Development of Dynamic Web Portal for Centre for Research in Smart Manufacturing

Design Artifacts

Version 1.0

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Group G

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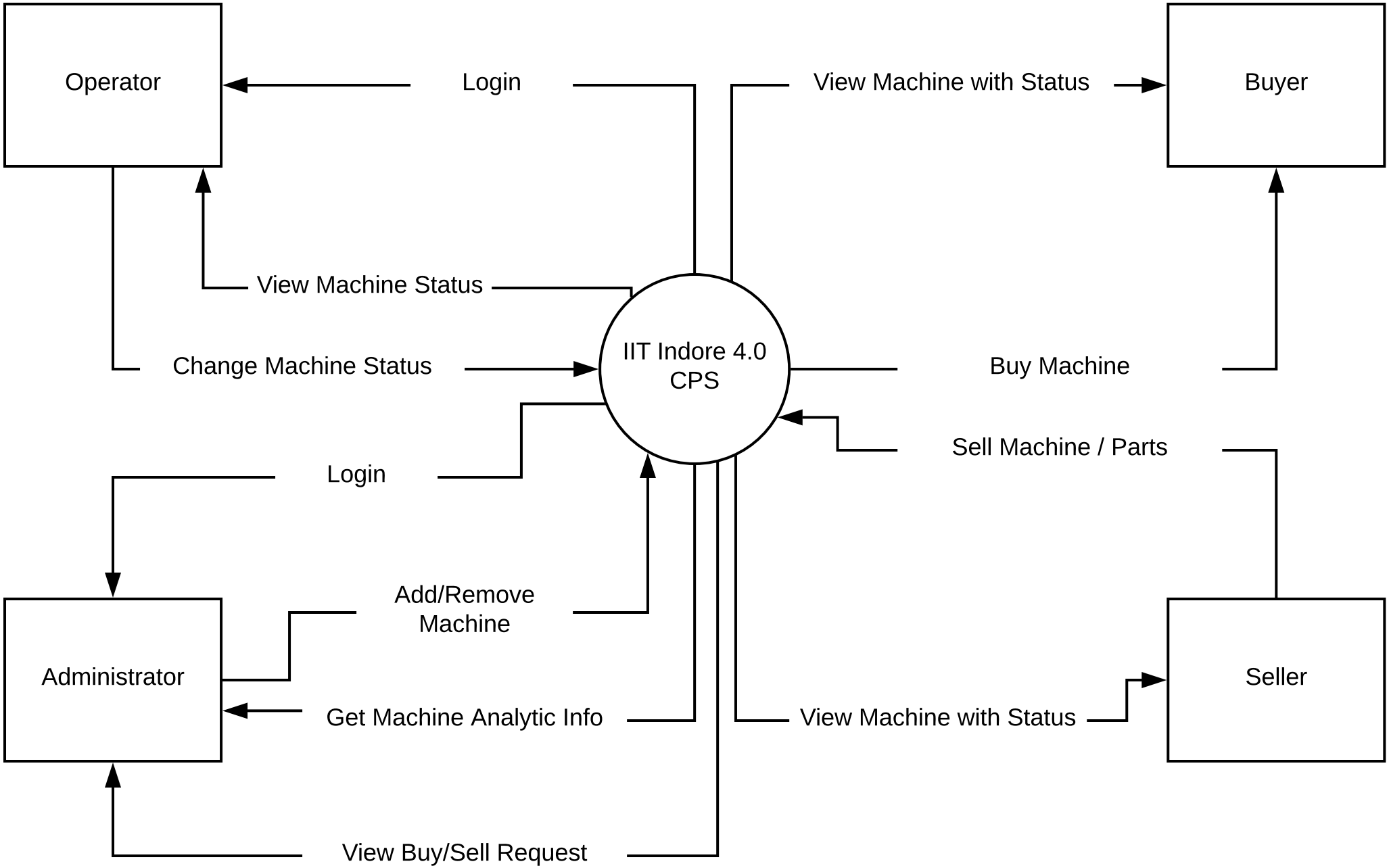
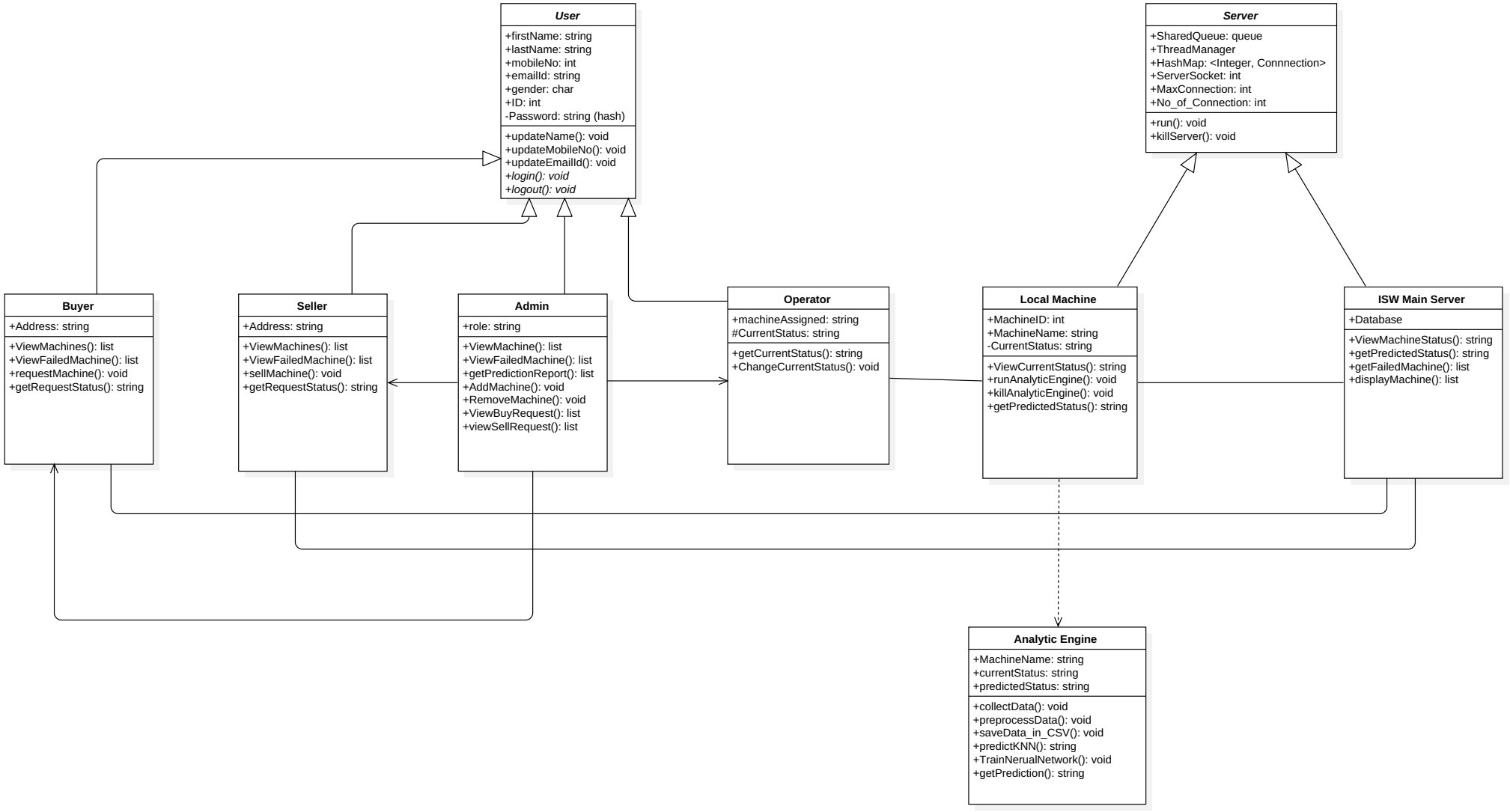
Context Diagram


Operator
Login
View Machine with Status
Buyer
View Machine Status
Change Machine Status
IIT Indore 4.0
CPS
Buy Machine
Sell Machine / Parts
Login
Add/Remove
Machine
Administrator
Seller
Get Machine Analytic Info
View Machine with Status
View Buy/Sell Request

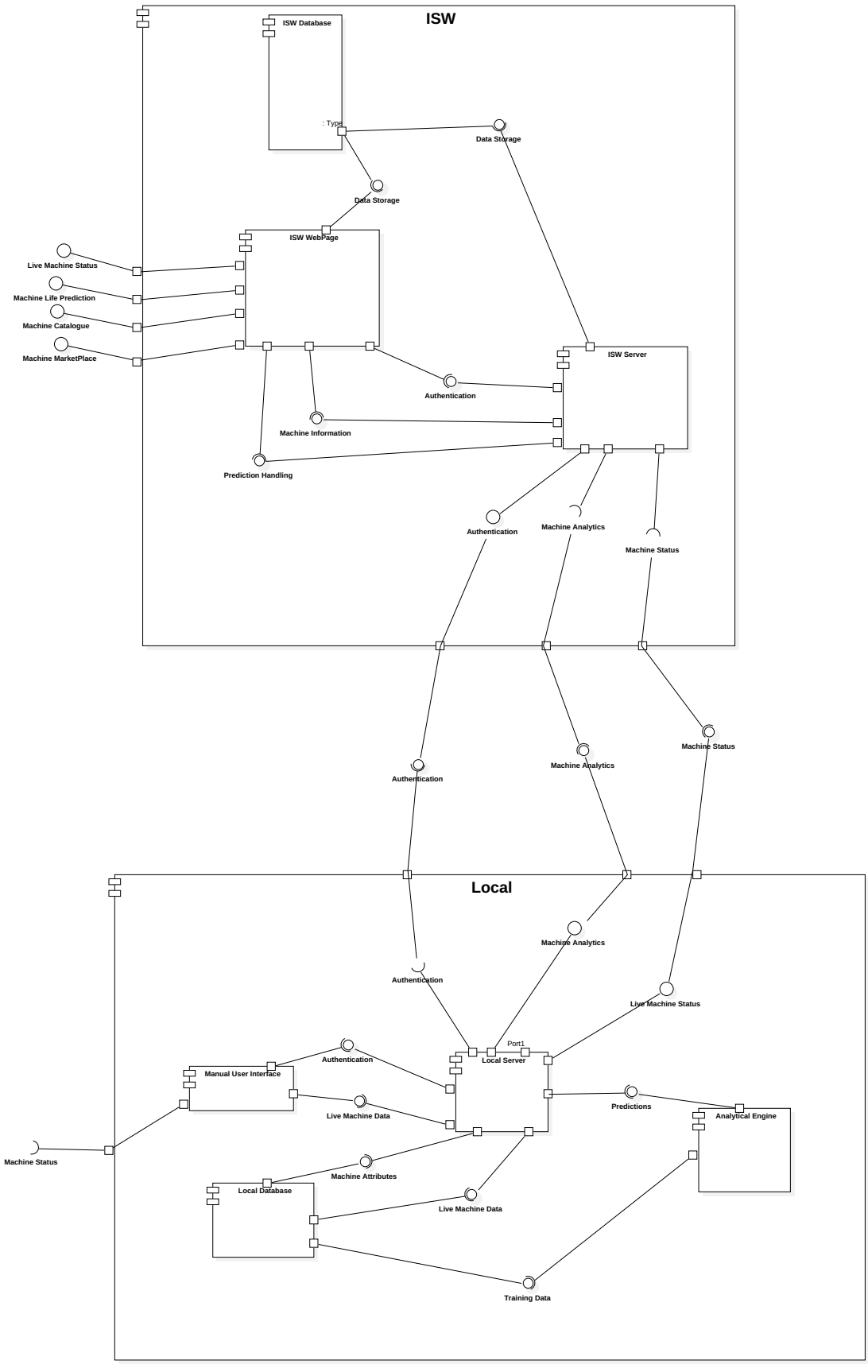
Use Case Diagram

UseCase Industry 4.0
User
Operator
Log in
Enter Username
Enter Password
Log out
Search
Enter Search Key
Results
Machine Current Status
Update Machine Status
Machine Analytics
LifeTime Prediction
Optimal Scheduling
Administrator
Manage Database
Insert into Database
Delete From Database
Modify Database
Bank
Buyer
Place Order
Checkout
Seller
Order History
Collect Payment
Add Machine Listing
Edit Machine Listing
Receive Order
Fullfill Order
Technician
Routine Maintainance
Shutdown Server
Repair
«include»
«extend»

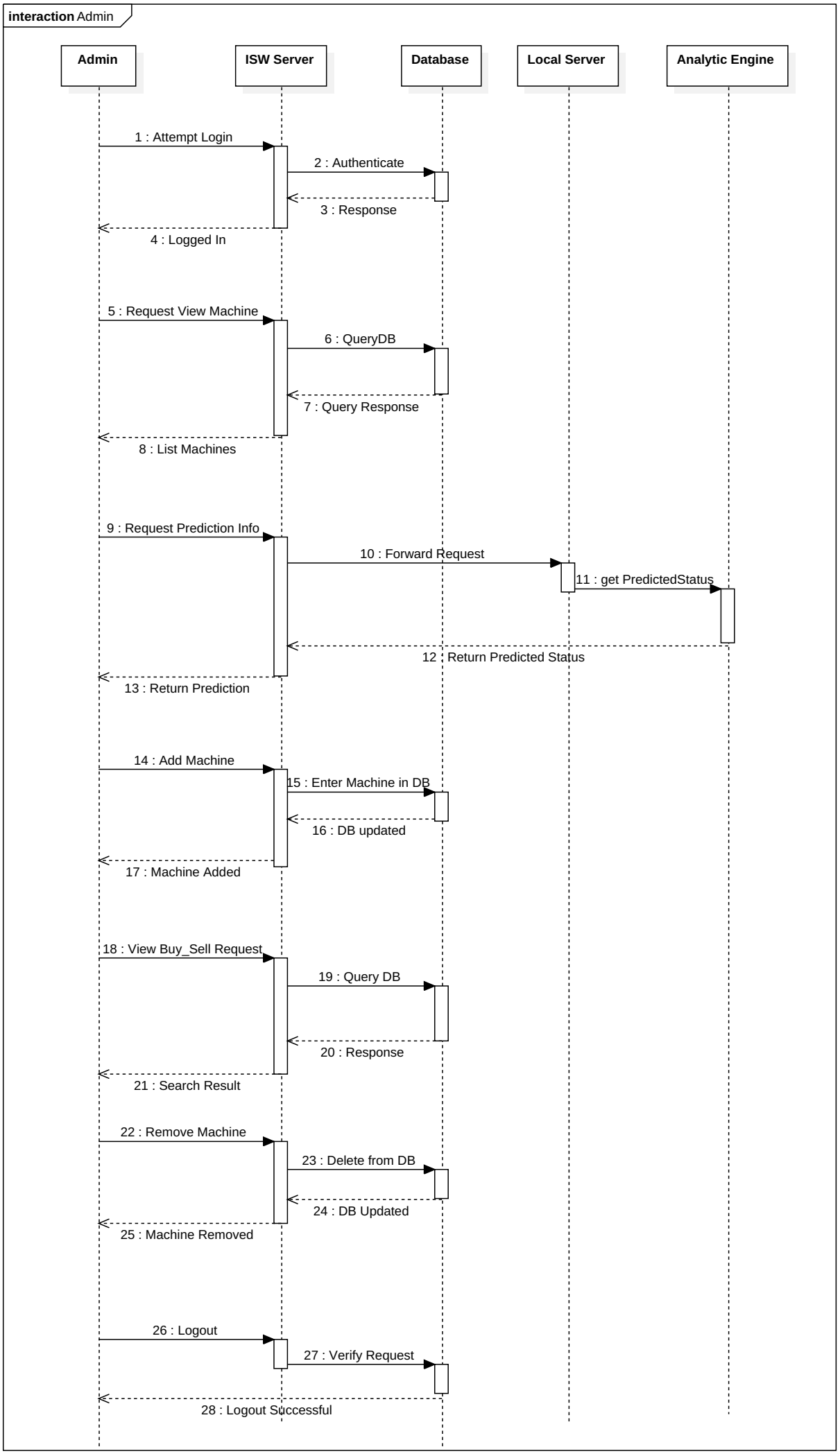
Class Diagram

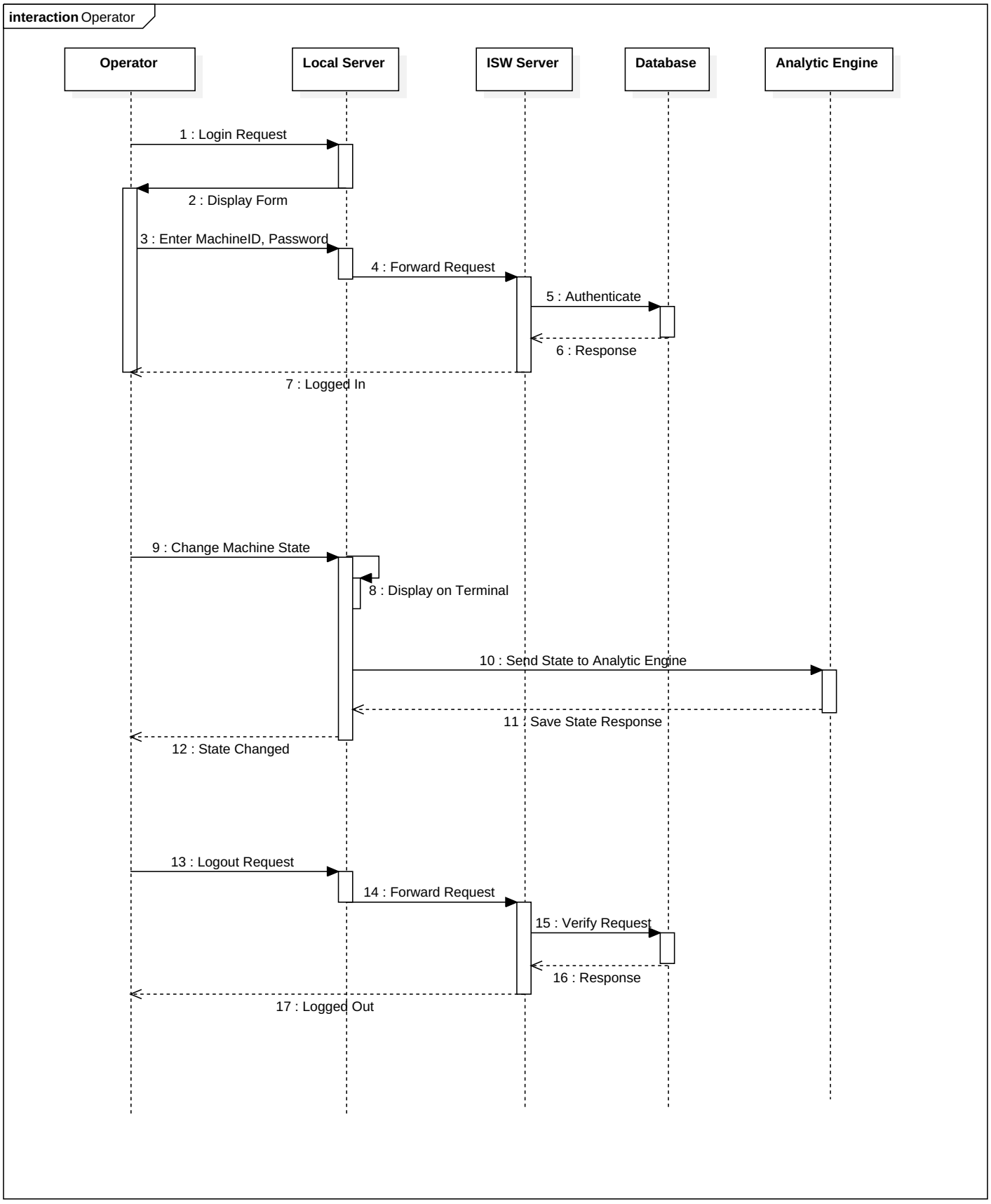

User
+firstName: string
+lastName: string
+mobileNo: int
+emailId: string
+gender: char
+ID: int
-Password: string (hash)
+updateName(): void
+updateMobileNo(): void
+updateEmailId(): void
+login(): void
+logout(): void
Server
+SharedQueue: queue
+ThreadManager
+HashMap: <Integer, Connnection>
+ServerSocket: int
+MaxConnection: int
+No_of_Connection: int
+run(): void
+killServer(): void
Buyer
+Address: string
+ViewMachines(): list
+ViewFailedMachine(): list
+requestMachine(): void
+getRequestStatus(): string
Seller
+Address: string
+ViewMachines(): list
+ViewFailedMachine(): list
+sellMachine(): void
+getRequestStatus(): string
Admin
+role: string
+ViewMachine(): list
+ViewFailedMachine(): list
+getPredictionReport(): list
+AddMachine(): void
+RemoveMachine(): void
+ViewBuyRequest(): list
+viewSellRequest(): list
Operator
+machineAssigned: string
#CurrentStatus: string
+getCurrentStatus(): string
+ChangeCurrentStatus(): void
Local Machine
+MachineID: int
+MachineName: string
-CurrentStatus: string
+ViewCurrentStatus(): string
+runAnalyticEngine(): void
+killAnalyticEngine(): void
+getPredictedStatus(): string
ISW Main Server
+Database
+ViewMachineStatus(): string
+getPredictedStatus(): string
+getFailedMachine(): list
+displayMachine(): list
Analytic Engine
+MachineName: string
+currentStatus: string
+predictedStatus: string
+collectData(): void
+preprocessData(): void
+saveData_in_CSV(): void
+predictKNN(): string
+TrainNerualNetwork(): void
+getPrediction(): string

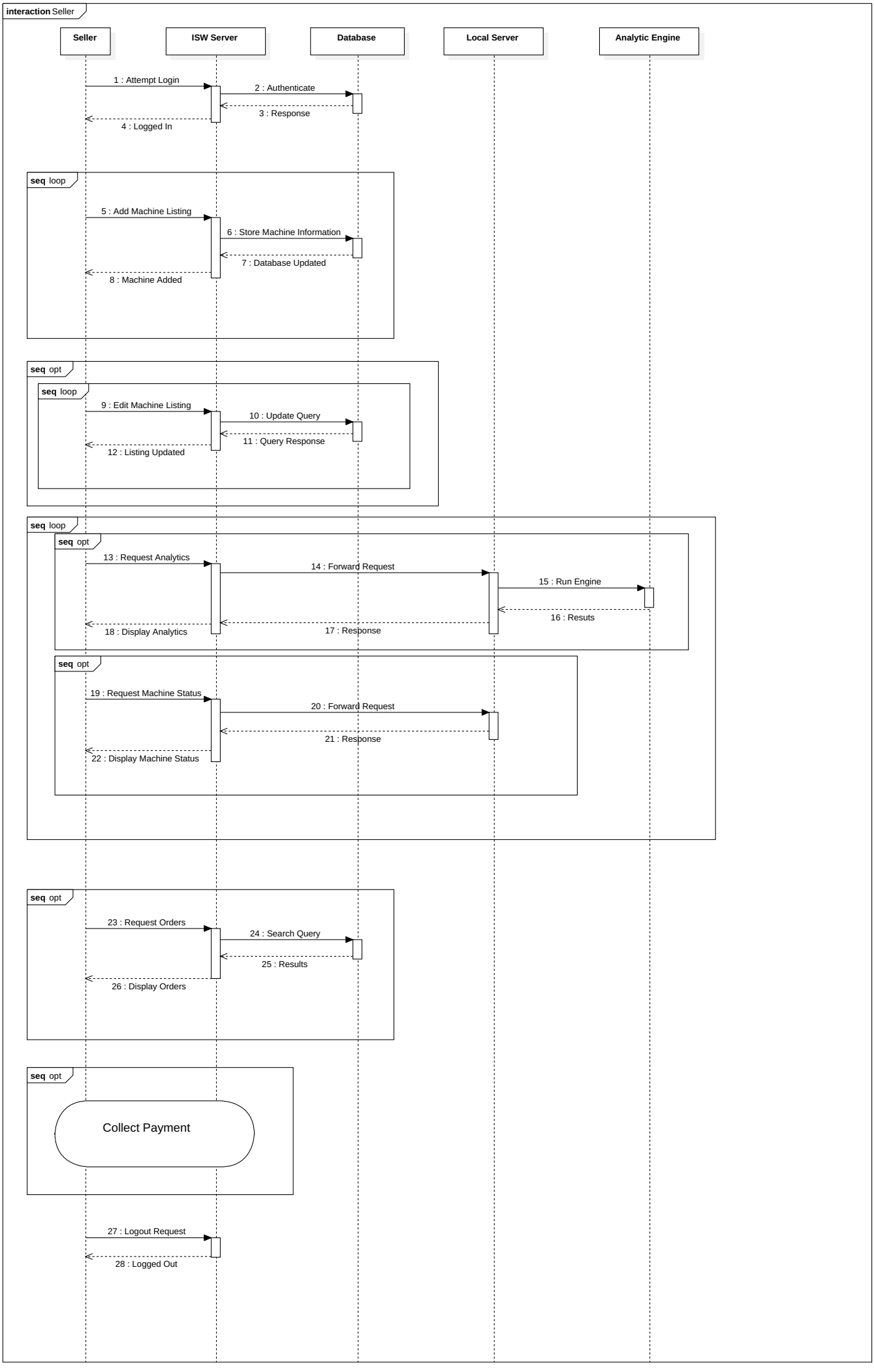
Component Diagram

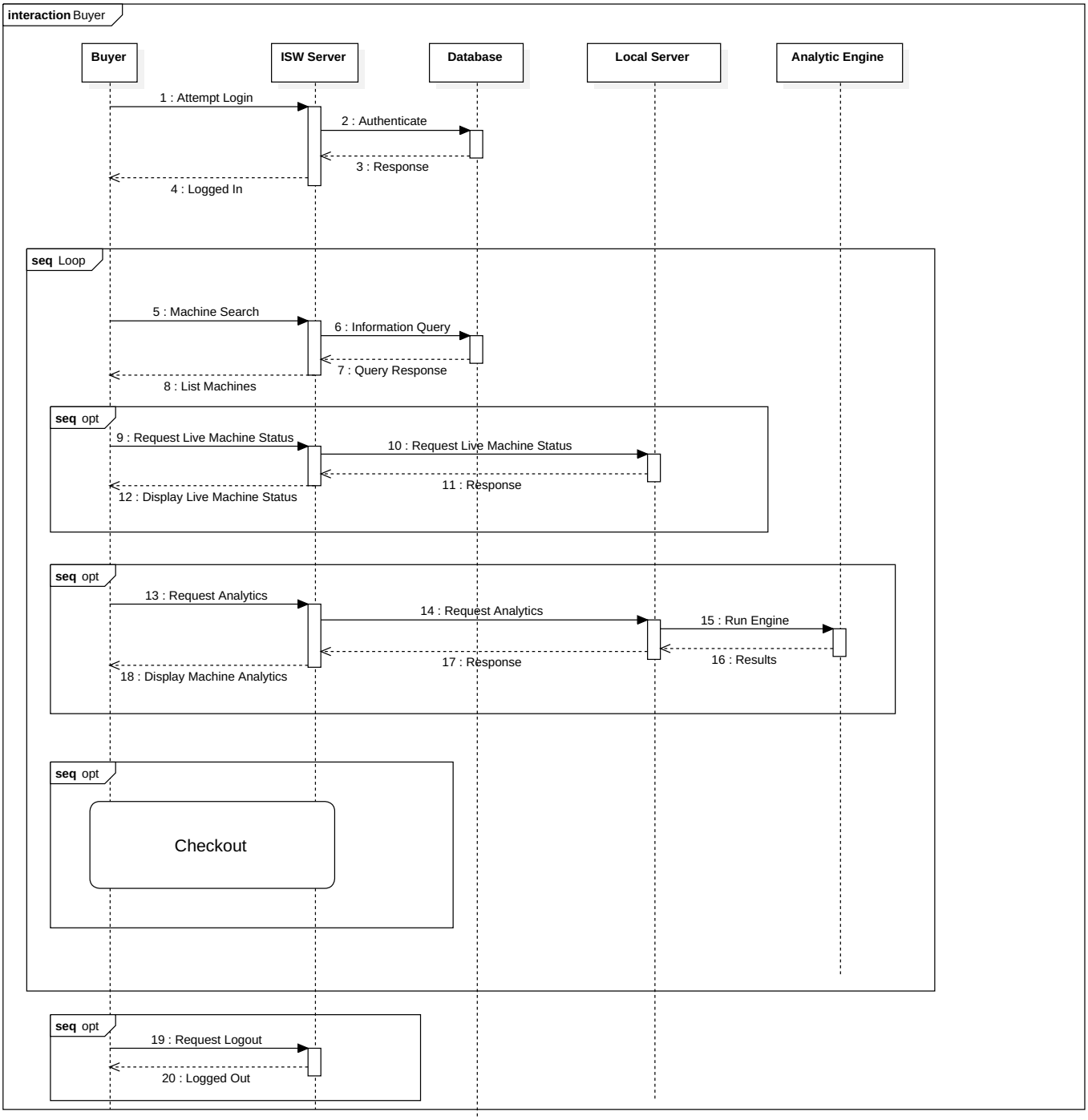

ISW
ISW Database
: Type
Data Storage
Data Storage
ISW WebPage
Live Machine Status
Machine Life Prediction
Machine Catalogue
Machine MarketPlace
ISW Server
Authentication
Machine Information
Prediction Handling
Authentication
Machine Analytics
Machine Status
Machine Status
Machine Analytics
Authentication
Local
Machine Analytics
Authentication
Live Machine Status
Port1
Local Server
Authentication
Manual User Interface
Live Machine Data
Predictions
Analytical Engine
Machine Status
Machine Attributes
Local Database
Live Machine Data
Training Data

Sequence Diagram

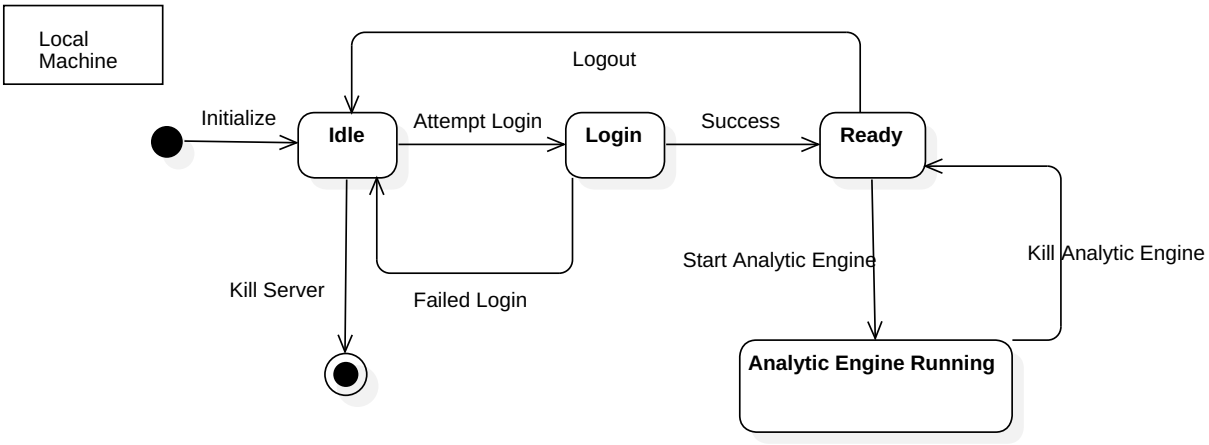

interaction Admin
Admin
ISW Server
Database
Local Server
Analytic Engine
1 : Attempt Login
2 : Authenticate
3 : Response
4 : Logged In
5 : Request View Machine
6 : QueryDB
7 : Query Response
8 : List Machines
9 : Request Prediction Info
10 : Forward Request
11 : get PredictedStatus
12 : Return Predicted Status
13 : Return Prediction
14 : Add Machine
15 : Enter Machine in DB
16 : DB updated
17 : Machine Added
18 : View Buy_Sell Request
19 : Query DB
20 : Response
21 : Search Result
22 : Remove Machine
23 : Delete from DB
24 : DB Updated
25 : Machine Removed
26 : Logout
27 : Verify Request
28 : Logout Successful

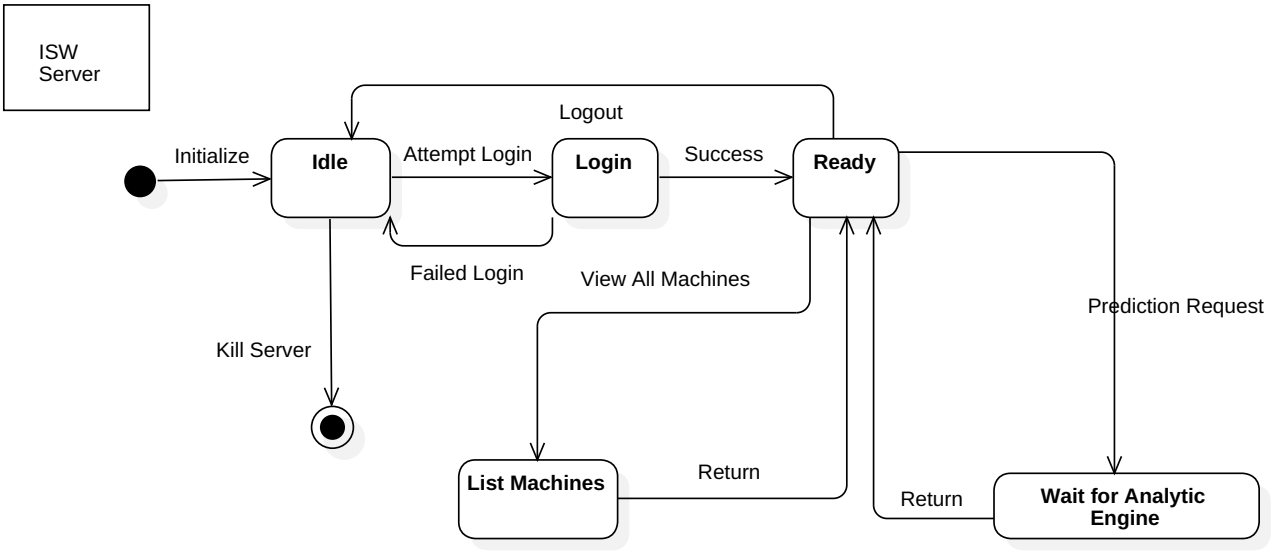

interaction Operator
Operator
Local Server
ISW Server
Database
Analytic Engine
1 : Login Request
2 : Display Form
3 : Enter MachineID, Password
4 : Forward Request
5 : Authenticate
6 : Response
7 : Logged In
9 : Change Machine State
8 : Display on Terminal
10 : Send State to Analytic Engine
11 : Save State Response
12 : State Changed
13 : Logout Request
14 : Forward Request
15 : Verify Request
16 : Response
17 : Logged Out

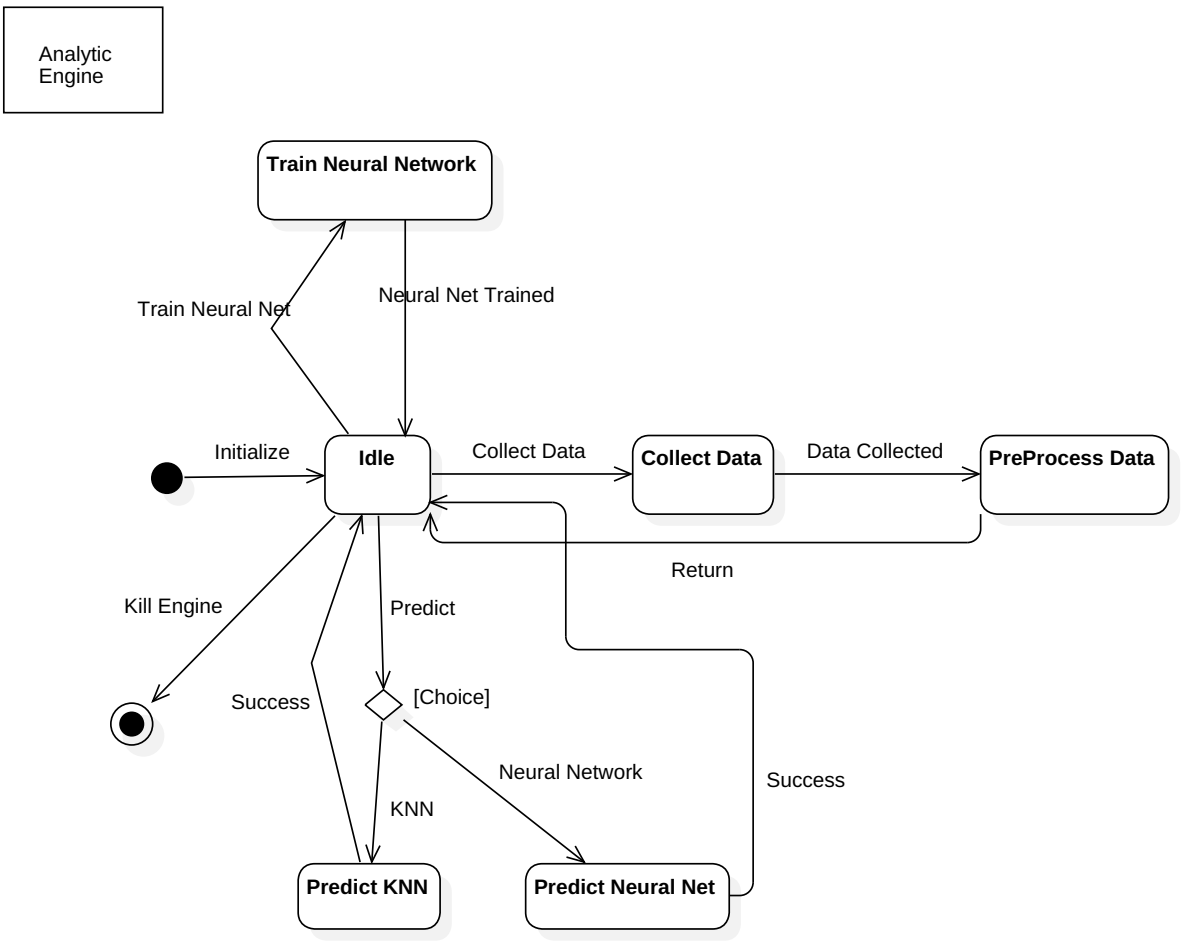

interaction Seller
Seller
ISW Server
Database
Local Server
Analytic Engine
1 : Attempt Login
2 : Authenticate
3 : Response
4 : Logged In
seq loop
5 : Add Machine Listing
6 : Store Machine Information
7 : Database Updated
8 : Machine Added
seq opt
seq loop
9 : Edit Machine Listing
10 : Update Query
11 : Query Response
12 : Listing Updated
seq loop
seq opt
13 : Request Analytics
14 : Forward Request
15 : Run Engine
16 : Resuts
17 : Response
18 : Display Analytics
seq opt
19 : Request Machine Status
20 : Forward Request
21 : Response
22 : Display Machine Status
seq opt
23 : Request Orders
24 : Search Query
25 : Results
26 : Display Orders
seq opt
Collect Payment
27 : Logout Request
28 : Logged Out


interaction Buyer
Buyer
ISW Server
Database
Local Server
Analytic Engine
1 : Attempt Login
2 : Authenticate
3 : Response
4 : Logged In
seq Loop
5 : Machine Search
6 : Information Query
7 : Query Response
8 : List Machines
seq opt
9 : Request Live Machine Status
10 : Request Live Machine Status
11 : Response
12 : Display Live Machine Status
seq opt
13 : Request Analytics
14 : Request Analytics
15 : Run Engine
16 : Results
17 : Response
18 : Display Machine Analytics
seq opt
Checkout
seq opt
19 : Request Logout
20 : Logged Out

State Diagram


Local Machine
Logout
Initialize
Idle
Attempt Login
Login
Success
Ready
Kill Server
Failed Login
Start Analytic Engine
Kill Analytic Engine
Analytic Engine Running


ISW Server
Logout
Initialize
Idle
Attempt Login
Login
Success
Ready
Failed Login
View All Machines
Prediction Request
Kill Server
List Machines
Return
Return
Wait for Analytic Engine


Analytic Engine
Train Neural Network
Train Neural Net
Neural Net Trained
Initialize
Idle
Collect Data
Collect Data
Data Collected
PreProcess Data
Return
Kill Engine
Predict
Success
[Choice]
Neural Network
KNN
Success
Predict KNN
Predict Neural Net