Design

PSE of

PSE Group

Fraunhofer Institute for Systems and Innovation Research ISI
Advisor: M.Sc. Ankush Meshram

Version 1.0

Contents

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1.1 Front-End

1.1.1 Class Diagram

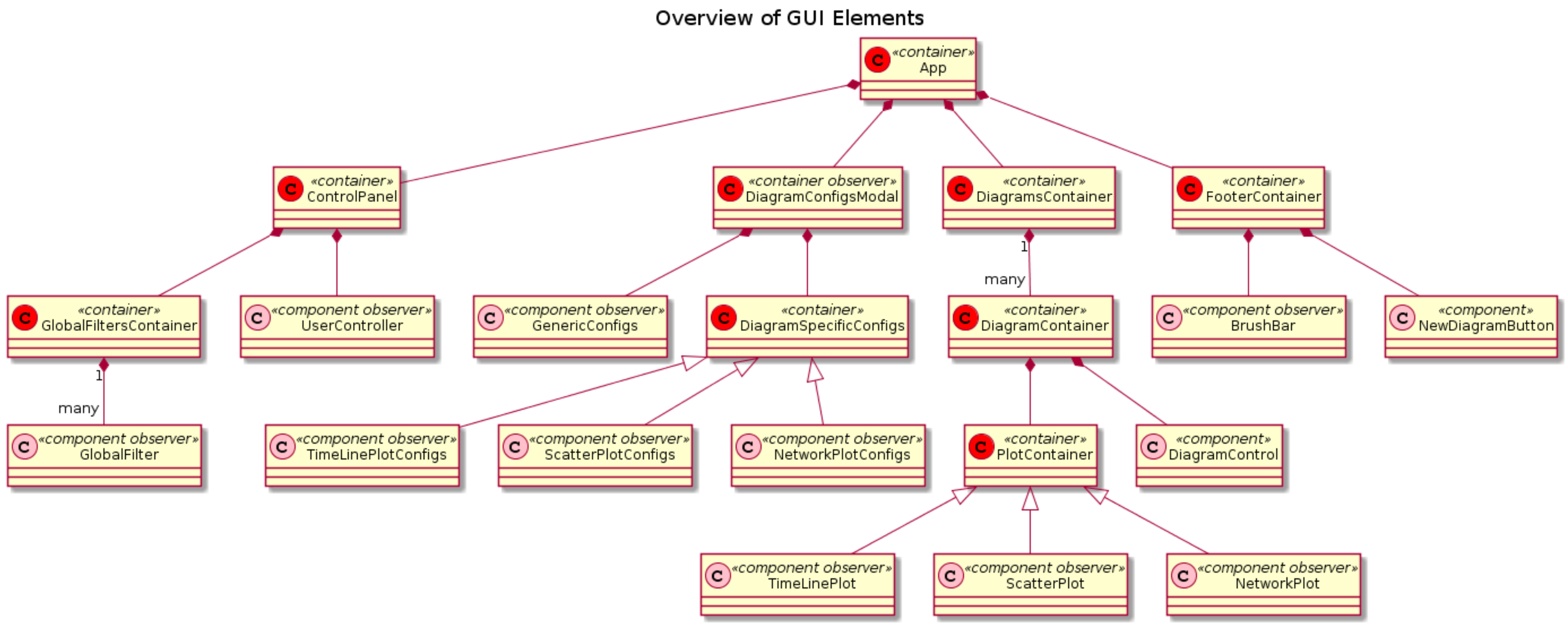

Overview of GUI Elements
C «container» App
C «container» ControlPanel
C «container observer» DiagramConfigsModal
C «container» DiagramsContainer
C «container» FooterContainer
C «container» GlobalFiltersContainer
C «component observer» UserController
C «component observer» GenericConfigs
C «container» DiagramSpecificConfigs
1
many
C «container» DiagramContainer
C «component observer» BrushBar
C «component» NewDiagramButton
1
many
C «component observer» GlobalFilter
C «component observer» TimeLinePlotConfigs
C «component observer» ScatterPlotConfigs
C «component observer» NetworkPlotConfigs
C «container» PlotContainer
C «component» DiagramControl
C «component observer» TimeLinePlot
C «component observer» ScatterPlot
C «component observer» NetworkPlot

Figure 1: This diagram shows an overview of GUI elements and their relationships inside the main application, when the user has successfully logged in.

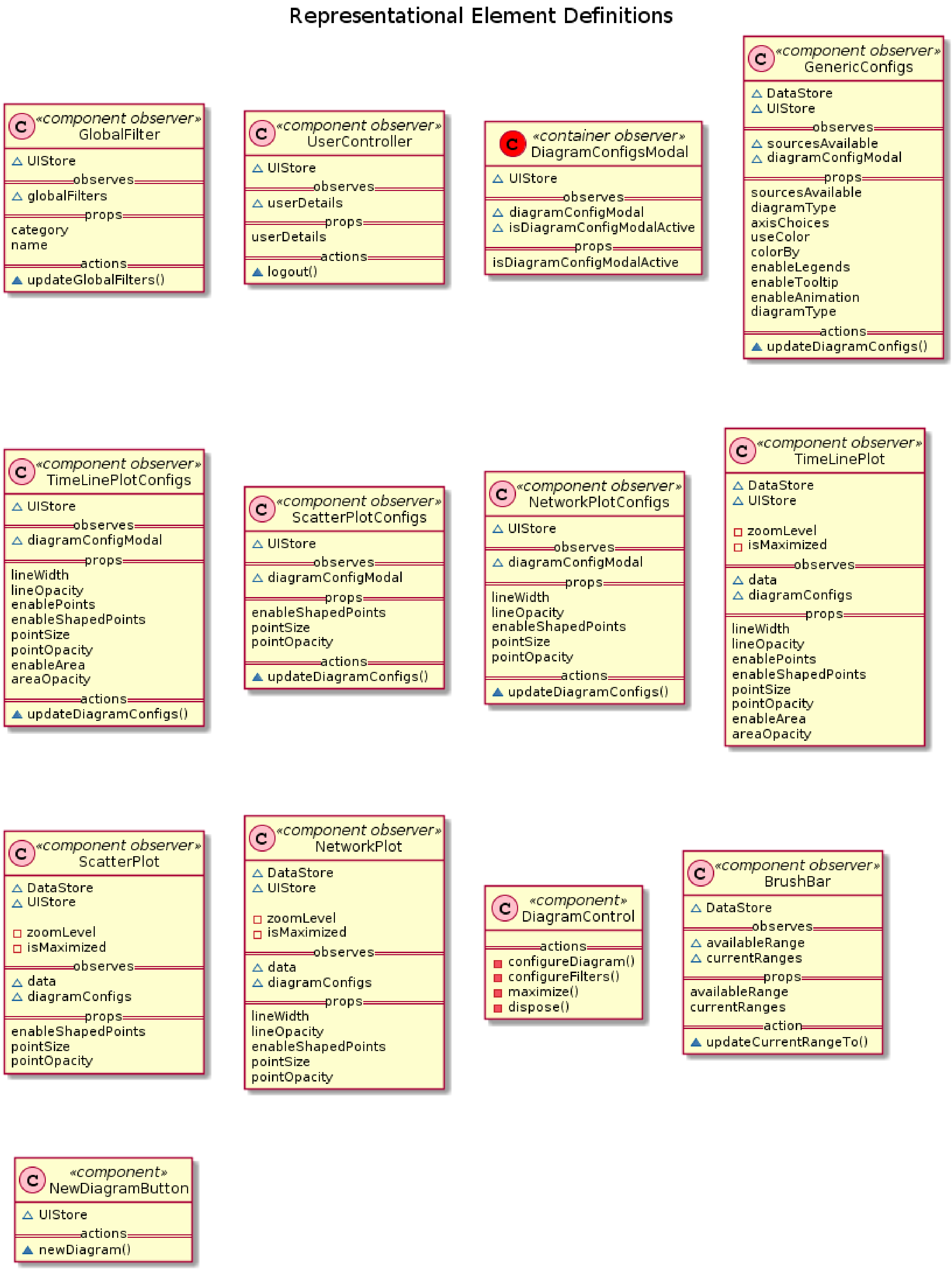


Figure 2: This diagram shows the definitions of all representational elements.

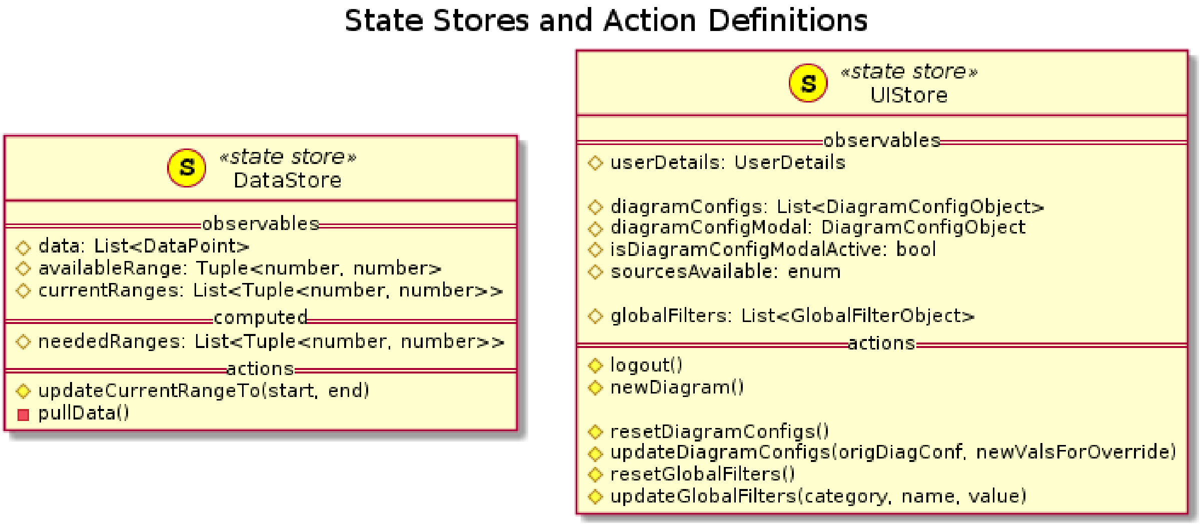

State Stores and Action Definitions
«state store»
DataStore
observables
data: List<DataPoint>
availableRange: Tuple<number, number>
currentRanges: List<Tuple<number, number>>
computed
neededRanges: List<Tuple<number, number>>
actions
updateCurrentRangeTo(start, end)
pullData()
«state store»
UIStore
observables
userDetails: UserDetails
diagramConfigs: List<DiagramConfigObject>
diagramConfigModal: DiagramConfigObject
isDiagramConfigModalActive: bool
sourcesAvailable: enum
globalFilters: List<GlobalFilterObject>
actions
logout()
newDiagram()
resetDiagramConfigs()
updateDiagramConfigs(origDiagConf, newValsForOverride)
resetGlobalFilters()
updateGlobalFilters(category, name, value)

Figure 3: This diagram shows the design of the MobX state store objects and predefined actions to mutate the states.

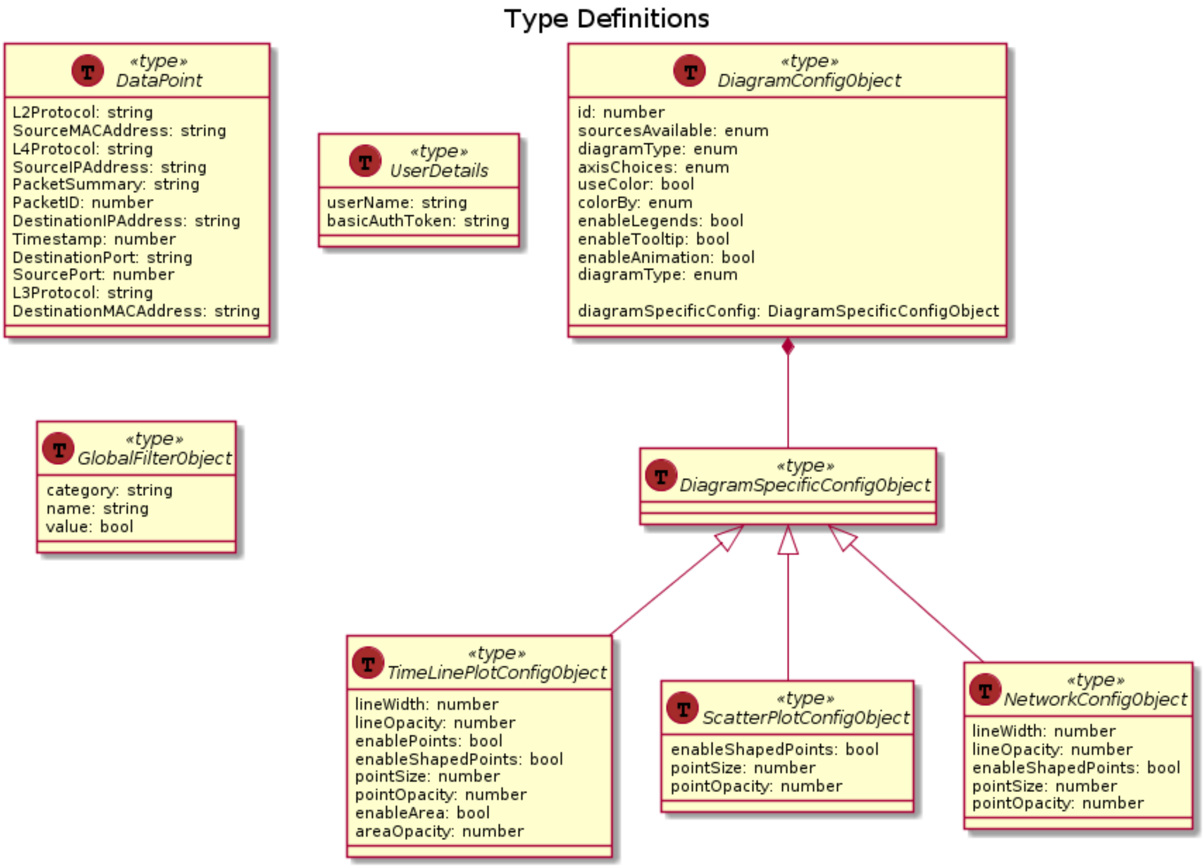
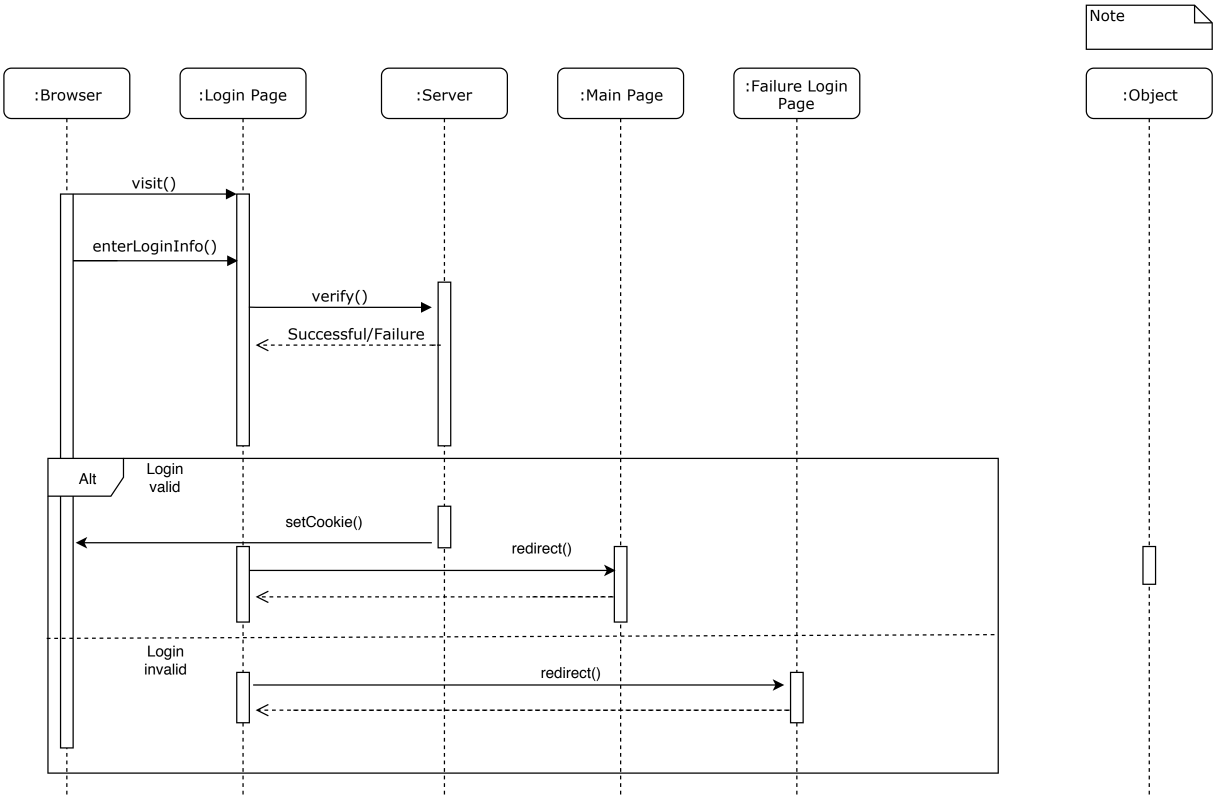
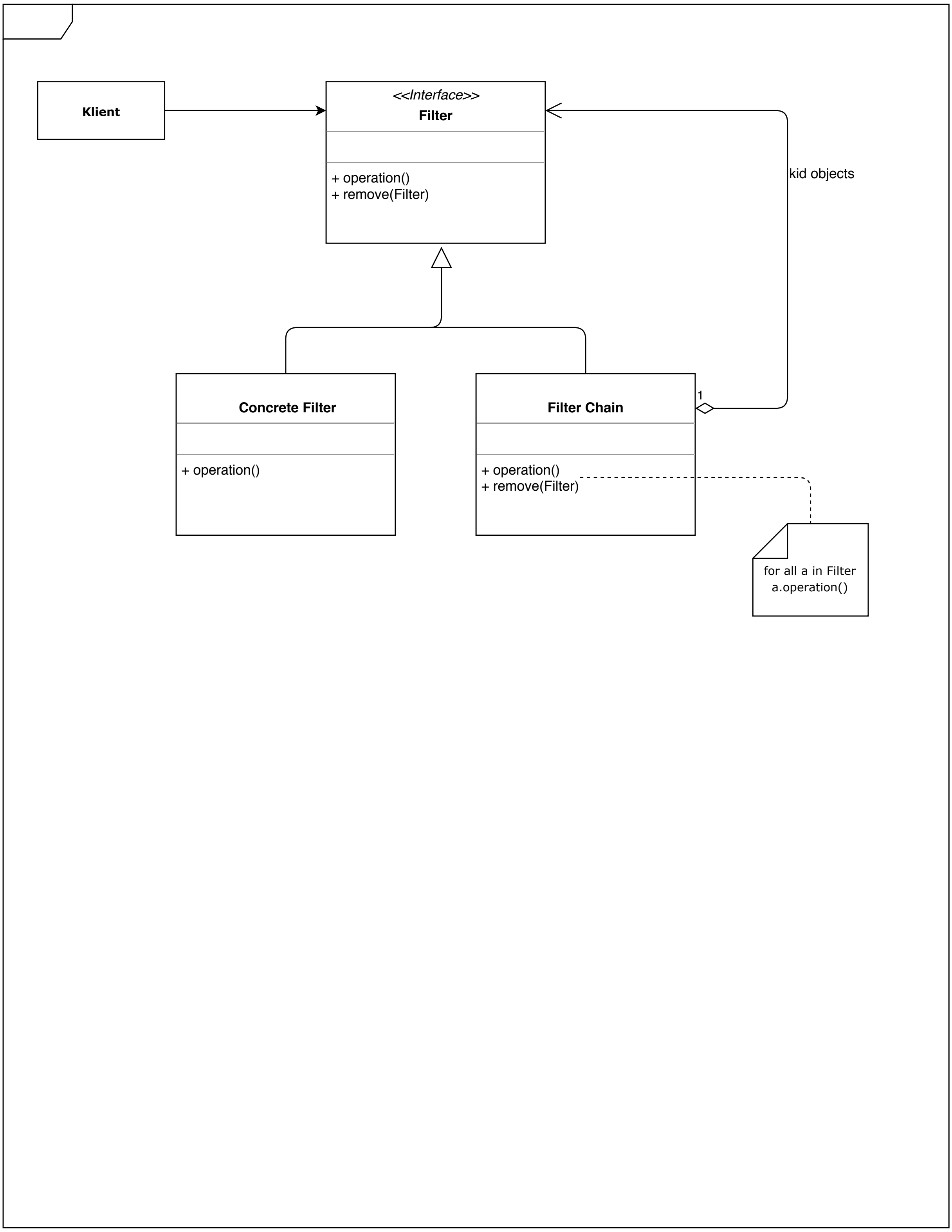


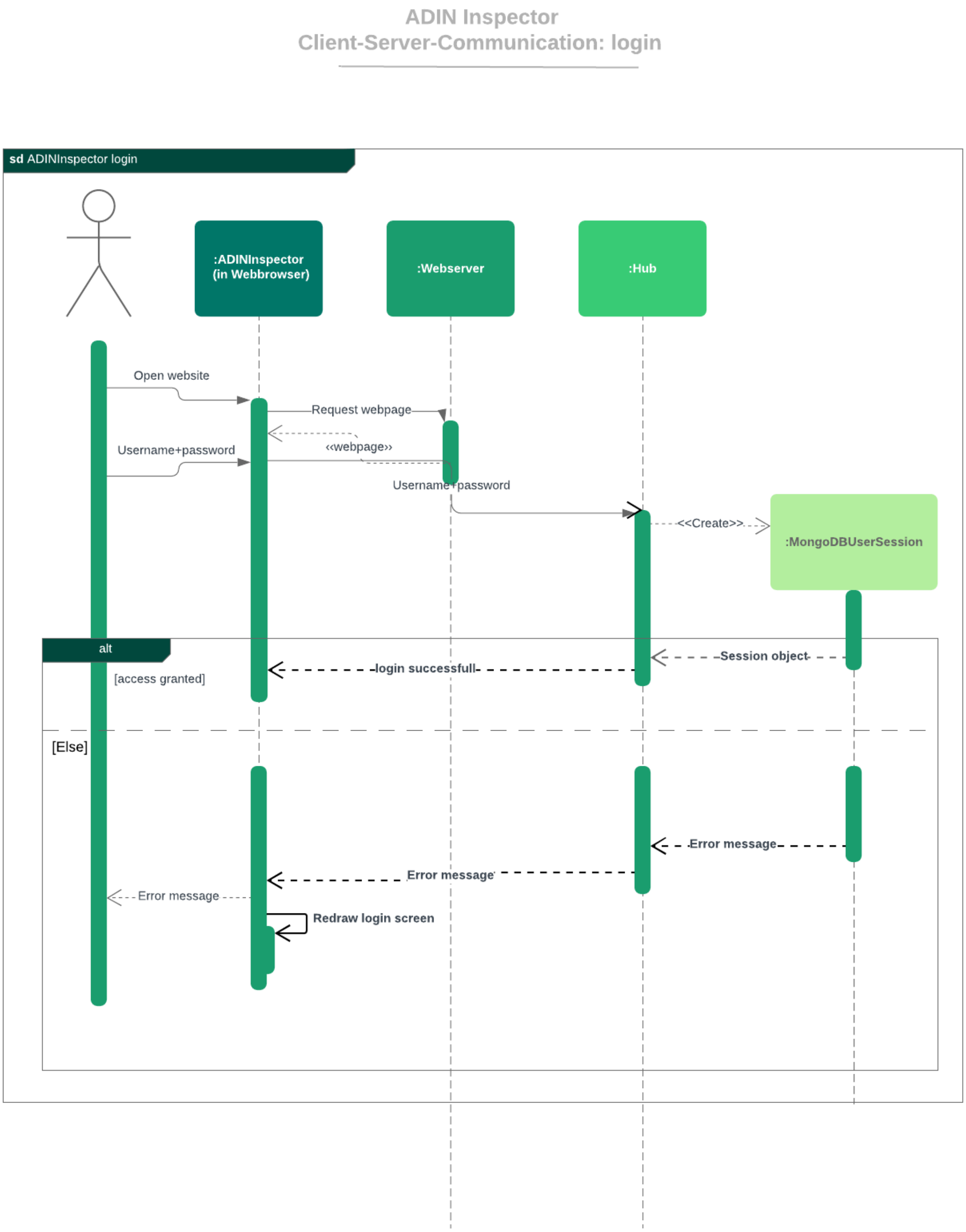
Figure 4: This diagram shows the definitions of custom types that are used in the MobX state stores.

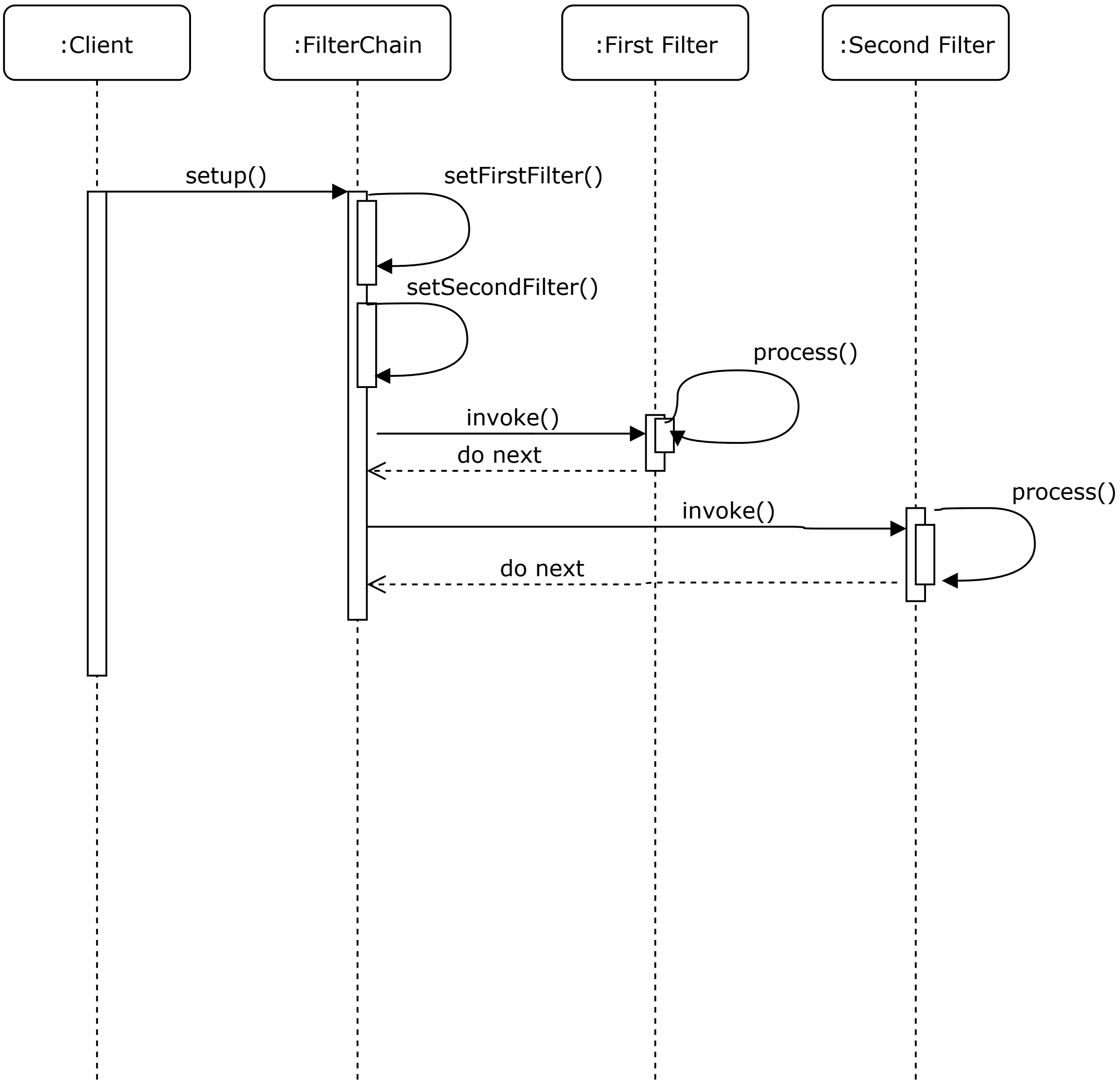
1.1.2 Sequence Diagram

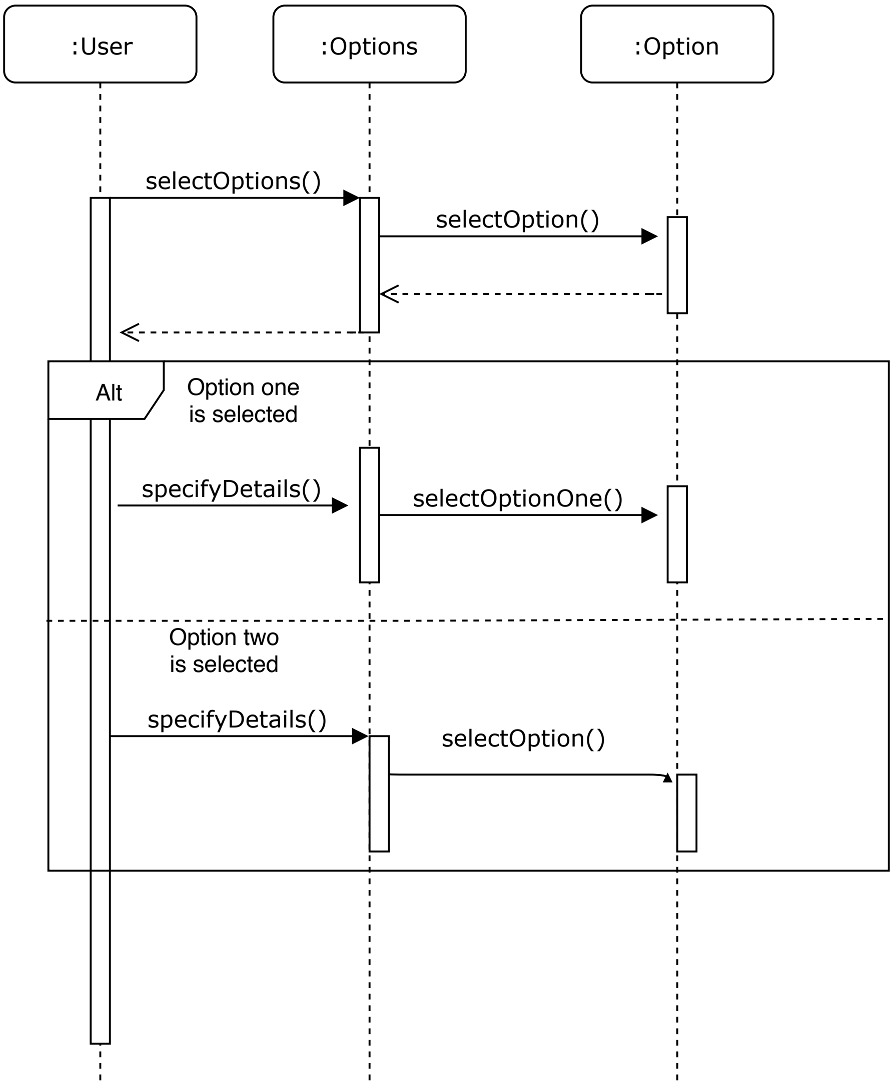


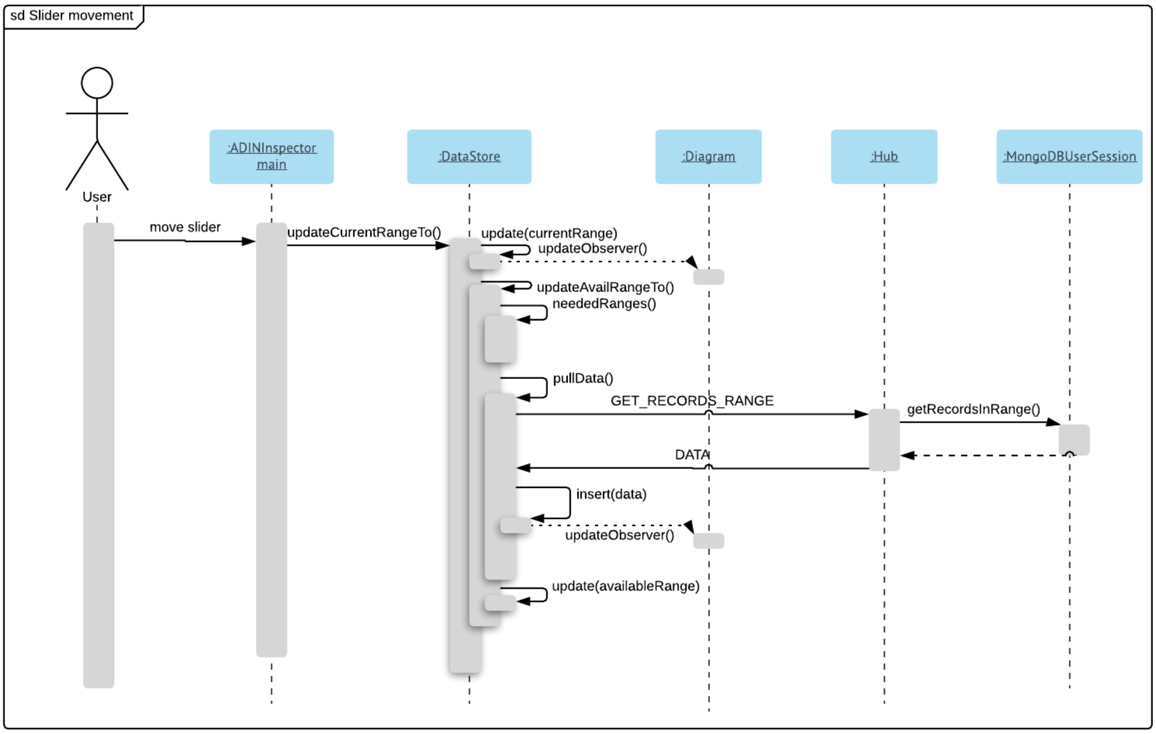

Klient
<<Interface>>
Filter
+ operation()
+ remove(Filter)
kid objects
Concrete Filter
+ operation()
Filter Chain
1
+ operation()
+ remove(Filter)
for all a in Filter
a.operation()

The following diagram shows an alternative view of the login sequence:




:Client
:FilterChain
:First Filter
:Second Filter
setup()
setFirstFilter()
setSecondFilter()
process()
invoke()
do next
process()
invoke()
do next


:User
:Options
:Option
selectOptions()
selectOption()
Alt
Option one
is selected
specifyDetails()
selectOptionOne()
Option two
is selected
specifyDetails()
selectOption()



Note: the - - - ►updateObserver() calls are performed by the MobX framework.

Figure 5: Sequence diagram for slider movement
This diagram shows the control flow for handling a movement of the slider by the user.

1.1.3 Activity Diagram

1.2 Client-server protocol

Messages between client and server are exchanged as strings in JSON format.
In the following list words in angle brackets ("<>") are placeholders.

1.2.1 Requests from client to server:

- getAvailableCollections
  syntax: {"cmd": "GET_AV_COLL"}
  expected response: list of collections

- getCollectionSize(collection)
  syntax: {"cmd": "GET_COLL_SIZE", "par": "<collection>"}
  where <collection> is the name of a collection
  expected response: collection size

- getCollection(collection)
  syntax: {"cmd": "GET_COLL", "par": "<collection>"}
  expected response: data set

- getRecordsInRange(collection, key, start, end)
  syntax: {"cmd": "GET_RECORDS_RANGE", "par": "<collection>", "key": "<keyvalue>", "start": "<startvalue>", "end:", "<endvalue>"}
  where <key> is the name of a key in the given collection and <startvalue> and <endvalue> are valid values for this key
  expected response: data set

- getRecordsInRangeSize(collection, key, start, end)
  syntax: {"cmd": "GET_RECORDS_RANGE_SIZE", "par": "<collection>", "key": "<keyvalue>", "start": "<startvalue>", "end:", "<endvalue>"}
  expected response: collection size

1.2.2 Messages from server to client:

- list of collections
  syntax: {"cmd": "LIST_COL", "par": ["<collection>"]}
  where <collection> is the name of a collection

- collection size
  syntax: {"cmd": "COLL_SIZE", "par": "<size>"}
  where <size> is the number of records in this collection

- data set
  syntax: {"cmd": "DATA", "par": [<record>]}
  where each record is a JSON object

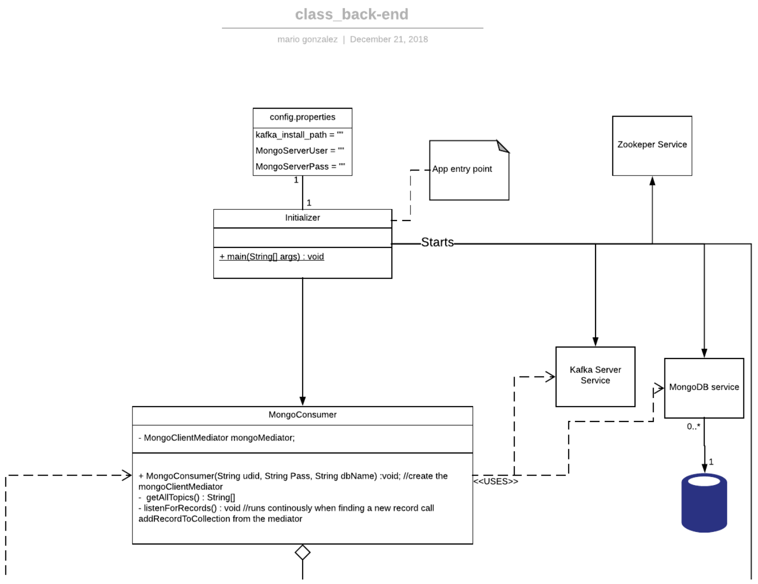

class_back-end
mario gonzalez | December 21, 2018
config.properties
kafka_install_path = ""
MongoServerUser = ""
MongoServerPass = ""
1
1
App entry point
Zookeper Service
Initializer
+ main(String[] args) : void
Starts
Kafka Server Service
MongoDB service
0..*
1
MongoConsumer
- MongoClientMediator mongoMediator;
+ MongoConsumer(String udid, String Pass, String dbName) :void; //create the mongoClientMediator
- getAllTopics() : String[]
- listenForRecords() : void //runs continously when finding a new record call addRecordToCollection from the mediator
<<USES>>

Figure 6: The classes involed in the initialization setup

1.3 Back-End

This subsection deals with the back-end of the ADIN INSPECTOR. How the system deals with client http calls, and how kafka interacts with the system. An overview of the system can be seen in Figure 9. Smaller subsections have been expanded in Figure ??, Figure ??, Figure ??.

1.3.1 Class Diagram

The overview in Figure 9 shows a number of classes and it's interaction with eachother. What follows is a more in-depth view of what each component of this diagram does, what data it's stored and how it fits into the overarching architecture.

- Config properties file
  The config file is stored alongside the built application .jar file and contains the path to the Kafka installation folder, the user name and password of a mongoDB account with the highest level of access and the name of the database.

- Initializer
  Methods:

  - main
    parameters: String of arguments from the console
    returns: void
    App entry point.
    We load the config.properties life and use the path provided to start the zookeper, kafka and mongodb services

- MongoConsumer
  The Mongo Consumer, as the name implies, consumes all messages from all topics in the

Kafka messaging system. Once a message is found it is passed along to the Mongo Client for further processing.
Variables

  - clientMediator
    Type : MongoClientMediator
    An instance of the Mongo Client Mediator, created with the credentials from the config file.

  Methods

  - MongoConsumer constructor
    parameters: user name and password of a mongoDB account with the highest level of access.
    Initializes the MongoClient variable and calls listenForRecords();
  - getAllTopics
    parameters: none
    returns: an array of strings containing all the available kafka Topics.
    Asks the kafka server service which topics exists.
  - listenForRecords
    parameters: none
    returns: void
    This Method first calls getAllTopics and uses the array of topics to poll the kafka server for new messages.
    If new messages are found then the messages are passed to the Mongo Mediator for adding them to the Database.
    If no new messages are found for a topic notify the Mongo Mediator that the collection tied to the topic is ready for pre-processing.

- MongoClientMediator This object serves as a nexus between the users who want to get data out of the database and the consumer and dataProcessor who want to add data into the database. This class encapsulates the mongo client from the mongo API.
  Variables

  - client
    type: MongoClient
    An instance of the Mongo Client from the official java API.
  - dataProc
    A reference to the data processor class for this client.

  Methods

  - MongoClientMediator constructor
    parameters: Username and password
    Initializes the client variable, throws an error if the user is not found.
  - addRecordToCollection
    parameters: String representation of a record in json format
    String name of the collection it should be added to.

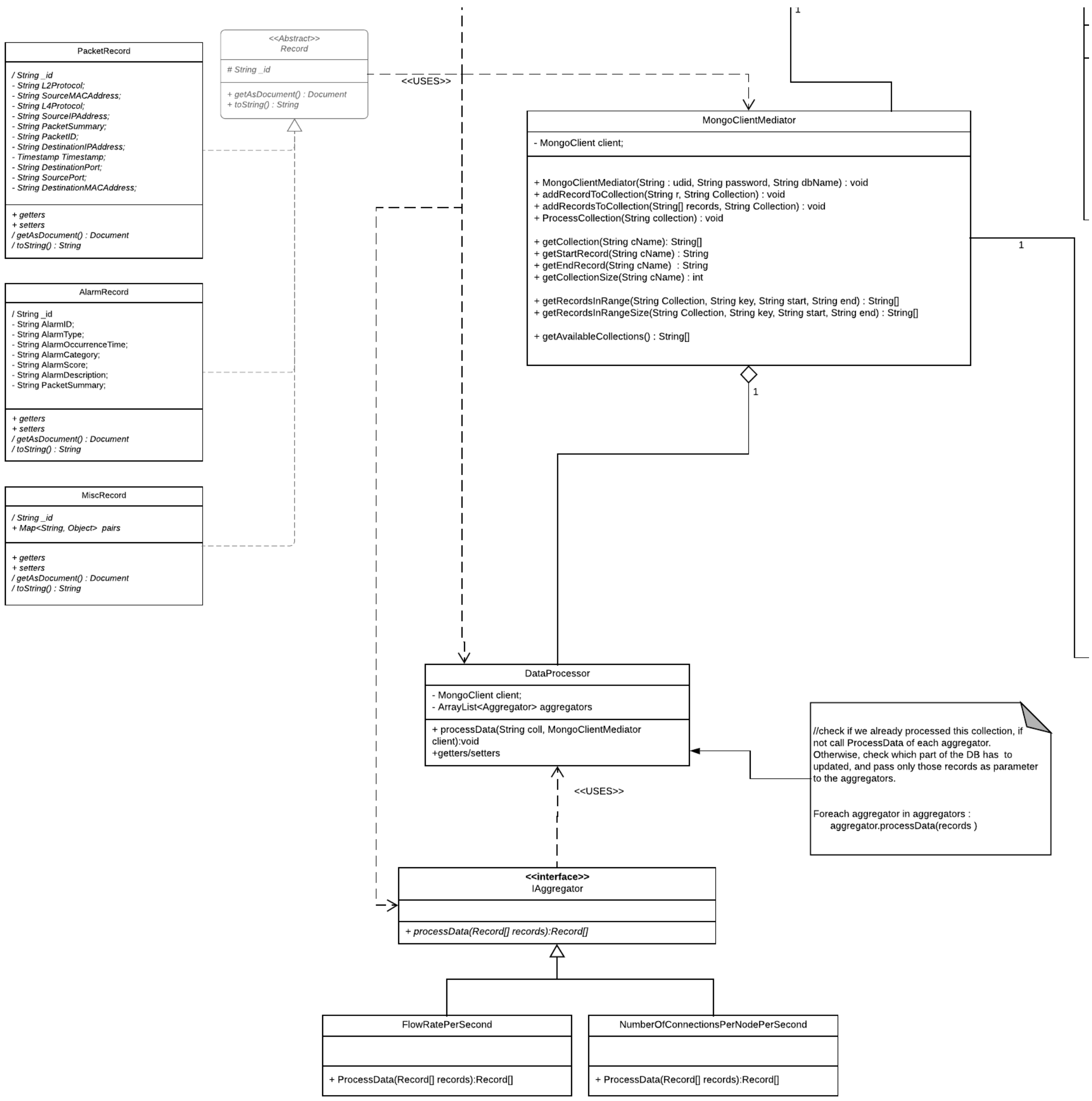

PacketRecord
/ String _id
- String L2Protocol;
- String SourceMACAddress;
- String L4Protocol;
- String SourceIPAddress;
- String PacketSummary;
- String PacketID;
- String DestinationIPAddress;
- Timestamp Timestamp;
- String DestinationPort;
- String SourcePort;
- String DestinationMACAddress;
+ getters
+ setters
/ getAsDocument() : Document
/ toString() : String
<<Abstract>>
Record
# String _id
+ getAsDocument() : Document
+ toString() : String
<<USES>>
1
MongoClientMediator
- MongoClient client;
+ MongoClientMediator(String : udid, String password, String dbName) : void
+ addRecordToCollection(String r, String Collection) : void
+ addRecordsToCollection(String[] records, String Collection) : void
+ ProcessCollection(String collection) : void
+ getCollection(String cName): String[]
+ getStartRecord(String cName) : String
+ getEndRecord(String cName) : String
+ getCollectionSize(String cName) : int
+ getRecordsInRange(String Collection, String key, String start, String end) : String[]
+ getRecordsInRangeSize(String Collection, String key, String start, String end) : String[]
+ getAvailableCollections() : String[]
1
AlarmRecord
/ String _id
- String AlarmID;
- String AlarmType;
- String AlarmOccurrenceTime;
- String AlarmCategory;
- String AlarmScore;
- String AlarmDescription;
- String PacketSummary;
+ getters
+ setters
/ getAsDocument() : Document
/ toString() : String
1
MiscRecord
/ String _id
+ Map<String, Object> pairs
+ getters
+ setters
/ getAsDocument() : Document
/ toString() : String
DataProcessor
- MongoClient client;
- ArrayList<Aggregator> aggregators
+ processData(String coll, MongoClientMediator client):void
+getters/setters
//check if we already processed this collection, if not call ProcessData of each aggregator. Otherwise, check which part of the DB has to updated, and pass only those records as parameter to the aggregators.
Foreach aggregator in aggregators :
aggregator.processData(records)
<<USES>>
<<interface>>
IAggregator
+ processData(Record[] records):Record[]
FlowRatePerSecond
+ ProcessData(Record[] records):Record[]
NumberOfConnectionsPerNodePerSecond
+ ProcessData(Record[] records):Record[]

Figure 7: The classes involed in reading and writing data into the database

returns: void
Converts the json string into a java object, then to a bson document and uses the mongoAPI to insert it into the database.

- addRecordsToCollection
parameters: String Array of records to be added to a collection
String name of the collection it should be added to.
returns: void
for each oneof the members of the array call addRecordToCollection
- ProcessCollection
parameters: String, name of a collection
returns: void
signal the data processor to start the processing of a collection
- getCollection
parameters: String, name of a collection
returns: String array containing all entries of the collection
- getStartRecord
parameters: String, name of a collection
returns: the first entry of the collection as a String.
- getEndRecord
parameters: String, name of a collection
returns: the last entry of the collection as a String.
- getCollectionSize
parameters: String, name of a collection
returns: the number of entries in the collectoin as int
- getRecordsInRange
parameters: String, name of the collection to query
String, key of the parameter used for filtering
String start and end ranges for the filtering
returns: String array containing all entries of the collection within that range
this Method is very general to allow for flexibility.For example by letting the key be, SourceIPaddresses, or a timeStamp.
- getRecordsInRangeSize
parameters: String, name of the collection to query
String, key of the parameter used for filtering
String start and end ranges for the filtering
returns: number of elements matching the range as int

- Record
Every message that comes from kafka and needs to be added to the database has it's own Record class that inherit from this one.
Every single class that inherits needs to be able to, using reflection, convert itself into a Bson Document where every variable is a key Value pair of the name of the variable and

it's associated value.
Variables

  - id
    type: String

Methods

  - getAsDocument()
    parameters: none
    returns: A Document, containing every variable of any class inheriting from this one.
    This function checks for every variable, gets it's name and value as a string and adds it to the document that it eventually returns.

- PacketRecord
  Inheriting from Record, this class contains the variables that match the json string obtained from kafka.
  Variables

  - id
    type: String
    this id is used for determining the ordering when saving to mongoDB, it's the offset of the message in the kafka messaging queue. inherited from Record
  - client
    type: String
  - L2Protocol
    type: String
  - SourceMACAddress
    type: String
  - L4Protocol
    type: String
  - SourceIPAddress
    type: String
  - PacketSummary
    type: String
  - DestinationIPAddress
    type: String
  - Timestamp
    type: String
  - DestinationPort
    type: String
  - SourcePort
    type: String

- DestinationMACAddress
  type: String

Methods

- getters / setters
  parameters: variable
  returns: variable type
  Each variable has it's getters and setter methods.

- AlarmRecord
  Inheriting from Record, this class contains the variables that match the json string obtained from kafka.
  Variables
  - id
    type: String
  - AlarmID
    type: String
  - AlarmType
    type: String
  - AlarmOccurrenceTime
    type: String
  - AlarmCategory
    type: String
  - AlarmScore
    type: String
  - AlarmDescription
    type: String
  - PacketSummary
    type: String

  Methods
  - getters / setters
    parameters: variable
    returns: variable type
    Each variable has it's getters and setter methods.

- MiscRecord
  Inheriting from Record, this class is used by the data processor as an 'in-between' state before saving to the database. As well as an extension point for adding more types of records into the database programatically in the future.
  Refer to the data processor class for further data on the key value pairs.
  Variables

  - pairs
    A Map of strings to Objects to store any 1 to many relationships

  Methods

  - getters / setters
    parameters: none
    returns: variable type
    Each variable has it's getters and setter methods.

- DataProcessor
  This class is a mediator for each one of our data aggregators used for extraciton of features from the raw data stored in mongoDB.
  We might want to hve multiple data processors for chaining different aggregators together or to split up the work into mutliple threads. This is dependant on further performance testing.
  Variables

  - client
    an instance of the associated mongoClient that requested the data aggregation
  - aggregators
    A Arraylist containing all the aggregators to be applied on a collection.

  Methods

  - getters / setters
  - processData
    parameters: variable
    returns: variable type

- IAggregator
  This interface is the building block for every aggregator to be applied to data
  Variables Methods

  - processData
    parameters: Records array of the records to be processed

- FlowRatePerSecond
  Implements IAggregator. This calculates, per port, the outgoing and ingoing connections. A record processed by this aggregator is stored in a collection as follows:

```
Name of collection: collectionName\_FlowratePerSec
structure of record as json:
 {
"date" : \{" date" " Unix_Timestamp  }
rounded down to the second this record points to.
Connections : [
{ Port: "portNumer", "InOut" : " In/Out ", count : "Number" }
{ Port: "portNumer", "InOut" : " In/Out ", count : "Number" }
...
```

```
  ] This array has an entry per port if the port communicated that second.
  Precomputing this allows us to stream whenever the client needs the information
  for a specific node.
}
```

Methods

- processData
  parameters: Records array of the records to be processed
  specific imlpementation left to the classes implementing this interface

- NumberOfConnectionsPerNodePerSecond
  Implements IAggregator. This calculates the outgoing and ingoing connections. A record processed by this aggregator is stored in a collection as follows:

```
  Name of collection: collectionName\_FlowratePerSec
  structure of record as json:
   {
  "date" : \{" date" " Unix_Timestamp  }
  rounded down to the second this record points to.
  Connections : [
  { Port: "portNumer", count : "Number" }
  { Port: "portNumer", count : "Number" }
  ...

  ] This array has an entry per port if the port communicated that second.
  Precomputing this allows us to stream whenever the client needs the information
  for a specific node.
}
```

Methods

- processData
  parameters: Records array of the records to be processed

- Hub
  This class implements the network handlers for the websocket connection to the client and access methods for a database connection.
  Variables

  - requestHandler
    Type : ClientProtocolHandler
    The strategy object we call for the actual parsing of the client requests.

  - database
    Type : IUserSession
    The database we use during a user session.

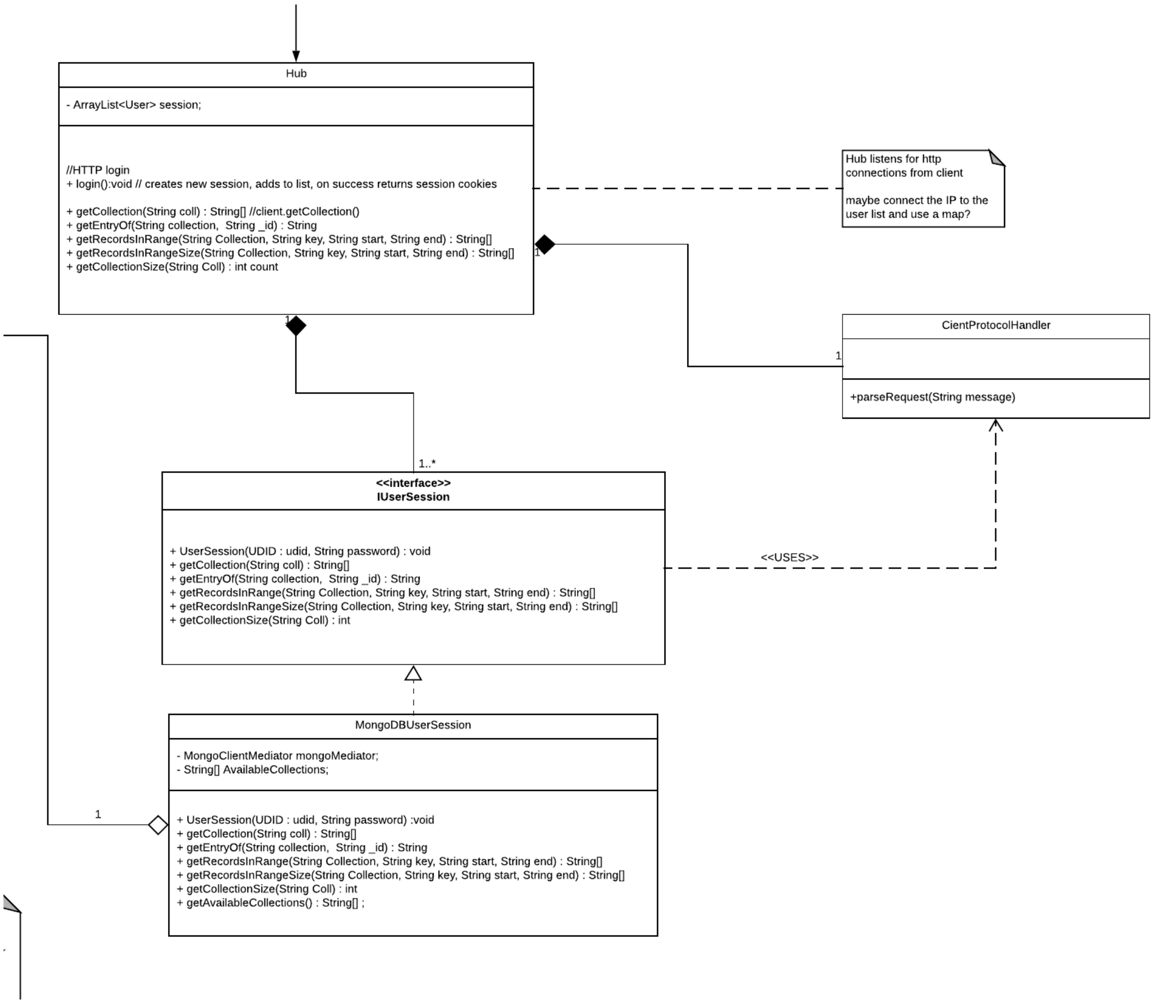

Hub
- ArrayList<User> session;
//HTTP login
+ login():void // creates new session, adds to list, on success returns session cookies
+ getCollection(String coll) : String[] //client.getCollection()
+ getEntryOf(String collection, String _id) : String
+ getRecordsInRange(String Collection, String key, String start, String end) : String[]
+ getRecordsInRangeSize(String Collection, String key, String start, String end) : String[]
+ getCollectionSize(String Coll) : int count
Hub listens for http connections from client
maybe connect the IP to the user list and use a map?
1
CientProtocolHandler
1
+parseRequest(String message)
1
1..*
<<interface>>
IUserSession
+ UserSession(UDID : udid, String password) : void
+ getCollection(String coll) : String[]
+ getEntryOf(String collection, String _id) : String
+ getRecordsInRange(String Collection, String key, String start, String end) : String[]
+ getRecordsInRangeSize(String Collection, String key, String start, String end) : String[]
+ getCollectionSize(String Coll) : int
<<USES>>
MongoDBUserSession
- MongoClientMediator mongoMediator;
- String[] AvailableCollections;
1
+ UserSession(UDID : udid, String password) :void
+ getCollection(String coll) : String[]
+ getEntryOf(String collection, String _id) : String
+ getRecordsInRange(String Collection, String key, String start, String end) : String[]
+ getRecordsInRangeSize(String Collection, String key, String start, String end) : String[]
+ getCollectionSize(String Coll) : int
+ getAvailableCollections() : String[] ;

Figure 8: The classes involed in the communication between the server and the client

Methods

- handleOpen
  parameters: Session session - the current session
  returns: void
  Event handler for the start of websocket connection.
- handleClose
  parameters: Session session - the current session
  returns: void
  Event handler for closing a connection.
- handleMessage
  parameters: String message - the message that we received from the client
  Session session - the current session
  returns: String - the response to be sent to the client
  Event handler for receiving a message. The message is passed to the ClientProtocolHandler.
- handleError
  parameters: Session session - the current session
  Throwable t - the exception that occurred
  returns: void
  Event handler for errors/exceptions during communication.

- IUserSession
  An IUserSession object encapsulates a data base session. On instantiation an IUserSession connects to a database using the given user id and password and uses this connection for all following data base access.
  Methods
  - UserSession
    parameters: String username - the user id to login with
    String password - the password
    returns: IUserSession
    Factory method to instantiate a new UserSession and log in into the database using the given credentials.
  - getAvailableCollections
    parameters: -
    returns: String array with collection names
    Returns an array with the names of the collections available to the current user.
  - getCollectionSize
    parameters: String collection - the collection to query
    returns: long - the number of records
    Returns the number of records in the specified collection.
  - getCollection
    parameters: String - name of a collection
    returns: String array containing all entries of the collection

  - getRecordsInRange
    parameters: String - name of the collection to query
    String key - the parameter used for filtering
    String start and end - range for the filtering
    returns: String array containing all entries of the collection within the filter range
    Returns an array containing all records of this collection for which the value of the specified key is in the range [start, end). The records will be in the same order as they are in the collection.

  - getRecordsInRangeSize
    parameters: String - name of the collection to query
    String key - the parameter used for filtering
    String start and end - range for the filtering
    returns: number of elements matching the range as int
    Returns the number of records in the specified collection for which the value of the specified key is within the range [start, end).

- MongoDBUserSession
  Encapsulates a user session for a connection to a MongoDB database.
  Methods

  - MongoDBUserSession constructor
    parameters: -
    Private constructor to create a new MongoDB session.

  - UserSession
    parameters: String username - the user id to login with
    String password - the password
    returns: a new MongoDBUserSession object
    Factory method to instantiate a new MongoDBUserSession and log in into the database using the given credentials.

  - getAvailableCollections
    parameters: -
    returns: String array with collection names
    Returns an array with the names of the collections available to the current user.

  - getCollectionSize
    parameters: String collection - the collection to query
    returns: long - the number of records
    Returns the number of records in the specified collection.

  - getCollection
    parameters: String - name of a collection
    returns: String array containing all entries of the collection

  - getRecordsInRange
    parameters: String - name of the collection to query
    String key - the parameter used for filtering
    String start and end - range for the filtering

returns: String array containing all entries of the collection within the filter range
Returns an array containing all records of this collection for which the value of the specified key is in the range [start, end). The records will be in the same order as they are in the collection.

- getRecordsInRangeSize
  parameters: String - name of the collection to query
  String key - the parameter used for filtering
  String start and end - range for the filtering
  returns: number of elements matching the range as int
  Returns the number of records in the specified collection for which the value of the specified key is within the range [start, end).

- ClientRequestHandler
  This class handles client requests by parsing them, executing the requested action and producing responses. The requested actions are typically executed by calls to the database session object.
  Methods
  - handleRequest
    parameters:
    IUserSession dbSession - the current database session
    Session session - the current client session
    String message - the client request to process
    returns: String - the response to be sent to the client
    Parse the message from the client, execute the requested action (typically a database query) and construct the response message.

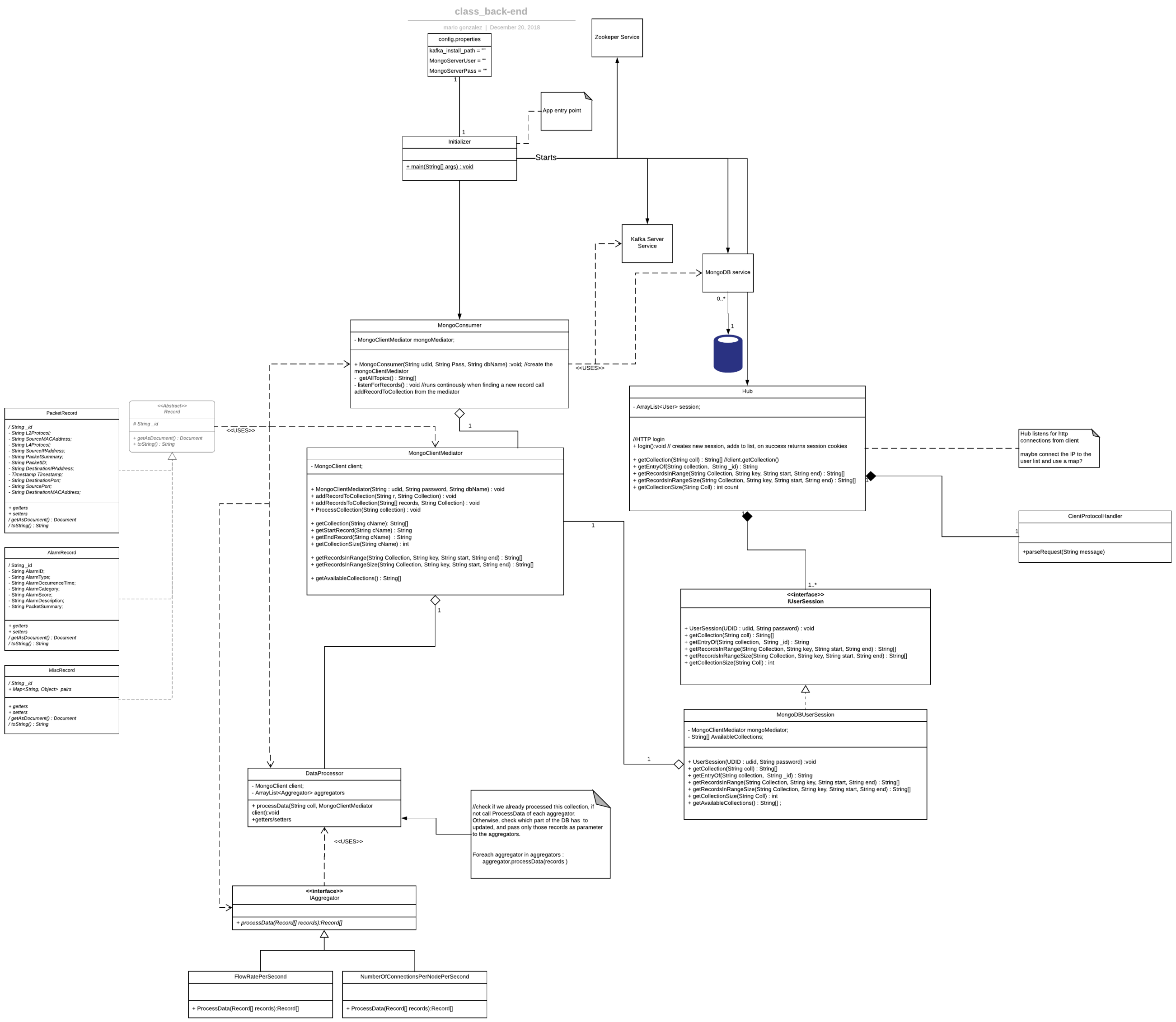

class_back-end
mario gonzalez | December 20, 2018
config.properties
kafka_install_path = ""
MongoServerUser = ""
MongoServerPass = ""
1
1
Initializer
+ main(String[] args) : void
App entry point
Starts
Zookeper Service
Kafka Server Service
MongoDB service
0..*
1
MongoConsumer
- MongoClientMediator mongoMediator;
+ MongoConsumer(String udid, String Pass, String dbName) :void; //create the mongoClientMediator
- getAllTopics() : String[]
- listenForRecords() : void //runs continously when finding a new record call addRecordToCollection from the mediator
<<USES>>
1
MongoClientMediator
- MongoClient client;
+ MongoClientMediator(String : udid, String password, String dbName) : void
+ addRecordToCollection(String r, String Collection) : void
+ addRecordsToCollection(String[] records, String Collection) : void
+ ProcessCollection(String collection) : void
+ getCollection(String cName): String[]
+ getStartRecord(String cName) : String
+ getEndRecord(String cName) : String
+ getCollectionSize(String cName) : int
+ getRecordsInRange(String Collection, String key, String start, String end) : String[]
+ getRecordsInRangeSize(String Collection, String key, String start, String end) : String[]
+ getAvailableCollections() : String[]
1
1
Hub
- ArrayList<User> session;
//HTTP login
+ login():void // creates new session, adds to list, on success returns session cookies
+ getCollection(String coll) : String[] //client.getCollection()
+ getEntryOf(String collection, String _id) : String
+ getRecordsInRange(String Collection, String key, String start, String end) : String[]
+ getRecordsInRangeSize(String Collection, String key, String start, String end) : String[]
+ getCollectionSize(String Coll) : int count
Hub listens for http connections from client
maybe connect the IP to the user list and use a map?
1
CientProtocolHandler
+parseRequest(String message)
1
1..*
<<interface>>
IUserSession
+ UserSession(UDID : udid, String password) : void
+ getCollection(String coll) : String[]
+ getEntryOf(String collection, String _id) : String
+ getRecordsInRange(String Collection, String key, String start, String end) : String[]
+ getRecordsInRangeSize(String Collection, String key, String start, String end) : String[]
+ getCollectionSize(String Coll) : int
MongoDBUserSession
- MongoClientMediator mongoMediator;
- String[] AvailableCollections;
+ UserSession(UDID : udid, String password) :void
+ getCollection(String coll) : String[]
+ getEntryOf(String collection, String _id) : String
+ getRecordsInRange(String Collection, String key, String start, String end) : String[]
+ getRecordsInRangeSize(String Collection, String key, String start, String end) : String[]
+ getCollectionSize(String Coll) : int
+ getAvailableCollections() : String[] ;
1
<<Abstract>>
Record
# String _id
+ getAsDocument() : Document
+ toString() : String
<<USES>>
PacketRecord
/ String _id
- String L2Protocol;
- String SourceMACAddress;
- String L4Protocol;
- String SourceIPAddress;
- String PacketSummary;
- String PacketID;
- String DestinationIPAddress;
- Timestamp Timestamp;
- String DestinationPort;
- String SourcePort;
- String DestinationMACAddress;
+ getters
+ setters
/ getAsDocument() : Document
/ toString() : String
AlarmRecord
/ String _id
- String AlarmID;
- String AlarmType;
- String AlarmOccurrenceTime;
- String AlarmCategory;
- String AlarmScore;
- String AlarmDescription;
- String PacketSummary;
+ getters
+ setters
/ getAsDocument() : Document
/ toString() : String
MiscRecord
/ String _id
+ Map<String, Object> pairs
+ getters
+ setters
/ getAsDocument() : Document
/ toString() : String
DataProcessor
- MongoClient client;
- ArrayList<Aggregator> aggregators
+ processData(String coll, MongoClientMediator client):void
+getters/setters
//check if we already processed this collection, if not call ProcessData of each aggregator. Otherwise, check which part of the DB has to updated, and pass only those records as parameter to the aggregators.
Foreach aggregator in aggregators :
aggregator.processData(records)
<<USES>>
<<interface>>
IAggregator
+ processData(Record[] records):Record[]
FlowRatePerSecond
+ ProcessData(Record[] records):Record[]
NumberOfConnectionsPerNodePerSecond
+ ProcessData(Record[] records):Record[]

Figure 9: This is the class diagram for the whole back-end system

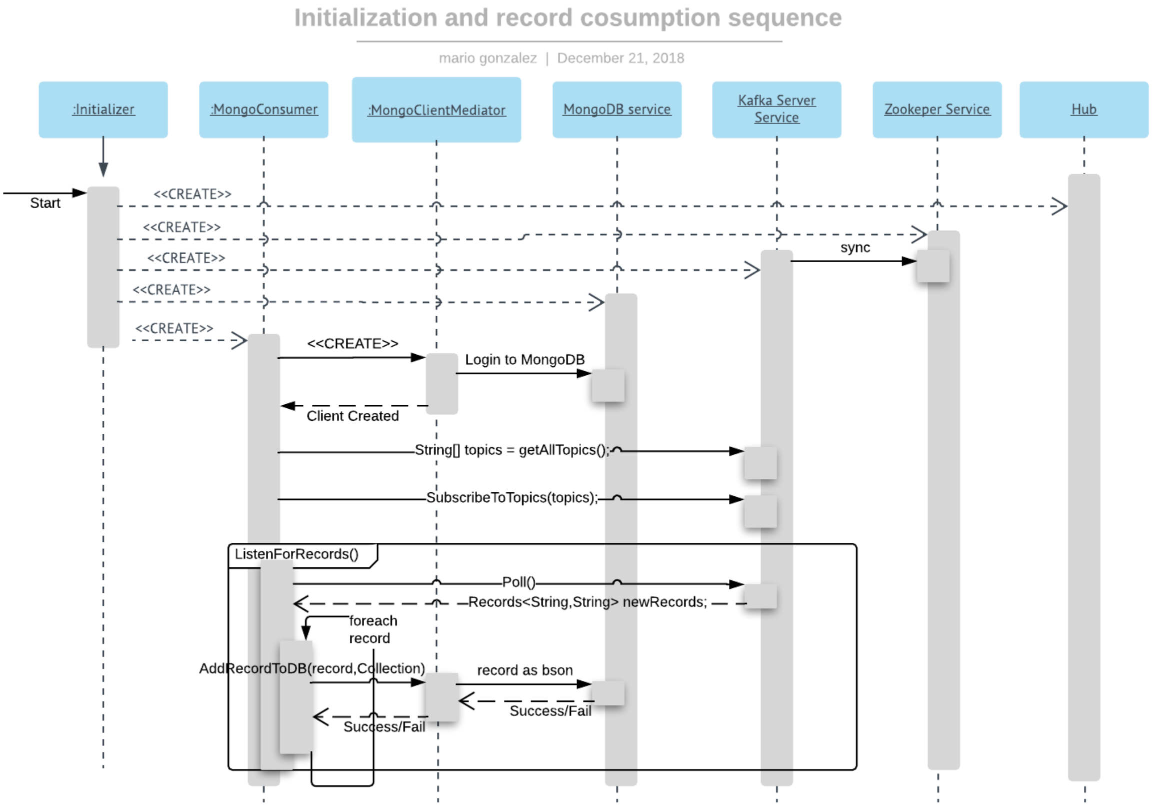


Figure 10: Initialization sequence and message consumption

1.3.2 Sequence Diagram

1.3.3 Activity Diagram

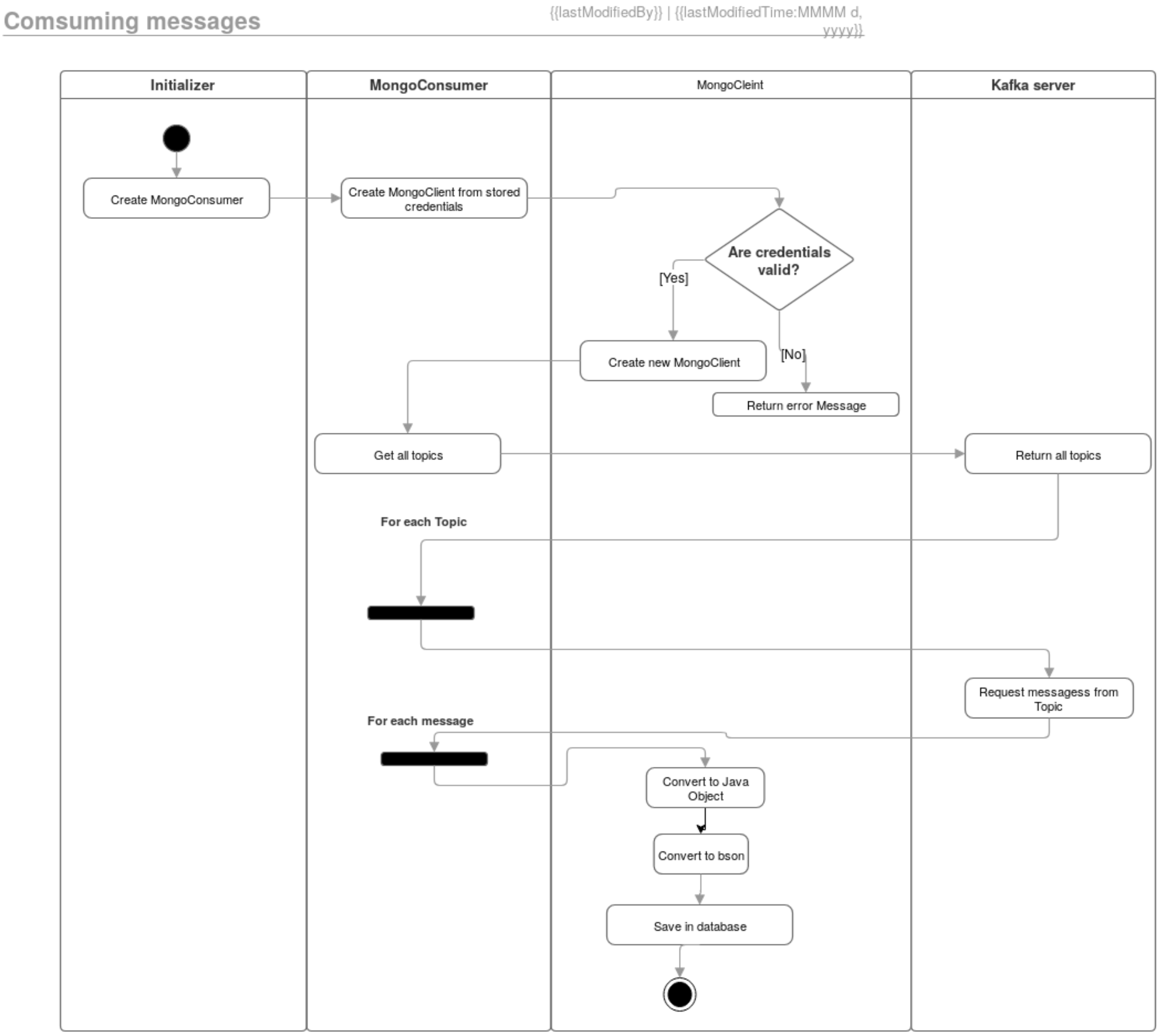


Figure 11: Message consumption workflow

For user access control the built-in UAC system in MongoDB is used, whereas every user can have roles assign to them.
A Role determines what can be done and seen within a database. For the purposes of the ADIN INSPECTOR there are three basic roles, Admin, Operator and Analyst. The admin role can create and destroy users as well as assign specific roles to them. An analyst can see all collectoins on the database and an Operator can only see part of them. The following Diagram workflow shows the user/role creation workflow an Administrator can use.

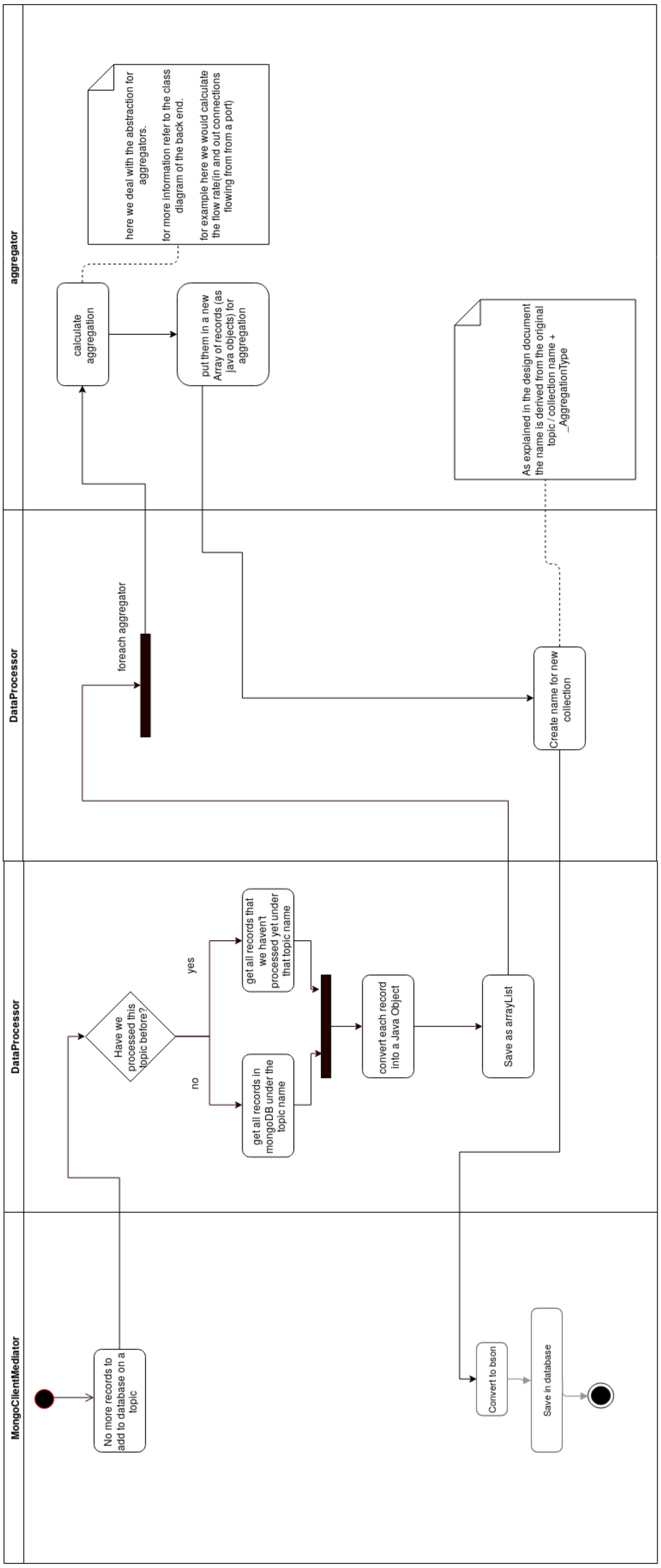

MongoClientMediator
DataProcessor
DataProcessor
aggregator
No more records to add to database on a topic
Have we processed this topic before?
no
yes
get all records in mongoDB under the topic name
get all records that we haven't processed yet under that topic name
convert each record into a Java Object
Save as arrayList
foreach aggregator
calculate aggregation
put them in a new Array of records (as java objects) for aggregation
here we deal with the abstraction for aggregators.
for more information refer to the class diagram of the back end.
for example here we would calculate the flow rate(in and out connections flowing from from a port)
Create name for new collection
As explained in the design document the name is derived from the original topic / collection name + _AggregationType
Convert to bson
Save in database

Figure 12: Processing Collection/Records workflow

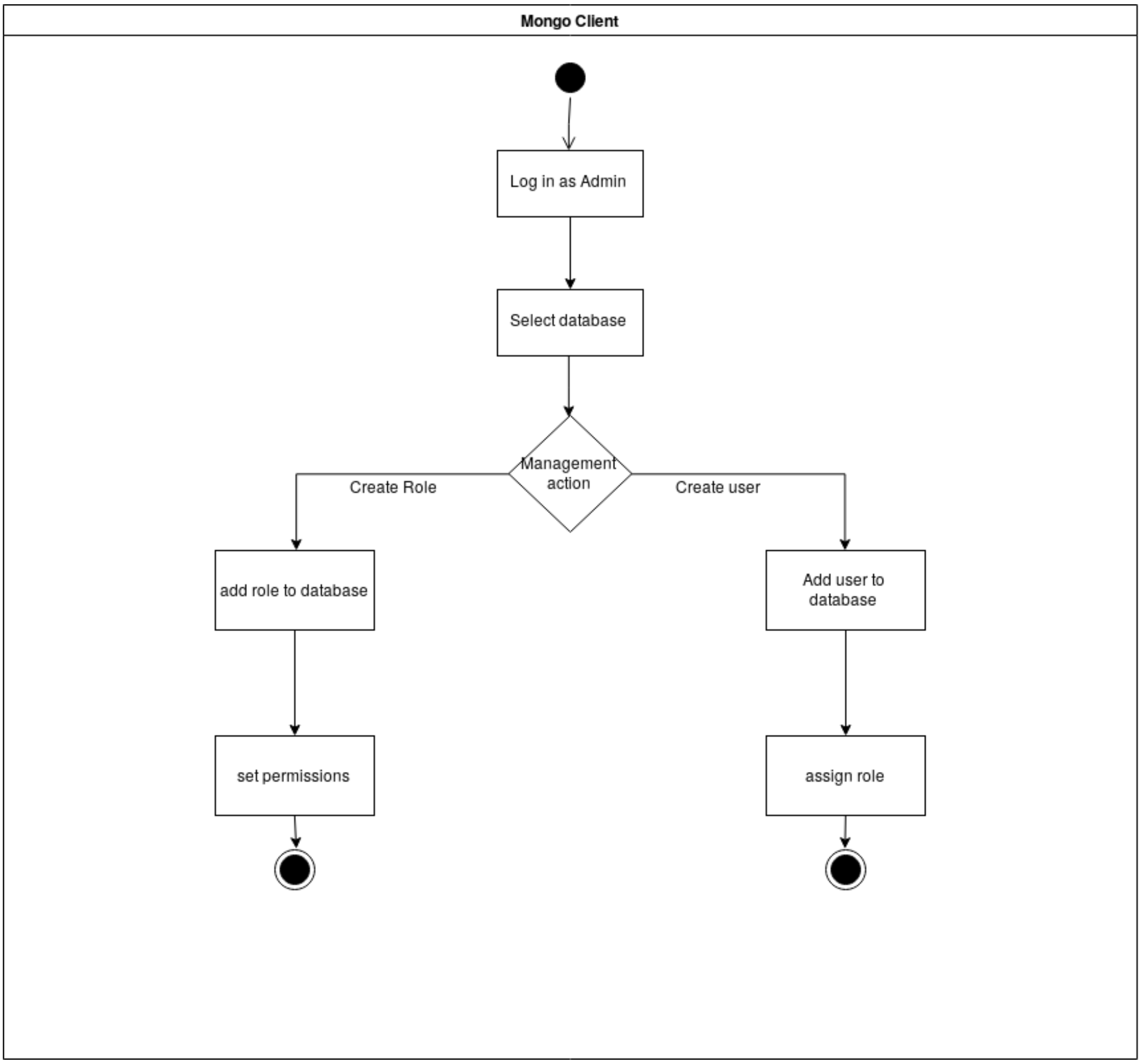


Figure 13: User Management workflow