



## Solution Data Structures

---

Mazen Elbawab

## INVENTORY DATA

### INVENTORY GENERAL DATA

#### KIT COMPOSITIONS

- Garments Only
- Sensor Kit Only
- Brainpack Only
- Full Kit

#### EQUIPMENT STATUSES

- ready
- in use
- defective
- In production
- Testing

#### SENSOR TYPES

- Nod IMU
- EM IMU
- StretchSense

#### BRAINPACKS QA STATUSES

- Charging Cycle Tested/Failed
- Buttons Tested/Failed
- LED Tested/Failed
- Sensors Connection Tested/Failed
- Software Connection Tested/Failed
- Command Tested/Failed
- Streaming Tested/Failed
- Tested and Ready

#### SENSORS QA STATUSES

- Firmware Tested/Failed
- Power Tested/Failed
- Orientation Tested/Failed
- Tested and Ready

#### SUITS/OCTOPI QA STATUSES POSSIBLE

- Baseplate Tested/Failed
- Wiring Tested/Failed
- Connector Tested/Failed
- Power Tested/Failed
- Tested and Ready

#### ANATOMICAL LOCATIONS

- Torso
- Left Upper arm

- Left Fore arm
- Left Thigh
- Left Tibia
- Right Upper arm
- Right Fore arm
- Right Thigh
- Right Tibia

#### INVENTORY DATA EXTRACTION

- Kits ready to use
- Kits producible
- Brainpacks ready to use
- Brainpacks producible
- Sensor sets ready to use
- Sensor sets producible
- Shirts ready to use
- Shirts producible
- Pants ready to use
- Pants producible
- Sensors ready to use
- Sensors defective

#### COMPONENTS TYPES

- Batteries
- BP Screws
- Capsule Screws
- USB Cables
- USB Chargers
- Narrows (m)
- Over-mold Bases
- Light Pipes
- BP top
- BP bottom
- Old BP top
- Old BP bottom
- Micro SD
- SD Cover
- Capsule top
- Capsule Bottom
- Sensor PCB
- Ribbon Cable (m)
- BP Buttons
- Capsule Washers
- Aux Cables
- Capsule Buttons

## INVENTORY DATA STRUCTURES

### COMPANY (CONTINUED)

- Company ID
- List of Related Kits

### KITS

- Kit ID (=serial number)
- Kit location
- Kit status
- Related Brainpack ID
- Related Sensors Set ID
- Related Shirt ID
- Related Pants ID
- Related Company ID

### COMPONENTS

- Component type ID
- Component Status
- Quantity

### BRAINPACKS (CONTINUED)

- Brainpack ID (=serial number)
- Brainpack Location
- Brainpack Version
- Brainpack Status
- Brainpack QA status
- Related Power Board ID
- Related Data Board ID
- Related Kit ID

### POWER BOARDS

- Power board ID (=Serial Number)
- Power board Version
- Power board Firmware version
- Power board Status
- Related Brainpack ID

### DATA BOARDS

- Data board ID (=Serial Number)
- Data board Version
- Data board Firmware version
- Data board Status
- Related Brainpack ID

### SENSOR SETS

- Sensor Set ID
- List of related sensors
- Sensor set QA status

- Related Kit ID

### SENSORS

- Sensor ID (=Serial Number)
- Sensor Type
- Sensor Version
- Sensor Location
- Sensor Firmware
- Sensor Status
- Sensor QA Status
- Related Sensor Set ID
- Sensor Anatomical location ID

### TOP GARMENTS

- Shirt ID (=Serial Number)
- Related Octopus ID
- Related Kit ID
- Shirt Size
- Shirt Location
- Shirt Status
- Shirt QA Status

### BOTTOM GARMENTS

- Pants ID (=Serial Number)
- Related Octopus ID
- Related Kit ID
- Pants Size
- Pants Location
- Pants Status
- Pants QA Status

### SHIRTS OCTOPI

- Shirt Octopus ID (=Serial Number)
- Related top garment ID
- Shirt Octopus Size
- Shirt Octopus Location
- Shirt Octopus Status
- Shirt Octopus QA Status

### PANTS OCTOPI

- Pants Octopus ID (=Serial Number)
- Related bottom garment ID
- Pants Octopus Size
- Pants Octopus Location
- Pants Octopus Status
- Pants Octopus QA Status

## USERS & LICENSING DATA

### COMPANY (CONTINUED)

- Company ID
- List of Related Licenses
- List of Related Users

- User Role
- User email
- Related License ID
- Related Meta Data ID
- Related Company ID

### ROLES

- Collector
- Analyst
- Company
- Admin

### META DATA

- Meta Data ID
- Related User ID
- Height
- Weight
- Gender
- DOB
- First Name
- Last Name

### LICENSE TYPES

- Collector
- Analyst

### LICENSE STATUSES

- Unassigned
- Assigned
- Activated
- Expired

### LICENSE

- License ID
- License generated key
- License Type
- License Status
- License Expiry date
- Related User ID
- Related Company ID

### USERS

- User ID (= User Name)
- User Password

User	Role	License	License Status	Team
User 1	Analyst	Analyst license #1345	Assigned	#1
User 2	Analyst	Analyst license #1346	Activated	#2
User 3	Collector	Collector license #2269	Activated	#1
User 4	Collector	Collector license #2270	Activated	#1
User 5	Collector	Collector license #2271	Activated	#1
User 6	Collector	Collector license #2272	Activated	#1
User 7	Collector	Collector license #2273	Expired	#1
User 8	Collector	Collector license #2274	Expired	#2
User 9	Collector	Collector license #2275	Assigned	#2
User 10	Collector	Collector license #2276	Assigned	#3
User 11	Analyst	-		#2
User 12	Collector	-		#2
User 13	Collector	-		#2
User 14	Collector	-		#1

## BRAINPACK DATA

### BRAINPACK INTERACTIONS

#### INITIALIZING

- Power up
- Battery status check
- Connect to sensors
- If no sensors - go to Reporting mode
- Start BLE Broadcast
- Connect to previous Wi-Fi
- Log end of initialization
- Ready to use

#### CALIBRATING

- Start calibration process
- Repeat [0...N calib sequences]
  - Start calibration sequence
  - Capture T-Pose
  - Capture calibration sequence movement
  - Log sensors frames outputs
  - End calibration sequence
- Ready to Record

#### RECORDING

- Receive recording name
- Start recording
- Log sensors frames output
- Stop recording

#### HOTSPOT LOGGING

- Identify Hotspot type entered (pain/concern)
- Log Date, Time and Geolocation if available

#### UPDATING FIRMWARE:

- Send current FW version to established connection
- Receive FW update request
- Go to update FW mode
- Receive new FW
- Update firmware
- Send update completed
- Reset

#### CONNECTING TO CLIENT

- OS connects to BP BLE
- APP connects to BP Through BLE
- App request configuration of BP Wi-Fi
- Receive Wi-Fi SSID and PWD
- Receive Cloud Server address
- Connect to Wi-Fi
- Connect to Cloud Server
- Broadcast BP ID (WAN/LAN)
- Receive Connection request (WAN/LAN)
- Connection established

#### STREAMING TO CLIENT

- Receive streaming request from established connection
- Broadcast data over UDP (to server or connected app)
- Receive streaming end request
- End streaming process

#### SYNCHING WITH CLIENT

- If Idle, send new data notification to established connection (to server or connected app)
- Receive go to send new data
- Send new data

#### END SYNCHING PROCESS RESETTING

- Log start of reset
- Start re-initialization process
- ready to use

#### IDLE

- = ready to use after x time of inactivity

#### ERROR

- Log error state
- Reset

#### CHARGING

- Detect charging plug
- Broadcast charging %
- Go into charging state

## BRAINPACK GENERAL DATA

### HOTSPOT TYPES

- Pain
- Concern

### BRAINPACK STATES

- Idle
- Initializing
- Calibrating
- Connecting Client
- Connecting Wifi
- Updating FW
- Synching data
- Streaming-Recording-Reporting
- Recording-Reporting
- Reporting
- Resetting
- Charging
- Error

### CONNECTION STATES

- Offline
- BLE Connected
- Wi-Fi Connected
- Server Connected
- Error

### FW UPDATE STATES

- Downloading FW
- Installing FW

- Reset post Installation FW
- FW Updated
- Error

### BRAINPACK PACKET TYPES (MSG = 2 WAYS)

- State Msg
- Battery Charge State Msg
- BLE connection Msg
- App Connection Msg
- Wifi/Server Connection Msg
- Connection State Msg
- FW Version Msg
- FW Update Msg
- FW Update state Msg
- Hotspot Msg
- New Data Notification Msg
- Data Synching State Msg
- New Data Synching Msg
- Start/Stop Calibration Msg
- Start/Stop Recording Msg
- Get/Set Recording Name Msg
- Get/Set T-Pose Msg
- Start/stop streaming Msg
- Reset Msg
- **Raw Frame Data**
- **Raw Recording Data**
- **Raw Calibration Data**
- **Reporting Data**