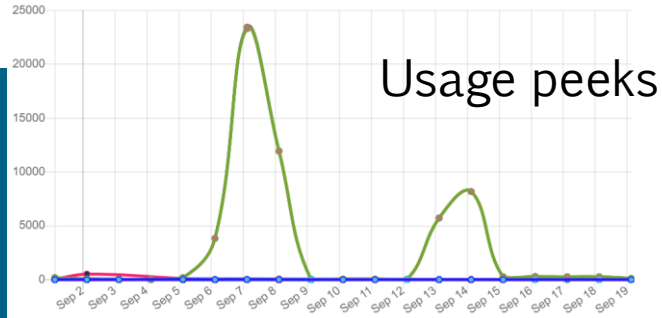
- Backed by a high performant NoSQL data store
  - Aggregate and track accounting information
  - Investigating moving to OpenSearch
- Distributed – Collection, Pre-processing & transformations, Storage, Processing
- Scaling – Vertical & Horizontal
- Data Folding & Accumulating indicators (coming…)
  - Information gradually eligible to be folded to create aggregations
  - Ensure long-term performance and maintainability
- Fan-out – Trusted services spreading accounting info
  - e.g. AAI on behalf of targeted services
- Supporting policy enforcement (coming…)
  - Run-time decision making, throttling or altering the scope of user requests

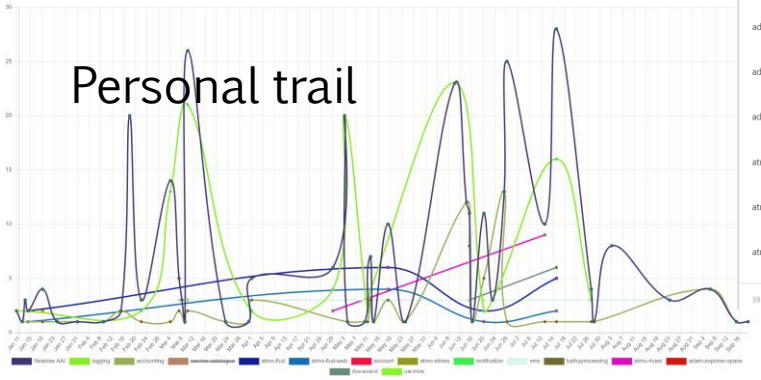


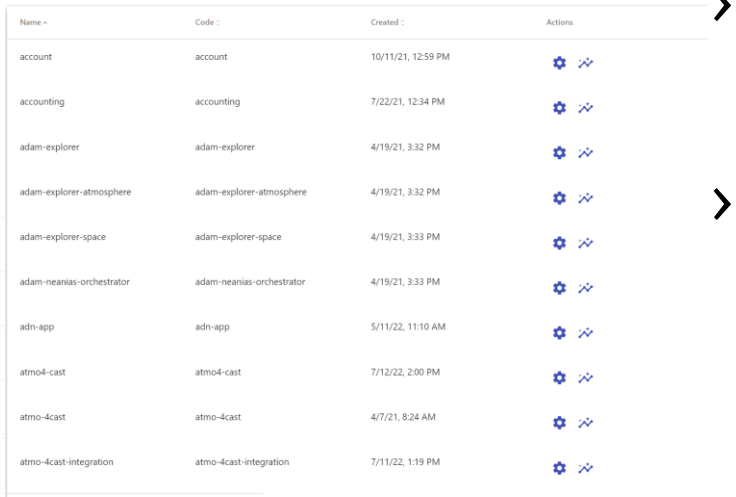
Integration and data flow



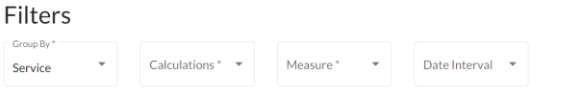
Visualization & Data exploration

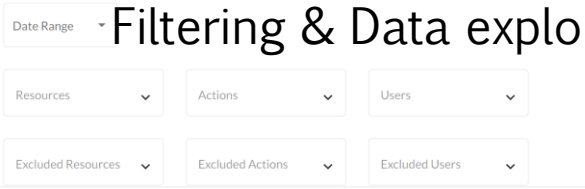


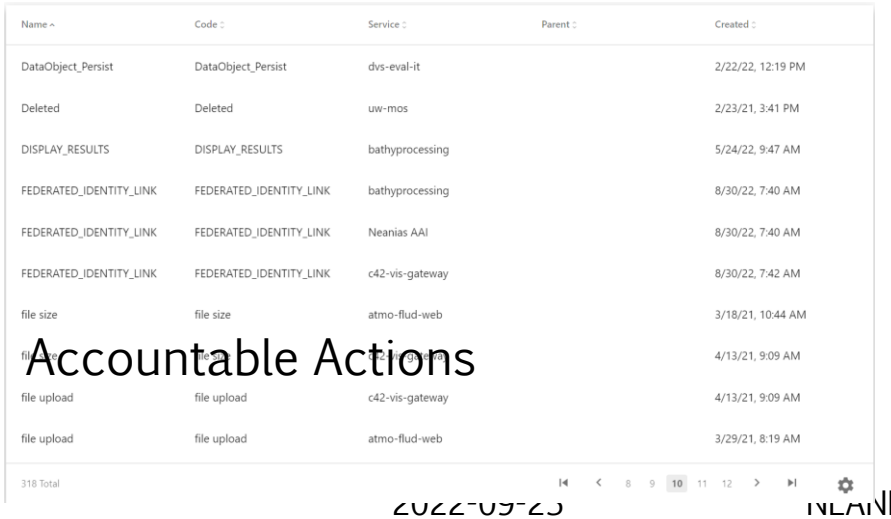




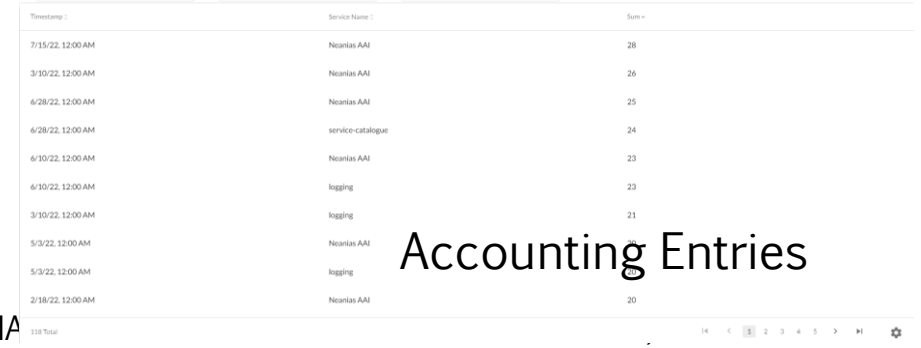
- Visualize & report on aggregated info
- Dedicated reporting utilities Web UI
  - Graphs, Data browsing, exports, reports





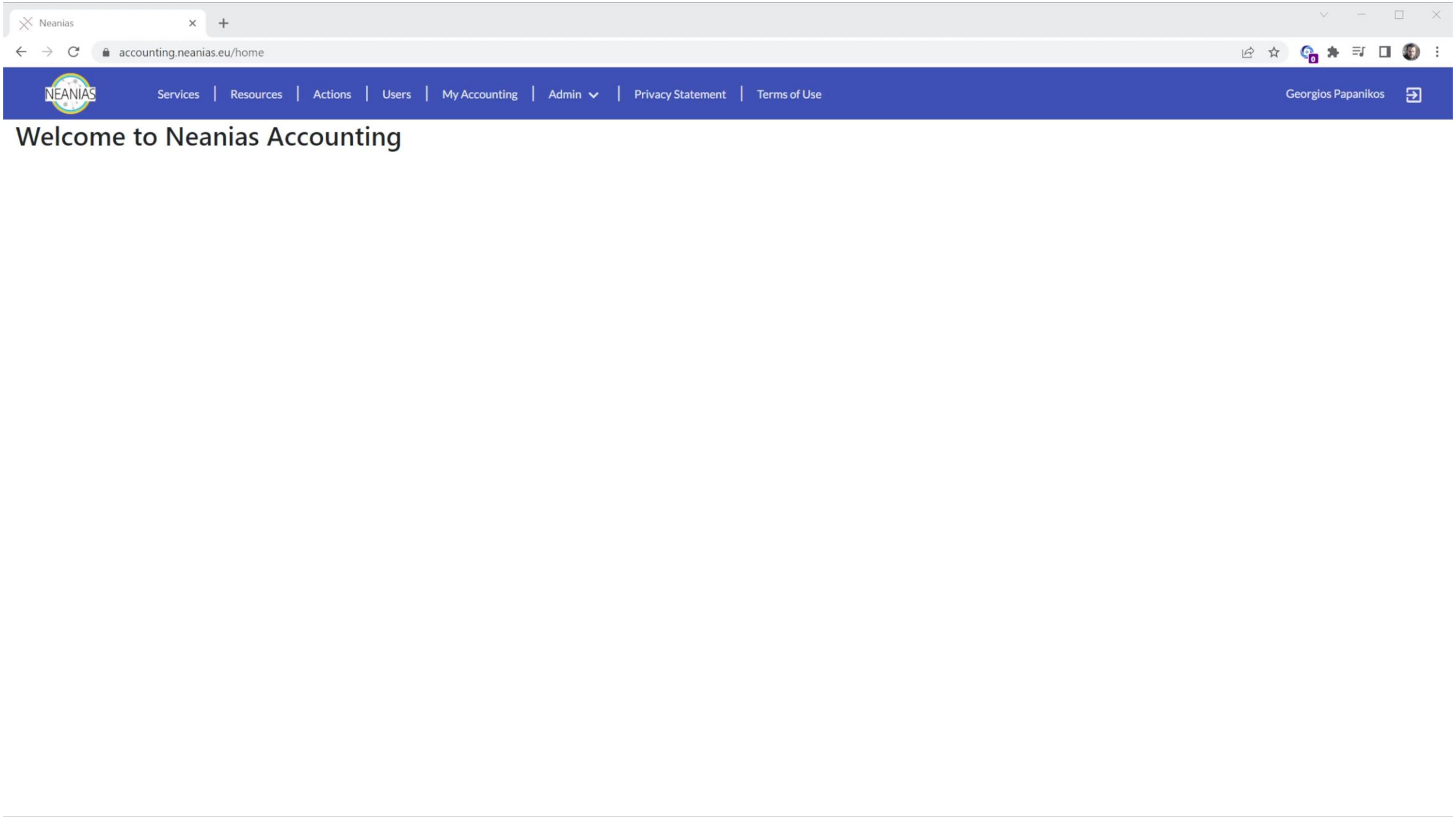


Accountable Actions

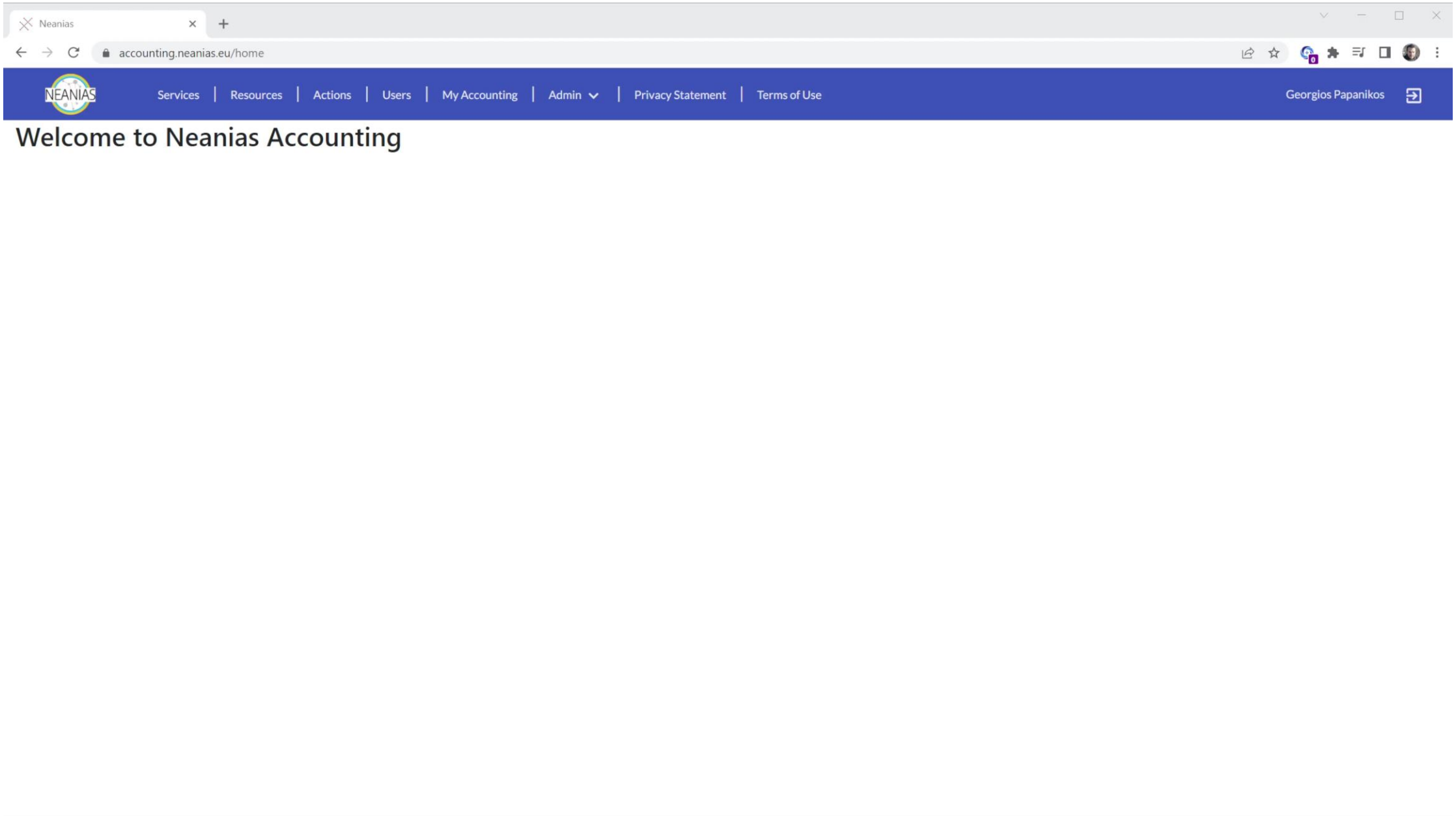


Accounting Entries

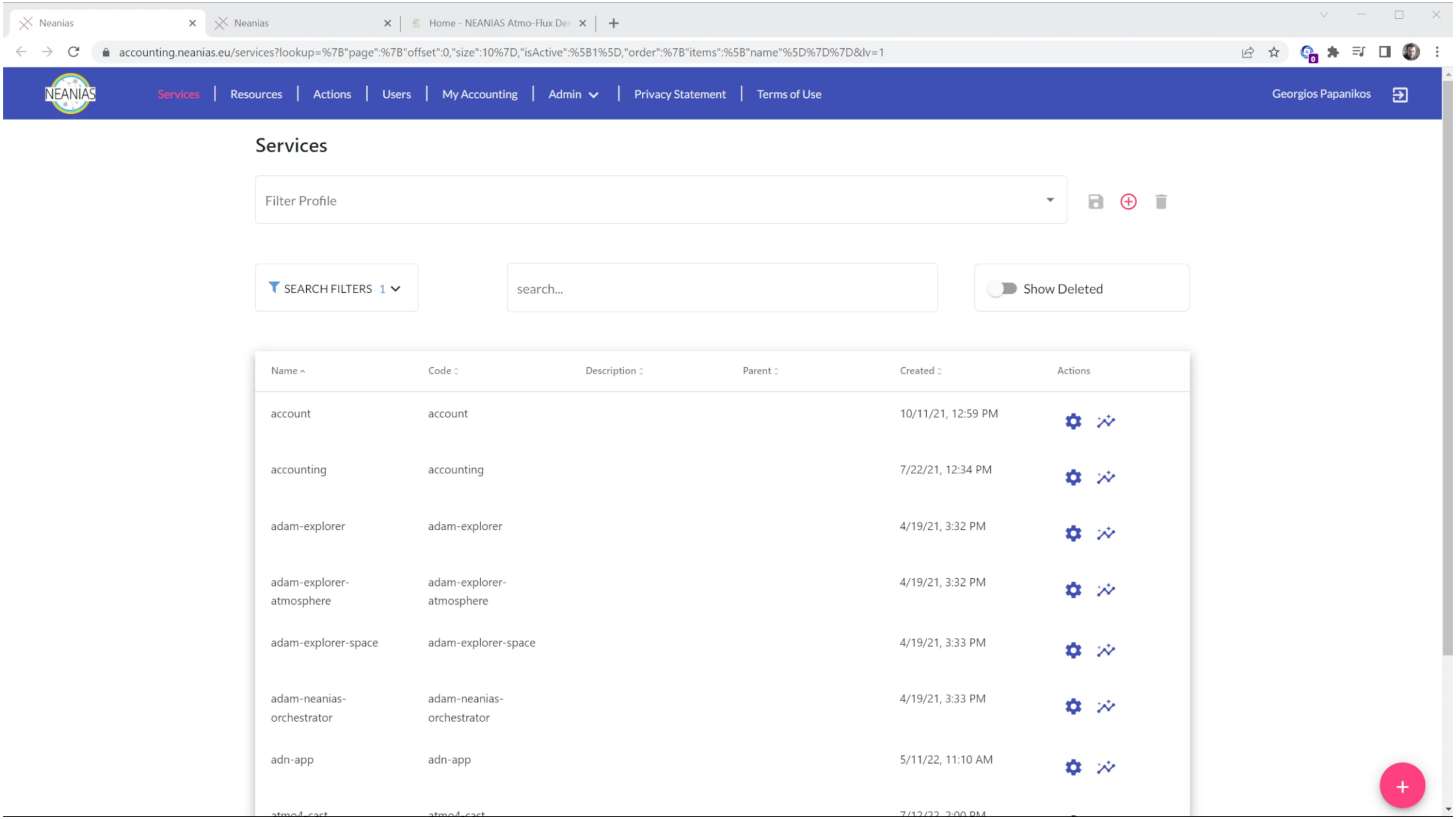
Browsing Accounting Data



End-User Usage



Accounting Actions



Wrap-up

- Accounting service:
  - Tracks usage of resources of a system, in a direct or indirect manner
  - Supports resource management and administration to oversee the operation of a system and potentially apply or tune policies
  - Non-disruptive integrations
- Key tool to:
  - Discover how a service is being used on the field
  - Single point of reference for KPI collection
  - Apply quotas / throttle usage
  - Design & Validate billing schemes
  - Design & evolve the offered service
- Offered as a Service in the cloud

NEANIAS

Novel EOSC Services for Emerging Atmosphere, Underwater & Space Challenges

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Thank you!

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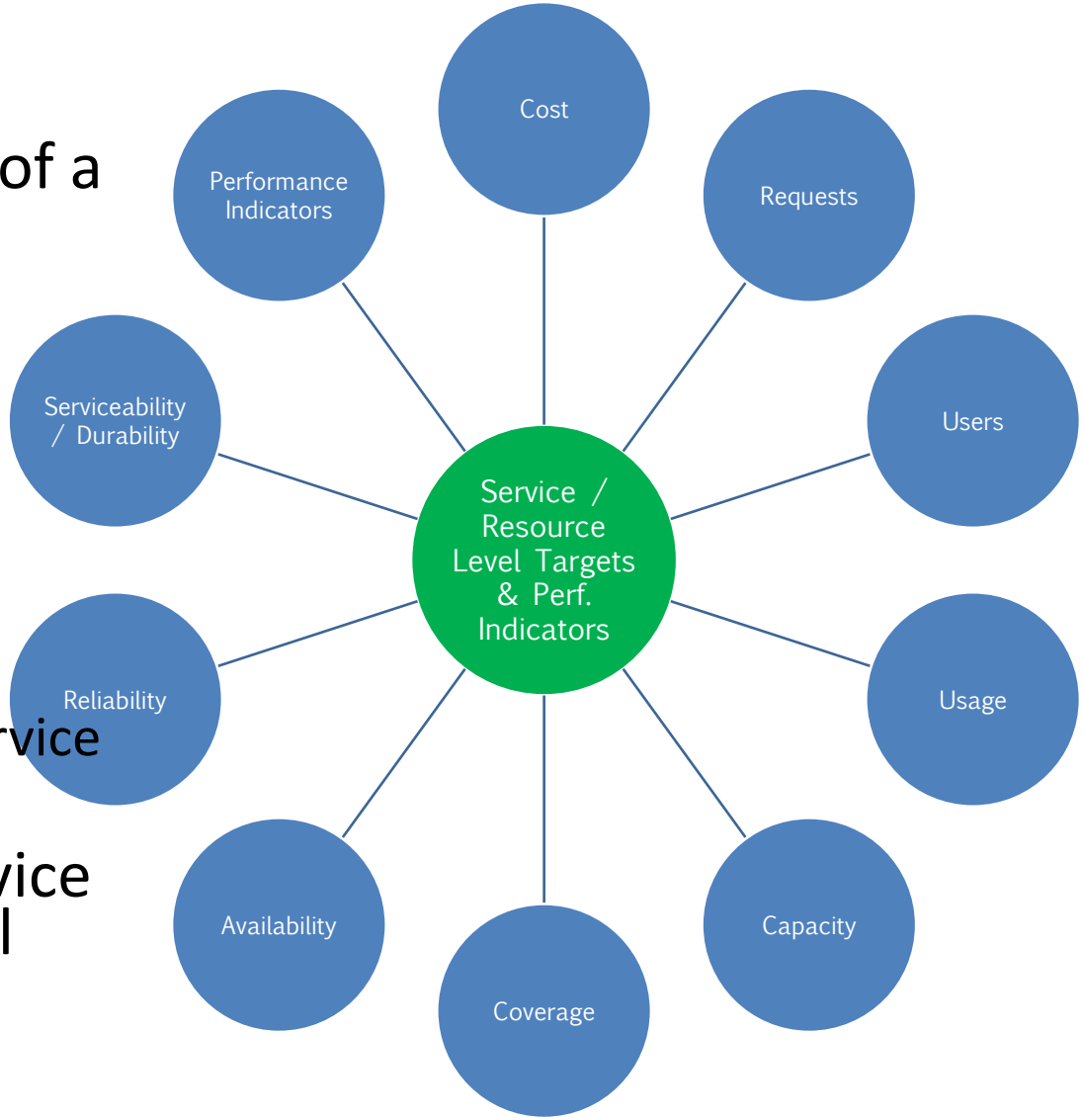
Supplementary Slides

Setting the stage – The challenge

- NEANIAS ecosystem characteristics
  - Divers, distributed and loosely connected set of services
  - Wide range of technologies, topology and supporting infrastructures
- Needed to be able to easily and centrally track and account for
  - Usage, resource allocation, response times, jobs submitted, …
  - Service & individual user level
- Example use cases:
  - A service provider wants to identify how much CPU time a particular user activity has occupied in the system
  - A service provider wants to know how many invocations per day were performed by a particular user
  - A service provider wants to know how much short-term storage is used by a user of a particular service
  - A service user wants to know the interactions he had with a specific service

EOSC on my mind

- Need to quantify access and usage of a service
  - Emerging suggestions within EOSC environment
  - Necessity for Service Providers
- Identify aspects of accountable information
  - Service / Resource Level Targets and Performance Indicators Set
  - Gathered or assisted calculation by Service Providers
- If EOSC releases an Accounting Service API and data model, the service will comply with its specification and interoperate with it.



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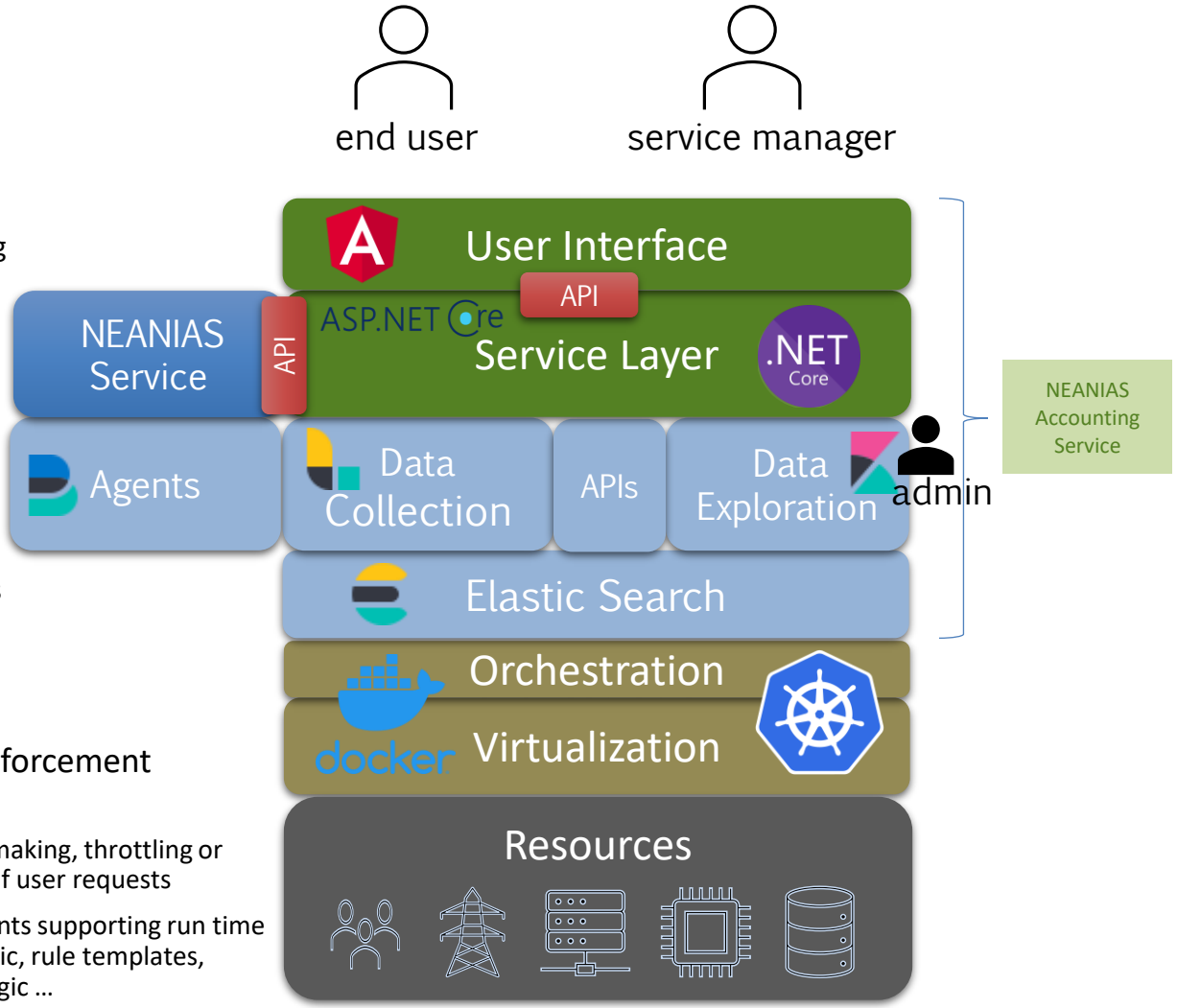
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- Distributed
  - Collection, Pre-processing & transformations, Storage, Processing
- Scaling
  - Vertical & Horizontal
- Data Folding & Accumulating indicators (coming…)
  - Varying granularity and time frames
  - Accumulation policies and granularity of information
  - Information gradually eligible to be folded to create aggregations
  - Ensure long-term performance and maintainability
  - Cost on granularity of historical data
- Dead Letter Queue
  - Keep malformed accounting records for future reference, without aggregating
- Fan-out
  - Trusted services spreading accounting info
  - e.g. AAI on behalf of targeted services
- Supporting policy enforcement (coming…)
  - Run-time decision making, throttling or altering the scope of user requests
  - Considering endpoints supporting run time decision making logic, rule templates, threshold setting logic …