TEAM 03, “CADENCE”

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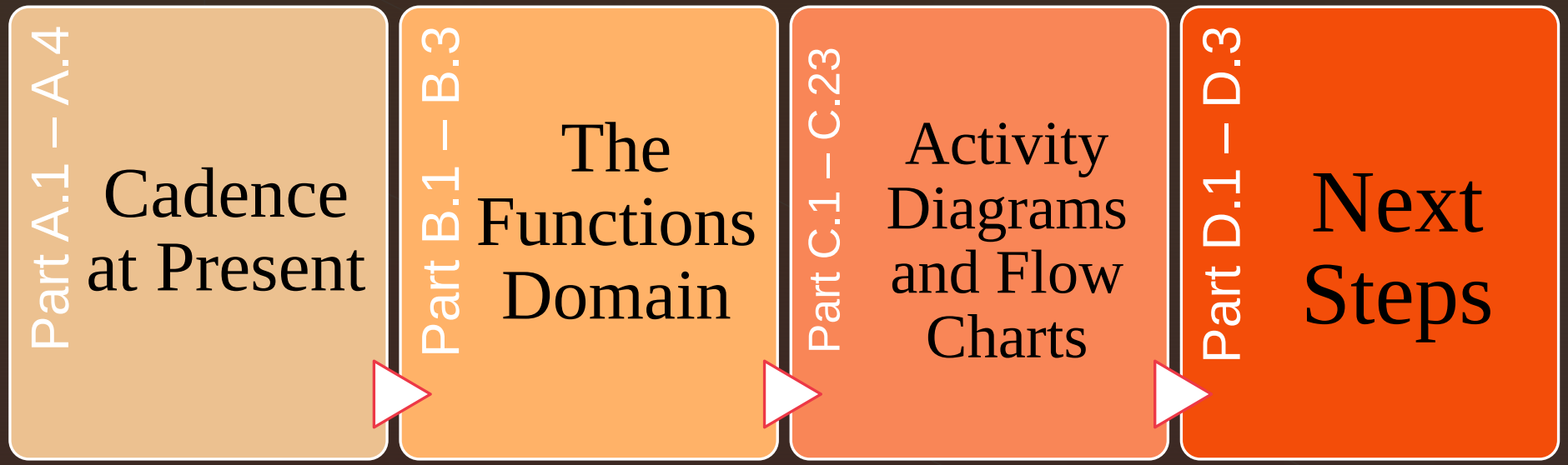
Decision Gate 04: **Functions Domain**

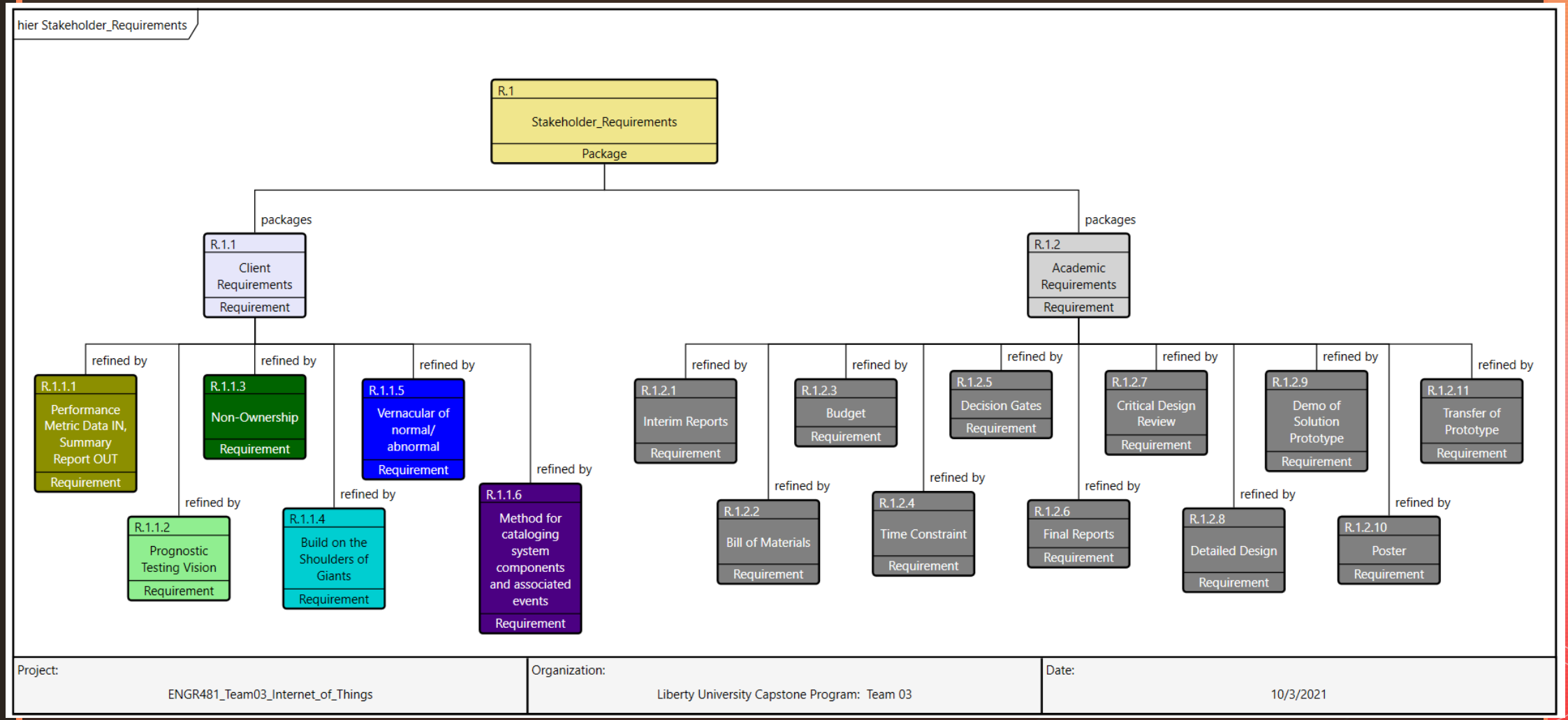
2021-10-22 Friday Agenda



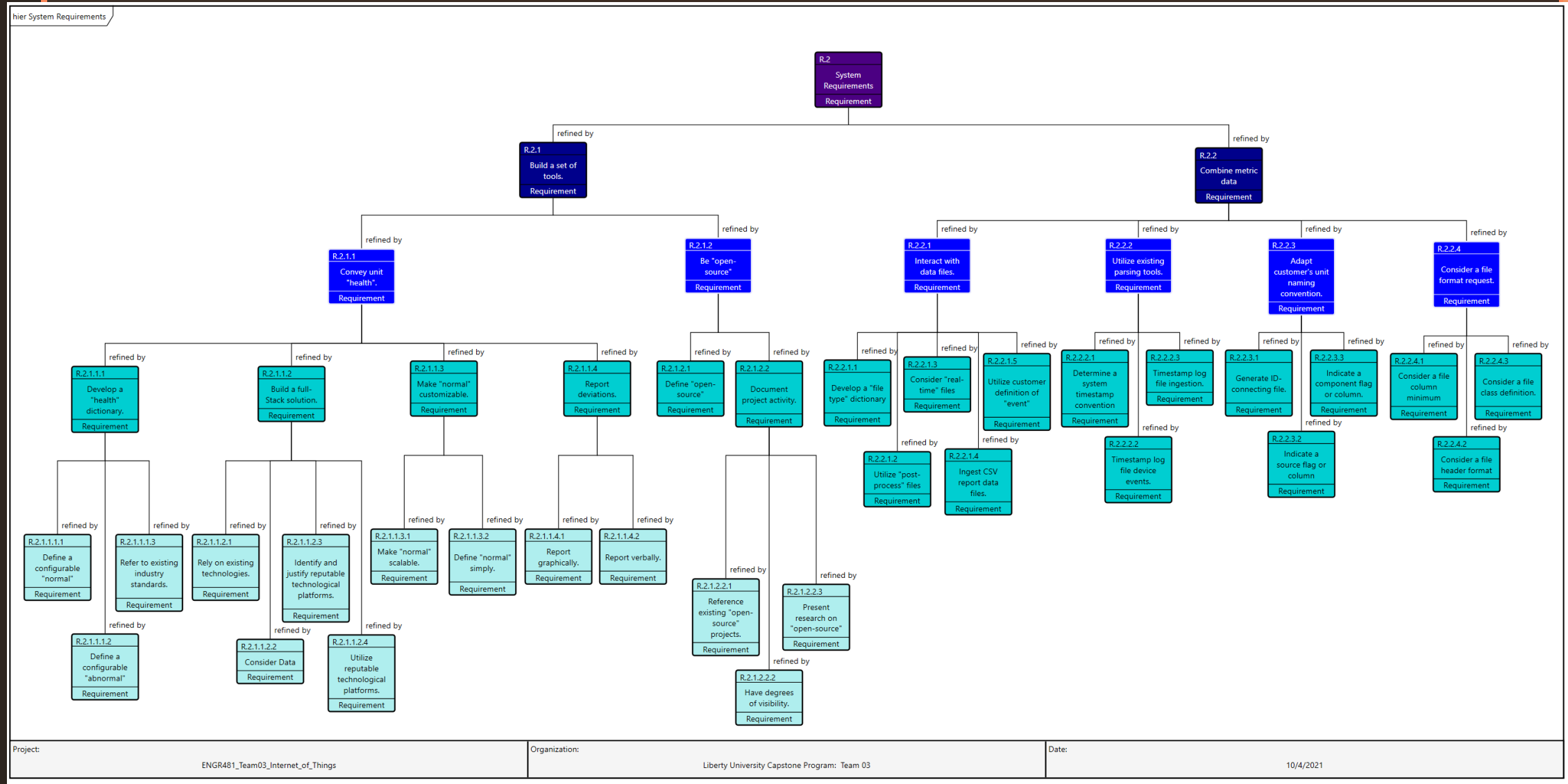
A.1/4 CADENCE At Present

- A.1.1 Mission Statement
- A.1.2 Recent Progress

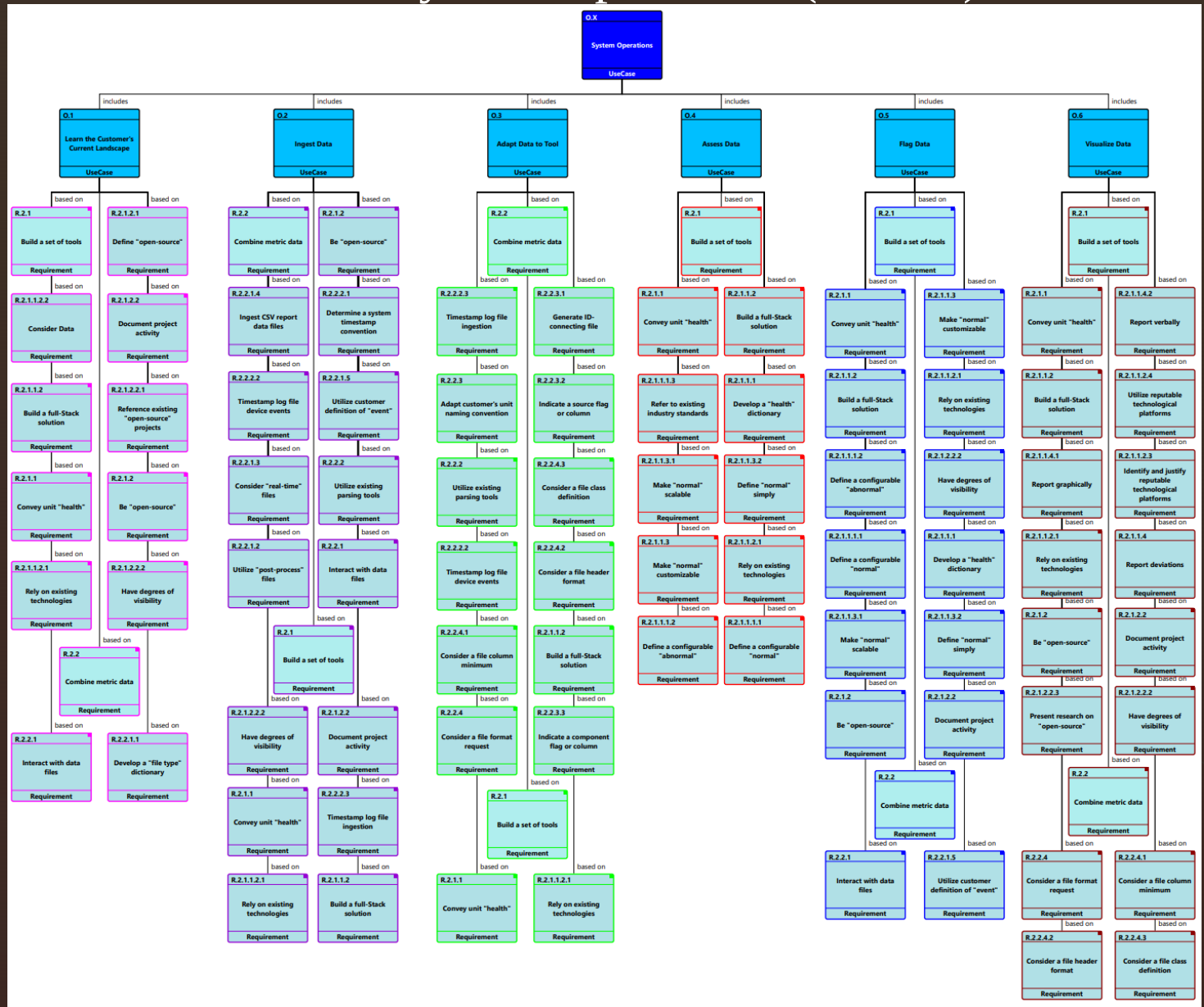
A.2/4 CADENCE Stakeholder Requirements (DG-01)



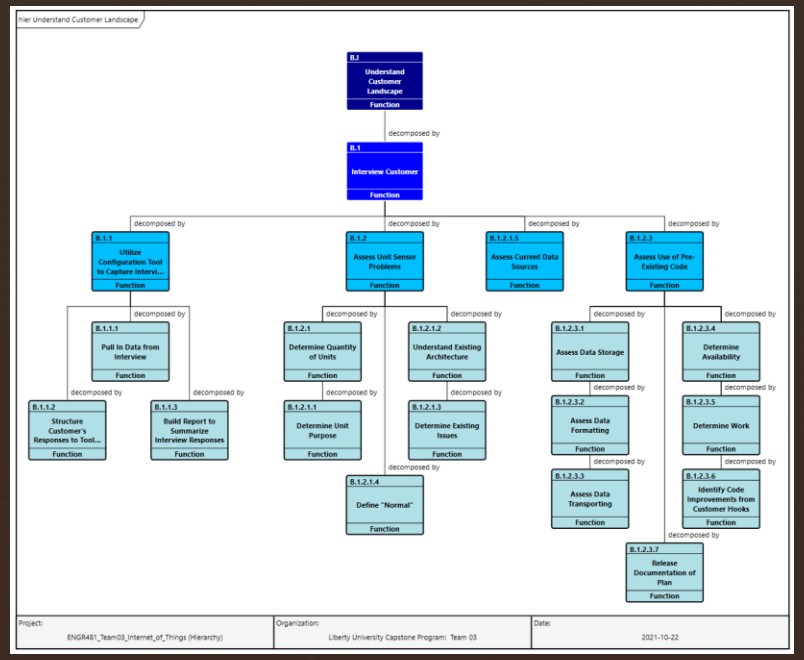
A.3/4 CADENCE System Requirements (DG-02)

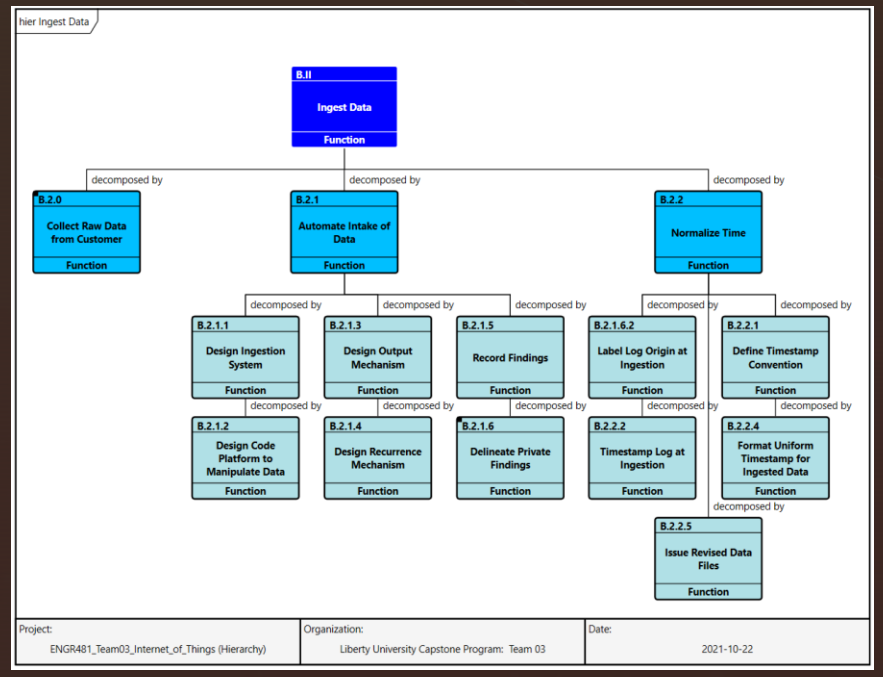


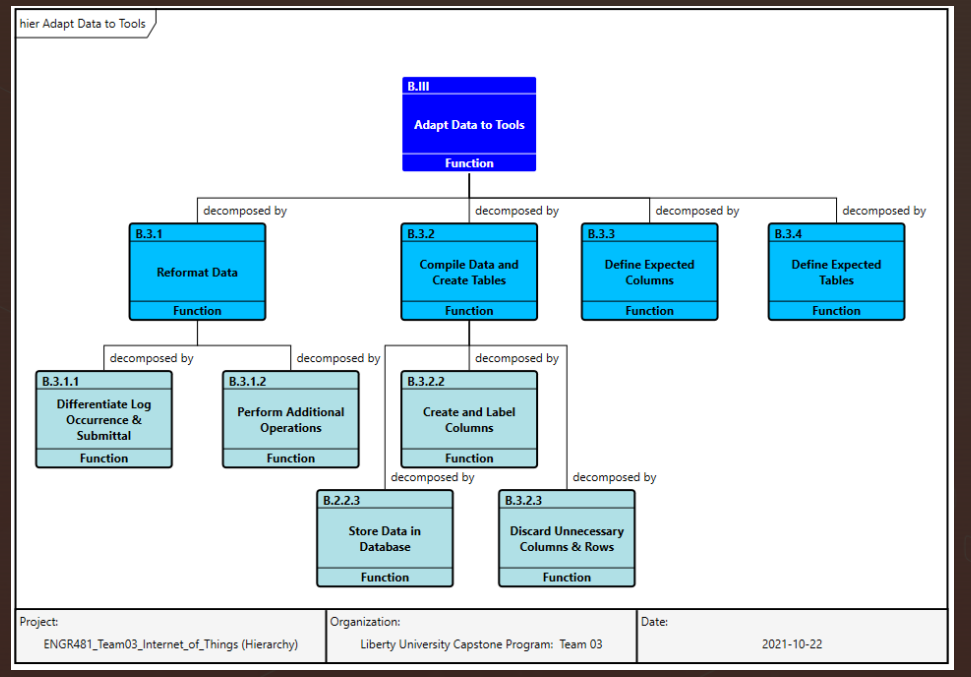
A.4/4 CADENCE System Operations (DG-03)

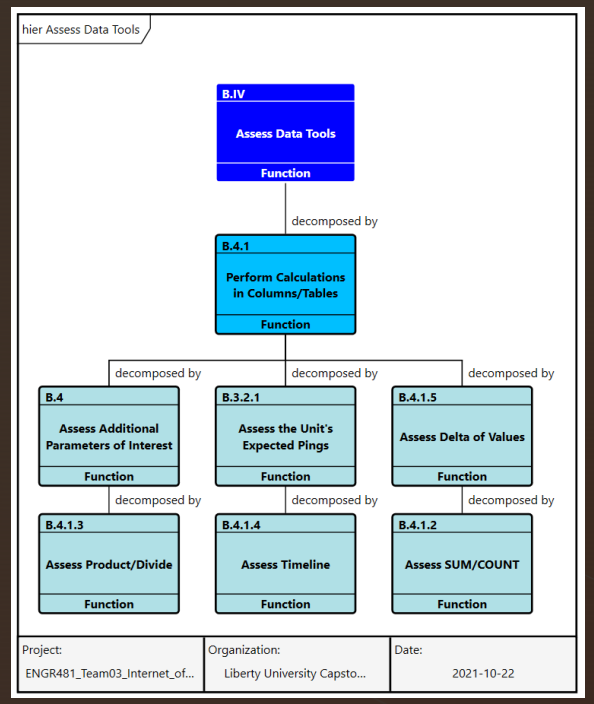


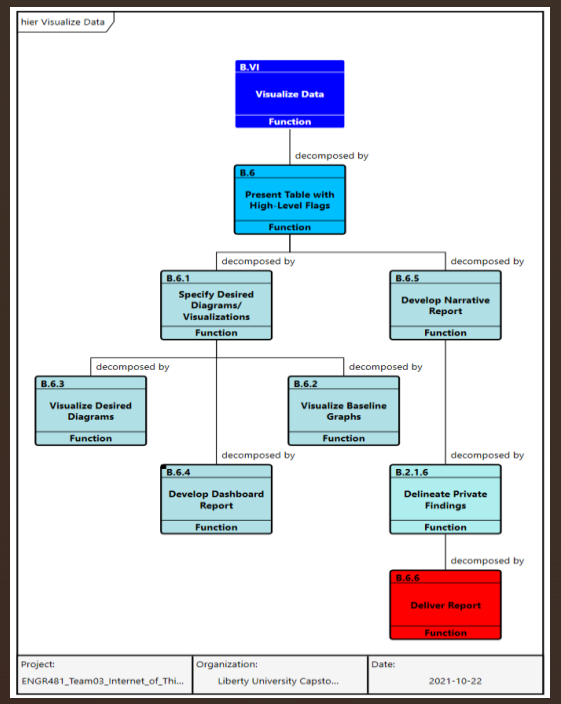
B.1/3 Functions Hierarchy Visual 1/2

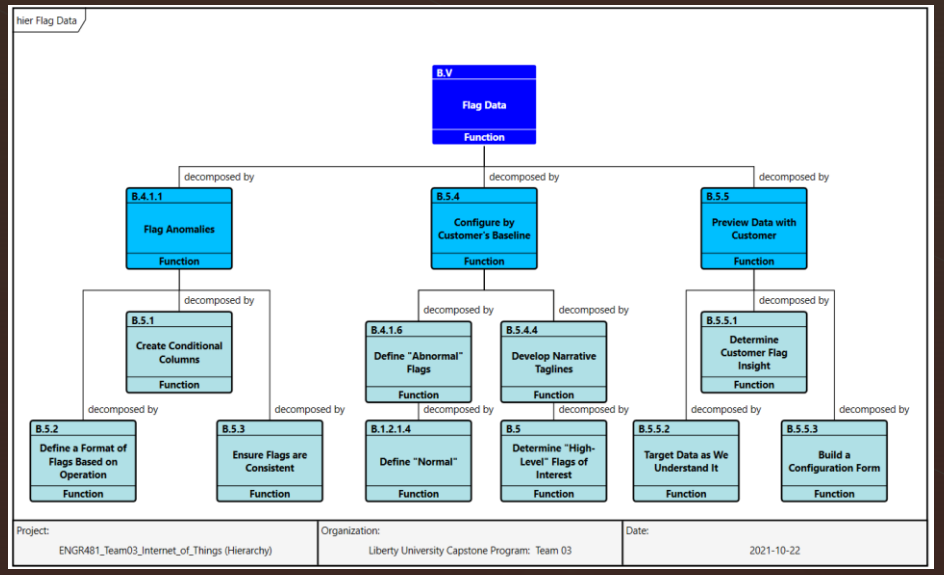












B.1/3 Functions Hierarchy Visual 2/2

B.2/3 Functions-to-Operations Matrix:

			Learn the Customer's Current Landscape	Ingest Data	Adapt Data to Tool	Assess Data	Flag Data	Visualize Data
	ID		1	2	3	4	5	6
ID	WBS	Name	O.1	O.2	O.3	O.4	O.5	O.6
1	B.0	Perform Device Testing	1	1	1	1	1	1
2	B.1	Engage with Customer	1					
3	B.1.1	Utilize Configuration Tool to Capture Interview Results	1					
4	B.1.1.1	Pull In Data from Interview	1					
5	B.1.1.2	Structure Customer's Response to Tool Interview Form	1					
6	B.1.1.3	Build Report to Summarize Interview Responses	1					
7	B.1.2	Interview Customer	1		1	1	1	
8	B.1.2.1	Assess Unit Sensor Problems	1		1	1	1	
9	B.1.2.1.1	Determine Quantity of Units	1		1	1	1	
10	B.1.2.1.2	Determine Unit Purpose	1		1	1	1	
11	B.1.2.1.3	Understand Existing Architecture	1		1	1	1	
12	B.1.2.1.4	Determine Existing Issues	1		1	1	1	
13	B.1.2.1.5	Define "Normal"	1		1	1	1	
14	B.1.2.2	Assess Current Data Sources	1		1	1	1	
15	B.1.2.3	Assess Use of Pre-Existing Code	1		1	1	1	
16	B.1.2.3.1	Assess Data Storage	1		1	1	1	
17	B.1.2.3.2	Assess Data Formatting	1		1	1	1	
18	B.1.2.3.3	Assess Data Transporting	1		1	1	1	
19	B.1.2.3.4	Determine Availability	1		1	1	1	
20	B.1.2.3.5	Determine Work	1		1	1	1	
21	B.1.2.3.6	Identify Code Improvements from Customer Hooks	1		1	1	1	
22	B.1.2.3.7	Release Documentation of Plan	1		1	1	1	
23	B.2	Collect Raw Data from Customer		1				
24	B.2.0.1	Embedded Level Tap Point		1				
25	B.2.0.2	Network Level Tap Point		1				
26	B.2.0.3	Application Level Tap Point		1				
27	B.2.1	Automate Intake of Data		1				
28	B.2.1.1	Design Ingestion System		1				
29	B.2.1.2	Design Code Platform to Manipulate Data		1				
30	B.2.1.3	Design Output Mechanism		1				
31	B.2.1.4	Design Recurrence Mechanism		1				
32	B.2.1.5	Record Findings		1				
33	B.2.1.6	Delineate Private Findings		1				1
34	B.2.1.6.1	Determine Data Sanitization Need		1				1
35	B.2.1.6.2	Redact Appropriate Fields		1				1
36	B.2.2	Normalize Time		1				
37	B.2.2.1	Define Timestamp Convention		1				
38	B.2.2.2	Timestamp Log at Ingestion		1				
39	B.2.2.3	Label Log Origin at Ingestion		1				

B.3/3 Functions-to-Operations Matrix:

40	B.2.2.4	Format Uniform Timestamp for Ingested Data		1				
41	B.2.2.5	Issue Revised Data Files		1				
42	B.3	Determine Data Formatting			1			
43	B.3.1	Reformat Data			1			
44	B.3.1.1	Differentiate Log Occurence and Submittal			1			
45	B.3.1.2	Perform Additional Operations			1			
46	B.3.2	Compile Data and Create Tables			1			
47	B.3.2.1	Store Data in Database			1			
48	B.3.2.2	Create and Label Columns			1			
49	B.3.2.3	Discard Unnecessary Columns and Rows			1			
50	B.3.3	Define Expected Columns			1			
51	B.3.4	Define Expected Tables			1			
52	B.4	Determine Data Transformation				1		
53	B.4.1	Perform Calculations in Columns/Tables				1		
54	B.4.1.1	Assess the Unit's Expected Pings				1		
55	B.4.1.2	Assessn SUM/COUNT				1		
56	B.4.1.3	Assess Product/Divide				1		
57	B.4.1.4	Assess Timeline				1		
58	B.4.1.5	Assess Delta of Values				1		
59	B.4.1.6	Assess Addtional Parameters of Interest				1		
60	B.5	Flag Anomalies					1	
61	B.5.1	Create Conditional Columns					1	
62	B.5.2	Define a Format of Flags Based on Operation					1	
63	B.5.3	Ensure Flags are Consistent					1	
64	B.5.4	Configure by Customer's Baseline					1	
65	B.5.4.1	Define "Normal" Flags					1	
66	B.5.4.2	Define "Abnormal" Flags					1	
67	B.5.4.3	Determine "High-Level" Flags of Interest					1	
68	B.5.4.4	Develop Narrative Taglines					1	
69	B.5.5	Preview Data with Customer					1	
70	B.5.5.1	Determine Customer Flag Insight					1	
71	B.5.5.2	Target Data as We Understand It					1	
72	B.5.5.3	Build a Configuration Form					1	
73	B.6	Present table with High-Level Flags						1
74	B.6.1	Specify Desired Diagrams/Visualizations						1
75	B.6.2	Visualize Baseline Graphs						1
76	B.6.3	Visualize Desired Diagrams						1
77	B.6.4	Develop Dashboard Report						1
78	B.6.5	Develop Narrative Report						1
79	B.6.6	Deliver Report						1

ID	WBS	Nickname	Name	Description
1	B.0	Perform Device Testing	**The solution may perform NORDIC Thingy Testing.**	The solution will perform device testing on a collection of data. The team will potentially focus on NORDIC thingy testing which will be testing conducted on the NORDIC prototyping platform for cellular IoT. The solution will follow a process that starts with engaging the customer to understand business needs and ends with an output of a set of reports on what the solution as ascertained about the data received (concerning the customer's device set)
3	B.1	Engage with Customer	**Converse with the customer to supply status updates and receive approval for system requirement modifications.**	The solution will acknowledge functions based on system requirements and the need for stakeholder approval for any necessary adjustment. The purpose of this functional start is to create an action item between the firm (Essential-IoT) and the customer that kickstarts the relationship between them and opens the project discussion. This will likely happen in the first days of negotiation.
4	B.1.1	Utilize Configuration Tool to Capture Interview Results	**The solution will utilize a configuration tool to capture customer interview results.**	The solution will develop and utilize a configuration tool that organizes the customer's feedback and compiles a report (to be read by the customer) concerning issues with which the solution will align. The configuration tool may take shape in a Microsoft Form, an excel sheet, a fillable PDF, a web database, or any other format that can ingest qualitative data. This data will be in a verbal, largely narrative form (i.e., "we want to discover units that have been offline for more than 48 hours", "we don't know how many units are working in any one-time frame", "we don't have a way to catalog working units", etc.).
5	B.1.1.1	Pull In Data from Interview	**The solution will pull in data from customer interview(s), including "narrative taglines" and "definition of normal".**	The solution shall ingest the data gained from the interview with the customer, whether automated or manually done, into the database (awaiting editing and summary compilation). Likely, Essential-IoT will fill out this configuration tool (i.e., an excel file or Google Survey Form) during or after the interview(s) with the customer. This ingestion point will be confidential between the firm (Essential-IoT) and the customer.
6	B.1.1.2	Structure Customer's Responses to Tool Interview Form.	**The solution will structure the customer's responses to the configuration file/tool/interview form.**	The solution will structure the customer's responses within the configuration tool for easy reading and analysis. This may include grammar/spelling adjustments, bulleting, expanding into paragraphs, creating word clouds or basic matrices of notes, and/or developing a checklist of action items. These actions/summaries will be largely uniform regardless of the client, so the process will be relatively automated.
7	B.1.1.3	Build Report to Summarize Interview Responses	**The solution will build a report that summarizes customer interview responses.**	The solution will develop a report summarizing the customer's responses (from the interview period). This report will be customized to the customer and will have general insights and action items that inform the subsequent OPERATIONS (2-6). This will also lay the groundwork for key details (i.e., "defining normal", "discerning what parameters we will be querying", "identifying specific visualizations or report formats that the customer desires to see").

C.1/23 Function Definitions Table:

Operation 1 (Learn the Customer's Current Landscape)

ID	WBS	Nickname	Name	Description
8	B.1.2	Interview Customer	**The solution must be initially developed by interviewing the customer and gathering their requirements.**	The solution needs to interview with the customer to understand their request and cater the solution to the customer's data landscape.
9	B.1.2.1	Assess Unit Sensor Problems	**The solution will assess the unit sensor problems with customer.**	The tool will assess the current unit sensors provided by the customer to gather information of current issues and problems with the customer's data landscape.
10	B.1.2.1.1	Determine Quantity of Units	**The solution will determine the quantity of unit sensors.**	The tool will go over the customer's current data landscape and count the number of unit sensors.
11	B.1.2.1.2	Determine Unit Purpose	**The solution will determine the unit sensors' purpose.**	The tool will go over the customer's current data landscape and determine each unit sensor's purpose.
12	B.1.2.1.3	Understand Existing Architecture	**The solution will observe and understand the customer's existing data architecture and flow.**	The tool will go over the customer's current data landscape and document the customer's existing data architecture and flow.
13	B.1.2.1.4	Determine Existing Issues	**The solution will review and determine the unit sensor's existing issues.**	The tool will address all the existing issues on the unit sensors within the customer's current data landscape to gain further understanding of the customer's request.
14	B.1.2.1.5	Define "Normal"	**The solution will define the normal of the existing data landscape.**	The tool must understand and document the existing data structure to determine the existing normal data trends in the customer's system.
15	B.1.2.2	Assess Current Data Sources	**The solution will assess the current sources of data.**	The tool will address all current sources of data to ensure all the data inputs from the unit sensors are accounted. This will also be a survey of what technologies, companies, partners, and/or formats the customer is currently utilizing to interact with the unit data.
16	B.1.2.3	Assess Use of Pre-Existing Code	**The solution will assess the use of our pre-existing common code with the customer's particular needs and current infrastructure.**	The tool will assess all the code changes needed to push onto the current data infrastructure to ensure the code changes will resolve and not further harm current issues. "Pre-existing Common Code" will be native to Essential-IoT; Essential-IoT will possess a library of developed solutions, visualizations, queries, and other code sets that approach commonly observed unit health metrics. This phase will determine which of those library functions Essential-IoT can recycle for the specific customer, and which of the customer's needs will require new software development from Essential-IoT. The customer's current infrastructure will also largely influence how Essential-IoT applies pre-existing common code, as certain frameworks may not be conducive to the pre-existing code, and adjustments ay be required.

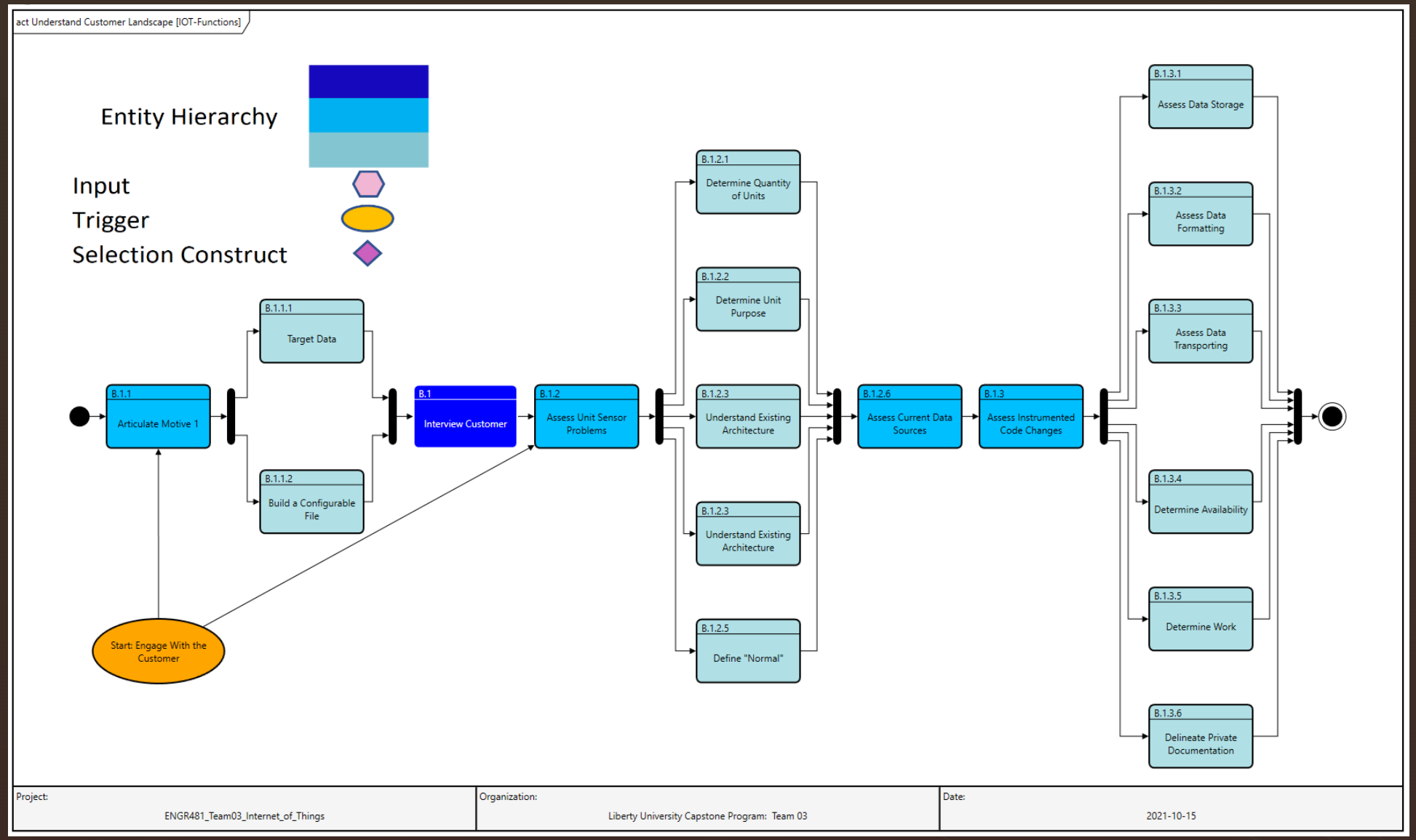
C.2/23 Function Definitions Table:

Operation 1 (Learn the Customer's Current Landscape)

ID	WBS	Nickname	Name	Description
17	B.1.2.3.1	Assess Data Storage	**The solution will assess current methods of data logging and storage.**	The tool will assess the current methods of data logging and storage to gain familiarization of the customer's current data storage methods.
18	B.1.2.3.2	Assess Data Formatting	**The solution will assess current methods of data formatting and recording.**	The tool will assess the current methods of data formatting and recording to gain familiarization of the customer's current data formatting methods.
19	B.1.2.3.3	Assess Data Transporting	**The solution will assess current methods of data transportation.**	The tool will assess the current methods of data transporting to gain familiarization of the customer's current data transportation methods.
20	B.1.2.3.4	Determine Availability	**The solution will assess the available code change that can easily be implemented.**	The tool will assess all the code changes for the customer's current data landscape and determine which code change is available for push.
21	B.1.2.3.5	Determine Work	**The solution will determine which code changes need work.**	The tool will assess the code changes for the customer's current data landscape and determine which code change needs work to better the current data structure or resolve an issue.
22	B.1.2.3.6	Identify Code Improvements from Customer Hooks	**The solution will identify common code tool improvements versus the customer-specific hooks.**	The interview will ascertain the key aspects of the customer's needs. Following this identification of what analyses/visualizations/diagnostics the customer desires, Essential-IoT will identify which software developments are (1) tweaks/adjustments to current, pre-existing code, and which software developments are (2) new, "customer-specific hook" software needs that will require building a tool from the ground up. The final solution (analysis of the customer's units) will likely be a combination of (1) and (2).
23	B.1.2.3.7	Release Documentation of Plan	**The solution will release the documentation of Essential-IoT "Application of Code" plan.**	Following the interview, Essential-IoT shall release a gameplan of what the 50,000-foot perspective to approach the customer's analysis/diagnostic needs concerning the units.

C.3/23 Function Definitions Table:

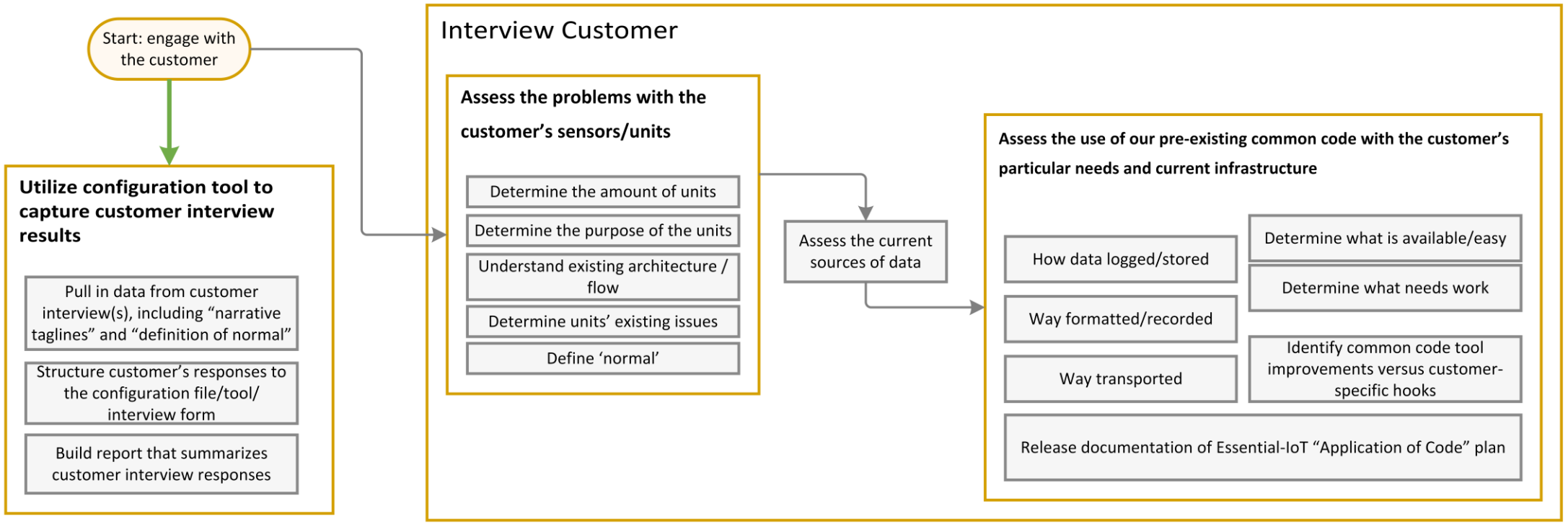
Operation 1 (Learn the Customer’s Current Landscape)



C.4/23 Activity Diagram:

Operation 1 (Learn the Customer's Current Landscape)

Operation 1: Learn the Customer's Current Landscape



C.5/23 Flowchart Lane:

Operation 1 (Learn the Customer's Current Landscape)

ID	WBS	Nickname	Name	Description
25	B.2.0	Collect Raw Data from Customer	**The solution will receive raw data from the customer.**	This information will provide Team 03 the ability to perform trial periods with the integrated applications (Power BI & ELK Stack) to prepare for the first ingest of log files.
26	B.2.0.1	Embedded Level Tap Point	**The solution will include an Embedded Level Tap Point as an initial set of operating conditions.**	The solution shall ingest data from an embedded level source of data; this data will be tagged within the database as being sourced from an embedded level. The tag "sourcedFromEmbeddedLevel" may result in niche diagnostics in later OPERATIONS. This data may provide insight into analysis of the unit by virtue of its origin.
27	B.2.0.2	Network Level Tap Point	**The solution will include a Network Level Tap Point as an initial set of operating conditions.**	The solution shall ingest data from a network level source of data; this data will be tagged within the database as being sourced from a network level. The tag "sourcedFromNetworkLevel" may result in niche diagnostics in later OPERATIONS. This data may provide insight into analysis of the unit by virtue of its origin.
28	B.2.0.3	Application Level Tap Point	**The solution will include an Application Level Tap Point as an initial set of operating conditions.**	The solution shall ingest data from an application level source of data; this data will be tagged within the database as being sourced from an application level. The tag "sourcedFromApplicationLevel" may result in niche diagnostics in later OPERATIONS. This data may provide insight into analysis of the unit by virtue of its origin.
29	B.2.1	Automate Intake of Data	**The solution will automate intake of data.**	The tool will automate the intake of data to ensure data is ingested into the system with no stopping when needed. This is a key pressure point of the firm (Essential-IoT); data should be ingested from a designated raw CSV holding location periodically (set on a timer to recur reliably and frequently).
30	B.2.1.1	Design Ingestion System	**The solution will have a designed ingestion system.**	The tool will contain a designed ingestion system to gather the continuous or semi-continuous flow of data.
31	B.2.1.2	Design Code Platform to Manipulate Data	**The solution will have a designated coding platform to manipulate data.**	The tool will contain a designed coding platform to manipulate the data received. This coding platform will be managed and manipulated internally by the firm (Essential-IoT).
32	B.2.1.3	Design Output Mechanism	**The solution will have a designed output mechanism.**	The tool will contain a designed output mechanism to be able to send out revised data files. These files will still be in CSV format.

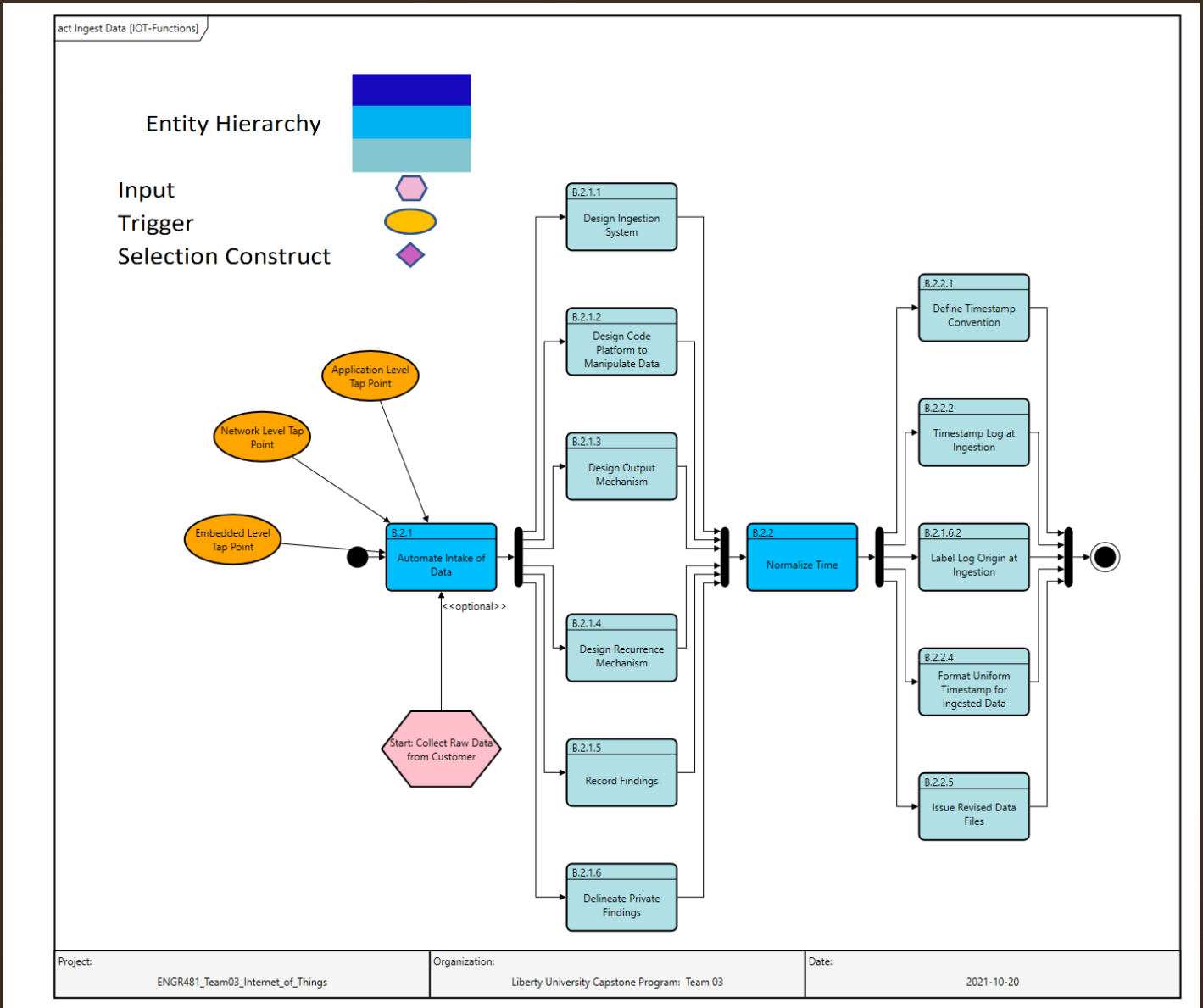
C.6/23 Function Definitions Table:

Operation 2 (Ingest Data)

ID	WBS	Nickname	Name	Description
33	B.2.1.4	Design Recurrence Mechanism	**The solution will have a designed auto-recurrence mechanism.**	The tool will contain a designed auto-recurrence mechanism to refresh the data automation system for new data.
34	B.2.1.5	Record Findings	**The solution will record findings.**	The tool will record findings from the data ingested into the system. This may be a simple report that is stored in a folder, acting as an action log. It may update a .txt file. It may issue an email from the firm (Essential-IoT) to the firm and the customer. It may be a different mechanism.
35	B.2.1.6	Delineate Private Findings	**The solution will differentiate public from private findings.**	The tool will delineate the public from the private findings to ensure all private and public data points are kept separate. This is to ensure the integrity of the relationship between the firm (Essential-IoT) and the customer.
36	B.2.1.6.1	Determine Data Sanitization Need	**The solution will determine if any data or outputs need to be sanitized for public viewing.**	The tool will identify data that needs to be sanitized for public viewing if the report were to be public.
37	B.2.1.6.2	Redact Appropriate Fields	**The solution will redact appropriate fields, visualizations, dashboards, and/or reports.**	The tool will redact fields, visualizations, dashboards, and reports that are not meant for public viewing.
38	B.2.2	Normalize Time	**The solution will normalize time by utilizing timestamp conventions.**	The tool will configure an expected timestamp and log convention for the data to normalize the time of data ingested into the system.
39	B.2.2.1	Define Timestamp Convention	**The solution will define an expected timestamp convention.**	The tool will define an expected timestamp convention which will align with the customer's expectations.
40	B.2.2.2	Timestamp Log at Ingestion	**The solution will timestamp log at moment of ingestion.**	The tool will timestamp log at moment of ingestion to follow the expected timestamp convention.
41	B.2.2.3	Label Log Origin at Ingestion	**The solution will label log origin at moment of ingestion.**	The tool will label log origin now of ingestion to follow the expected timestamp convention.
42	B.2.2.4	Format Uniform Timestamp for Ingested Data	**The solution will format uniform timestamp convention for existing data points.**	The tool will format a uniformed timestamp convention for the existing data points that adhere to the expected timestamp convention.
43	B.2.2.5	Issue Revised Data Files	**The solution, prior to integrating the data tool, will define a standard log file form that is prepared for ingestion to align with criteria approved by the stakeholder.**	Internal criteria such as timestamping, labelling and creating uniformity between data will be included in the design process during ingestion. This will prepare a log file for implementation with software tools as stated in the Mission Statement.

C.7/23 Function Definitions Table:

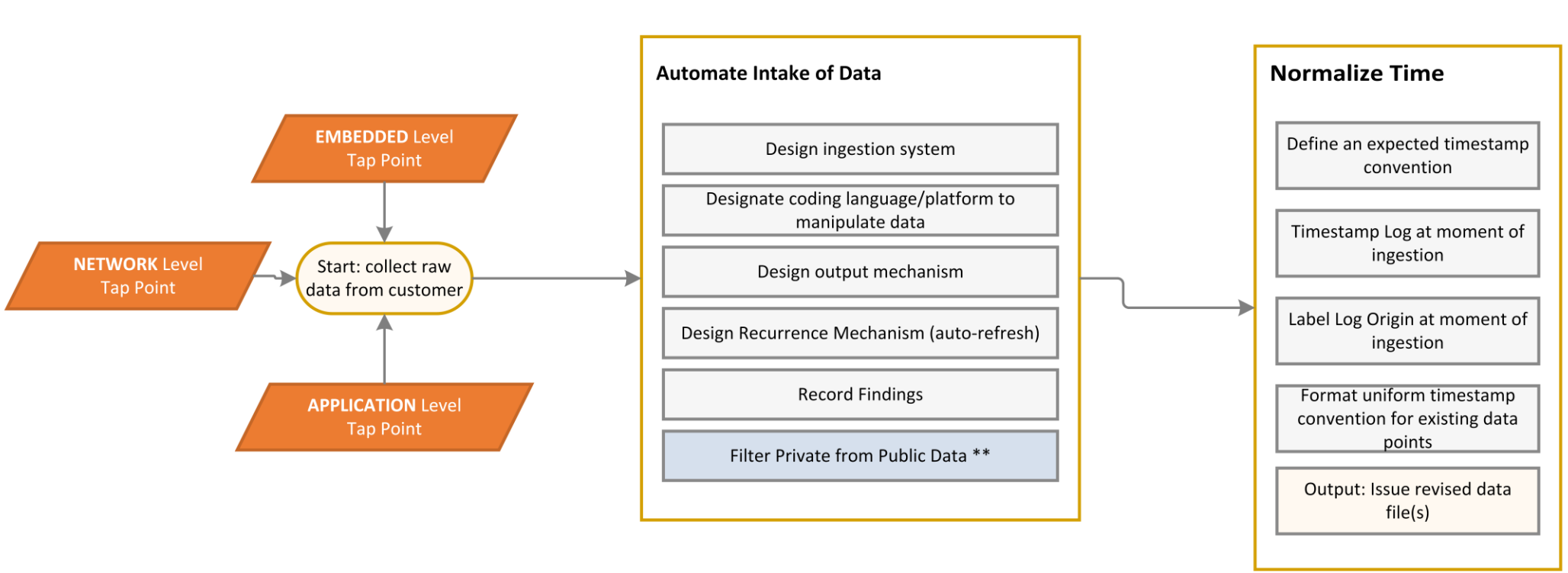
Operation 2 (Ingest Data)



C.8/23 Activity Diagram 2:

Operation 2 (Ingest Data)

Operation 2: Ingest Data



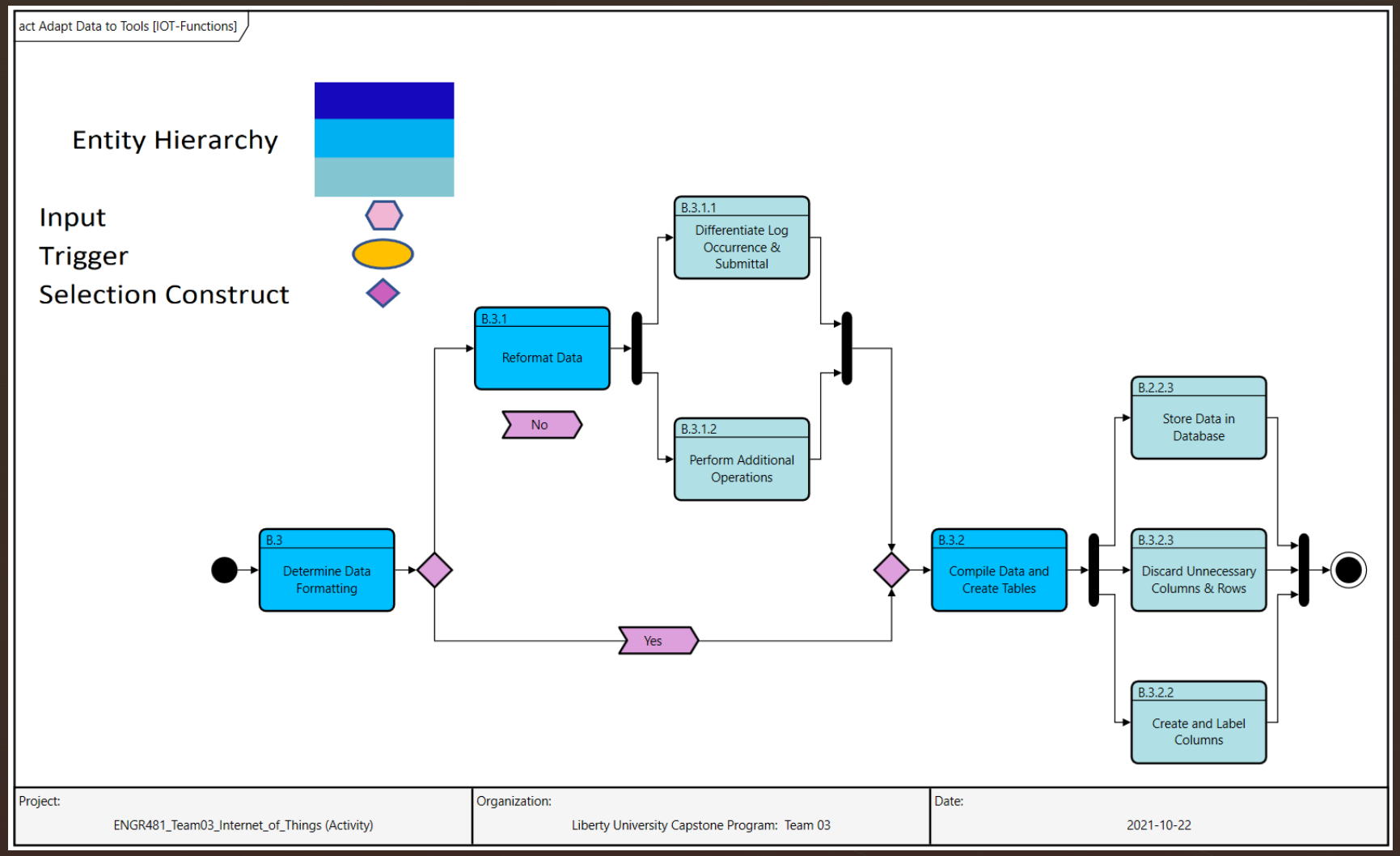
C.9/23 Flowchart Lane:

Operation 2 (Ingest Data)

ID	WBS	Nickname	Name	Description
43	B.3	Determine Data Formatting	**The solution will define whether the data is in a structured format.**	The tool must ensure the data is in a structured format for successful compilation.
44	B.3.1	Reformat Data	**The solution will reformat the data to fit the tool.**	The tool shall adjust the data storage/formatting within the current file to pass the data from the file to the toolset (based in PowerBI and ELK Stack). This function is valuable in simplifying that transition as much as possible. The "reformatting" may be as direct as "redacting Column D" or as indirect as "deleted comma-delimited values within the range of 4-6 empty data ranges".
45	B.3.1.1	Differentiate Log Occurrence & Submittal	**The solution will differentiate time of log object occurrence and log file submittal.**	The tool will differentiate between the time of log object occurrence and log file submittal to gather information of each log's timestamp. This differentiation in timestamp is valuable for analyzing when processes occur and tying those observations with a source of truth. It is paramount that these timestamps be an absolute source of truth.
46	B.3.1.2	Perform Additional Operations	**The solutions will perform additional operations as necessary.**	The solution shall perform additional reformatting operations as necessary to facilitate the transition of data from the CSV to the toolset (based in PowerBI or ELK Stack). These reformatting operations may not be identified until further into the implementation phase of the toolset, or they may be delineated as early as the interview DISCOVERY phase with the customer.
47	B.3.2	Compile Data and Create Tables	**The solution will compile data and create tables.**	The tool will compile the data and develop tables for reports.
49	B.3.2.1	Store Data in Database	**The solution will store data into a database of an existing software tool.**	The tool will store data into a database of an existing software tool.
50	B.3.2.2	Create and Label Columns	**The solution will create and label additional columns.**	The tool will create and label additional columns as needed during compilation and table creation.
51	B.3.2.3	Discard Unnecessary Columns & Rows	**The solution will discard unnecessary data columns and rows.**	The tool will throw away any garbage data rows or data columns.
52	B.3.3	Define Expected Columns	**The solution will define the expected columns to calculate.**	The tool will determine the expected columns to calculate, based on the customer's request, to compile and transform the data.
53	B.3.4	Define Expected Tables	**The solution will define the expected additional tables.**	The tool will define the expected additional tables for compilation and transformation per the customer's specifications.

C.10/23 Function Definitions Table:

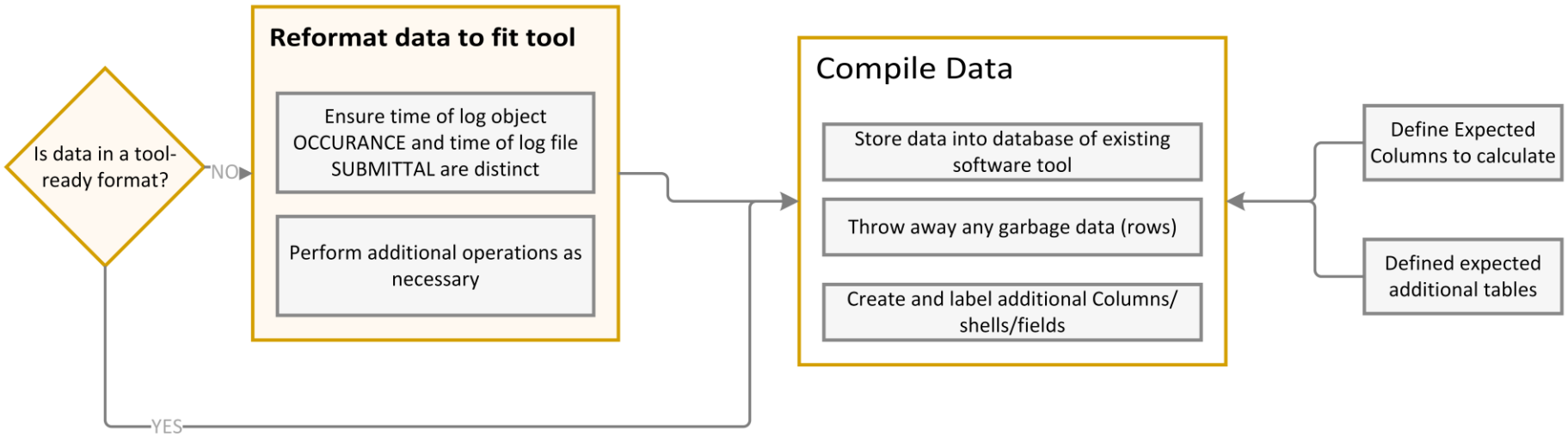
Operation 3 (Adapt Data to Tool)



C.11/23 Activity Diagram 3:

Operation 3 (Adapt Data to Tool)

Operation 3: Adapt Data to Tool



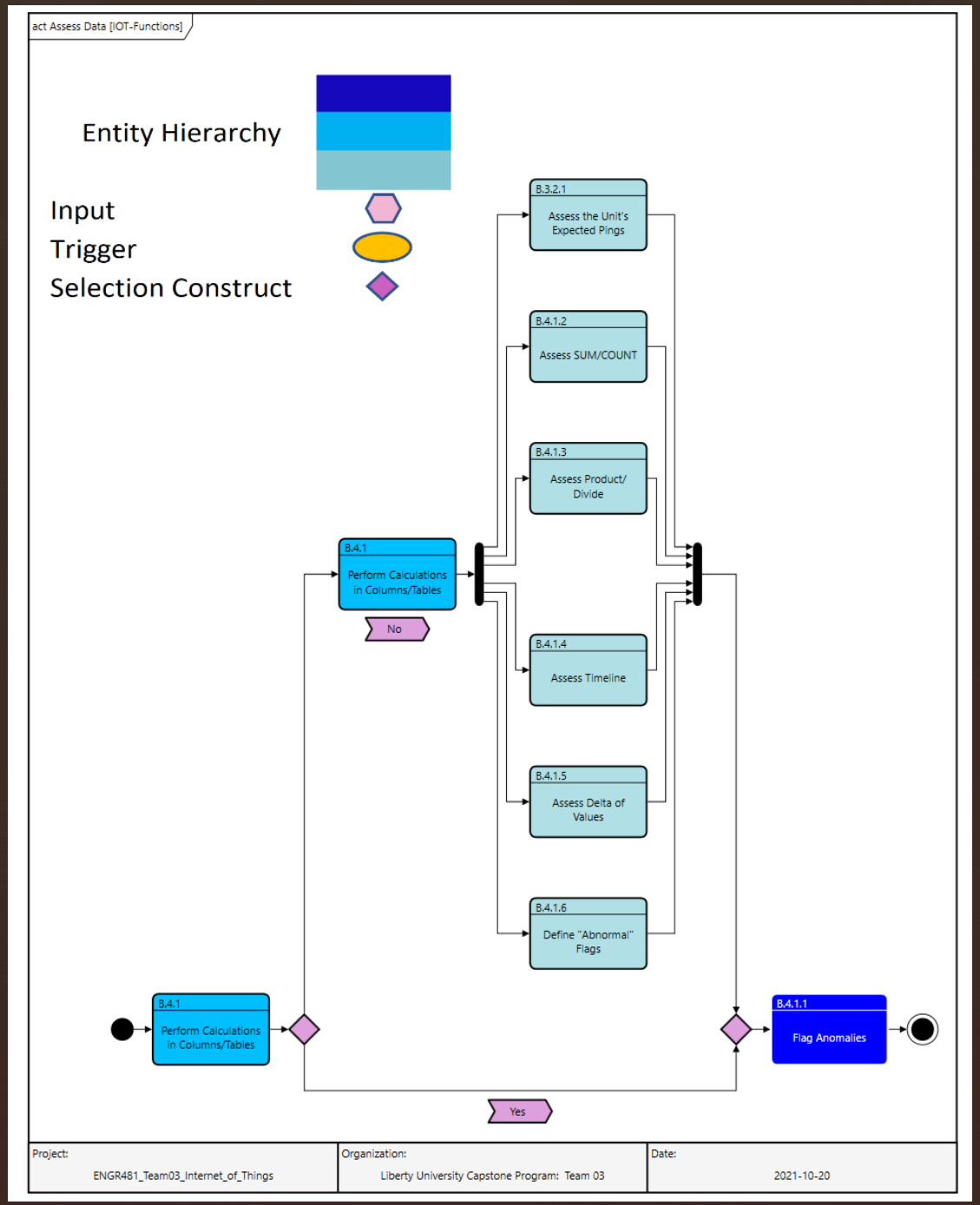
C.12/23 Flowchart Lane:

Operation 3 (Adapt Data to Tool)

ID	WBS	Nickname	Name	Description
54	B.4	Determine Data Transformation	**The solution will determine if the data is already transformed to a summarized, calculated form.**	The tool will assess if the data is transformed to properly perform calculations in additional columns and tables.
55	B.4.1	Perform Calculations in Columns/Tables	**The solution will perform calculations in additional columns and tables according to the customer's needs.**	The tool will perform calculations in the additional columns and tables to further the analysis of the data. The assessments are not limited in scope; they will be defined during the interview DISCOVERY phase with the customer. The assessments also may not utilize the default sub-functions listed within the function.
56	B.4.1.1	Assess the Unit's Expected Pings	**The solution may assess if the unit's expected rings are registered.**	The tool may perform Boolean calculations to assess if the unit's expected pings are registered in the system.
57	B.4.1.2	Assess SUM/COUNT	**The solution may assess sum/count detailed by customer.**	The tool may perform integer calculations to assess the sum and count, which are specified by the customer.
58	B.4.1.3	Assess Product/Divide	**The solution may assess product/divide detailed by customer.**	The tool may perform integer calculations to assess the product and divide as detailed by the customer.
59	B.4.1.4	Assess Timeline	**The solution may assess timeline detailed by customer.**	The tool may perform datetime calculations to assess the timeline as specified by the customer.
60	B.4.1.5	Assess Delta of Values	**The solution may assess the delta of the current values to the previous values as detailed by customer.**	The tool may perform integer and percent calculations to assess the delta between the current values and previous values as specified by the customer.
61	B.4.1.6	Assess Additional Parameters of Interest	**The solution may assess additional parameters of interest detailed by the customer.**	The tool may perform integer and percent calculations to assess the additional parameters of interest as specified by the customer.

C.13/23 Function Definitions Table:

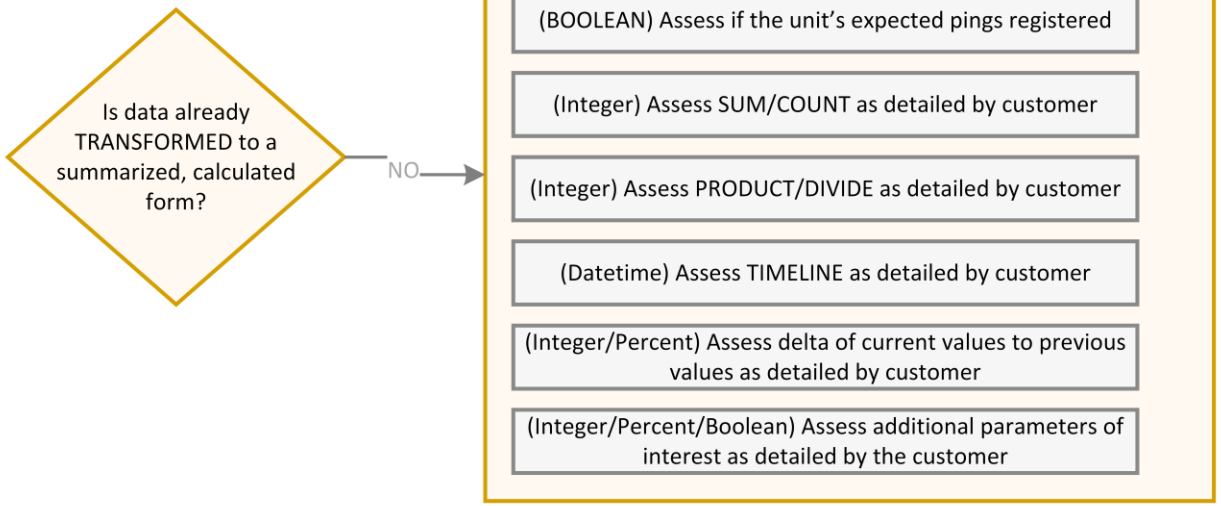
Operation 4 (Assess Data)



C.14/23 Activity Diagram 4:

Operation 4 (Assess Data)

Operation 4: Assess Data



C.15/23 Flowchart Lane：

Operation 4 (Assess Data)

ID	WBS	Nickname	Name	Description
62	B.5	Flag Anomalies	**The solution will flag anomalies from the transformed data.**	The tool will flag anomalies after analysis of the transformed data. These flags may be in the form of a HIGH/LOW indicator in a column.
63	B.5.1	Create Conditional Columns	**The solution will create conditional columns based off previously calculated columns.**	The tool will create conditional columns based off previously calculated columns to further format the table. The columns will show HIGH/LOW values depending on calculations made in OPERATION 4; the tolerance/parameters of these columns will be informed by the interview DISCOVERY phase between the firm (Essential-IoT) and the customer.
64	B.5.2	Define a Format of Flags Based on Operation	**The solution will define a format that defines flags based on SUM/AGGREGATE operations.**	The tool will define a format that can be a sum or aggregate in a query to show flags.
65	B.5.3	Ensure Flags are Consistent	**The solution will ensure the flags are consistent with data expectations.**	The tool will ensure the flagged data points are consistent with the data unit and formatting expectations specified by the customer.
66	B.5.4	Configure by Customer's Baseline	**The solution will configure by the customer's baseline.**	The tool shall pull information from the "configuration tool" that captured the customer's interview responses. This information will inform the definition of "normal" and "abnormal". It will also inform what flags the tool cares about reporting, and what flags are thrown out before the final report (i.e., the customer may not care that "XX units communicated every 5 minutes", and the customer may care that "XX units communicated every 5 hours"). Finally, the more unique aspect of this toolset, the customer's baseline information will inform what "narrative taglines" the report output (and therefore flags) will consider. For example, if the customer desires to be informed of the tagline ("ZZ% of our water pumps are active during high-heat periods of time, 10am-3pm, indicating civilian use. Of that set of act pumps, YY% of pumps report their highest usage during that period.") These taglines verbally summarize the numbers that will also eventually be delivered. The taglines also inform what flags the toolset desires to keep and what flags are not valuable to the customer.
67	B.5.4.1	Define "Normal" Flags	**The solution will define "normal" flags.**	The tool will define data that fits the expected data trend with normal flags.
68	B.5.4.2	Define "Abnormal" Flags	**The solution will define "abnormal" flags.**	The tool will define data that does not fit the expected data trend with abnormal flags.

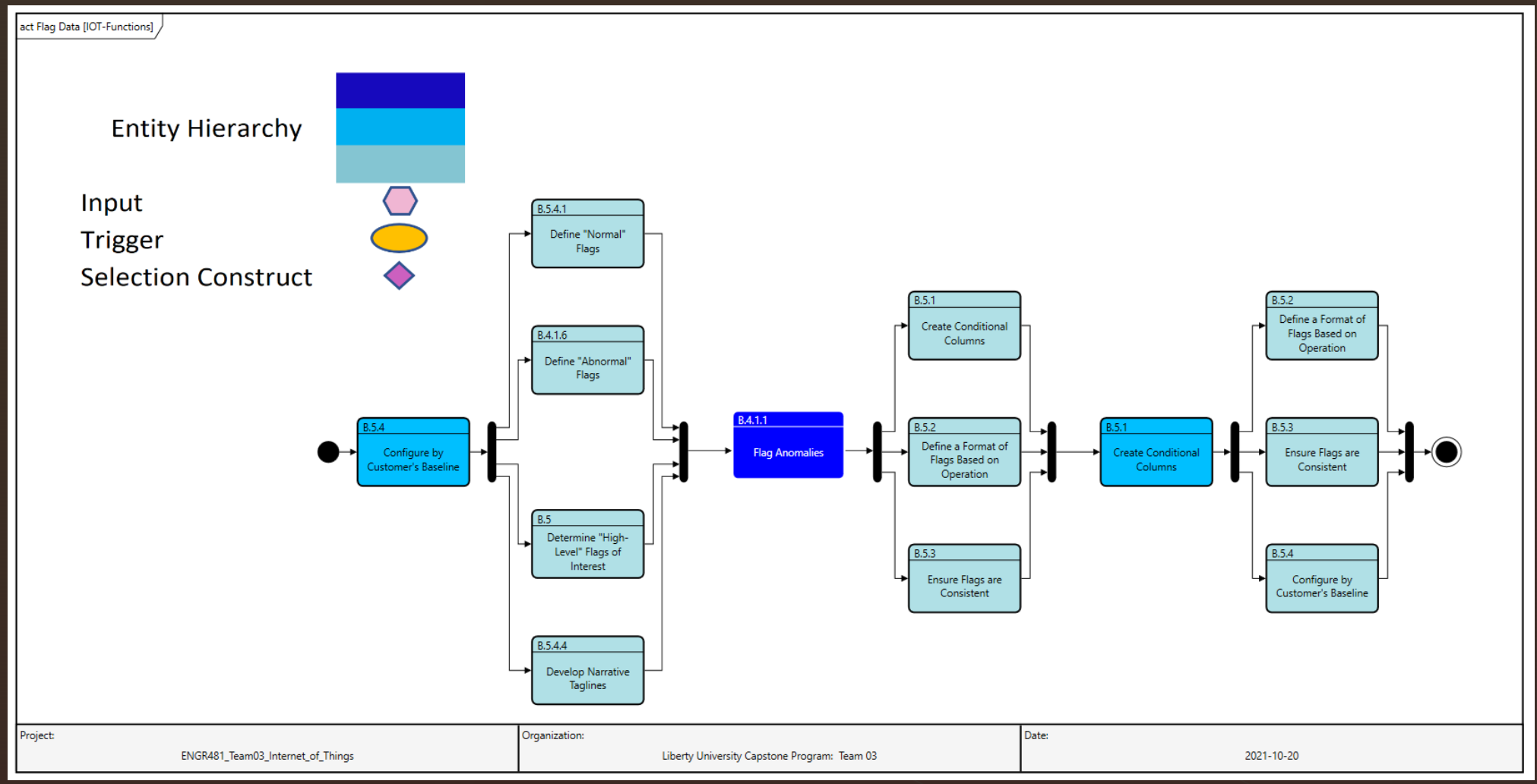
C.16/23 Function Definitions Table:

Operation 5 (Flag Data)

ID	WBS	Nickname	Name	Description
69	B.5.4.3	Determine "High-Level" Flags of Interest	**The solution will determine "high-level" flags of interest.**	The tool will determine the data that fits the high-level of interest, as specified by the customer, and flag it. This may be qualitatively defined (i.e., "flag units that communicate excessively") or it may be quantitatively defined (i.e., "flag units that have >5 pings within 1 hour")
70	B.5.4.4	Develop Narrative Taglines	**The solution will develop narrative taglines.**	The solution shall develop a repertoire of narrative taglines that serve to communicate data insights to the layman or non-technical report reader. These taglines impact what flags will need to be developed within the toolset.
71	B.5.5	Preview Data with Customer	**The solution will preview the data with the customer.**	The solution will then check in with the customer, confirming that this set of flags is as the customer desires. The firm (Essential-IoT) will ask the customer questions to understand if the objectives stated in the interview have been satisfied (i.e., “is this unit that we have flagged actually a unit that you want to be informed about? Is this issue, ascertained from the data, a significant issue?"). It may be the case the unit is not actually defective (due to improperly defined constraints, incorrectly understood pressure points, etc.), or it may be the case that the unit is in fact defective, and the report is doing as it is supposed to do by bringing the unit to the customer's attention (i.e., flagging the unit).
72	B.5.5.1	Determine Customer Flag Insight	**The solution will provide an explanation to the client, the reasoning behind each of the defined flags and the scope of their impact**	The solution will describe to the client in an understandable format, what each flag criteria identifies and how the system was developed to respond to stimulus from ingested data.
73	B.5.5.2	Target Data as We Understand it	**Using a defined 'normal', separate data that does not fulfill this definition. The data filtered out will be the targeted data to analyze and use to develop system functionality in an operating environment.**	Identifiable data is used to perform functions that contribute to the stakeholders needs and align with the mission statement.
74	B.5.5.3	Build a Configuration Form	**The solution must have a definition for its configuration to detect variation from a 'baselined' normal**	The solution shall respond to the customer's insights on the flags currently generated. This may result in code changes (either in OPERATION 4 or OPERATION 5) to correctly flag units going forward. This "configuration form" will document customer insight in the same fashion that the "configuration tool" from OPERATION 1 documented customer insight. A note to the customer when reaching this level: Artificial Intelligence is out of scope for this solution, but it is a viable replacement or enhancement to OPERATION 5. Ideally, the process of determining which flags are valid and which flags are invalid would be automated and handled by the system internally.
69	B.5.4.3	Determine "High-Level" Flags of Interest	**The solution will determine "high-level" flags of interest.**	The tool will determine the data that fits the high-level of interest, as specified by the customer, and flag it. This may be qualitatively defined (i.e., "flag units that communicate excessively") or it may be quantitatively defined (i.e., "flag units that have >5 pings within 1 hour")

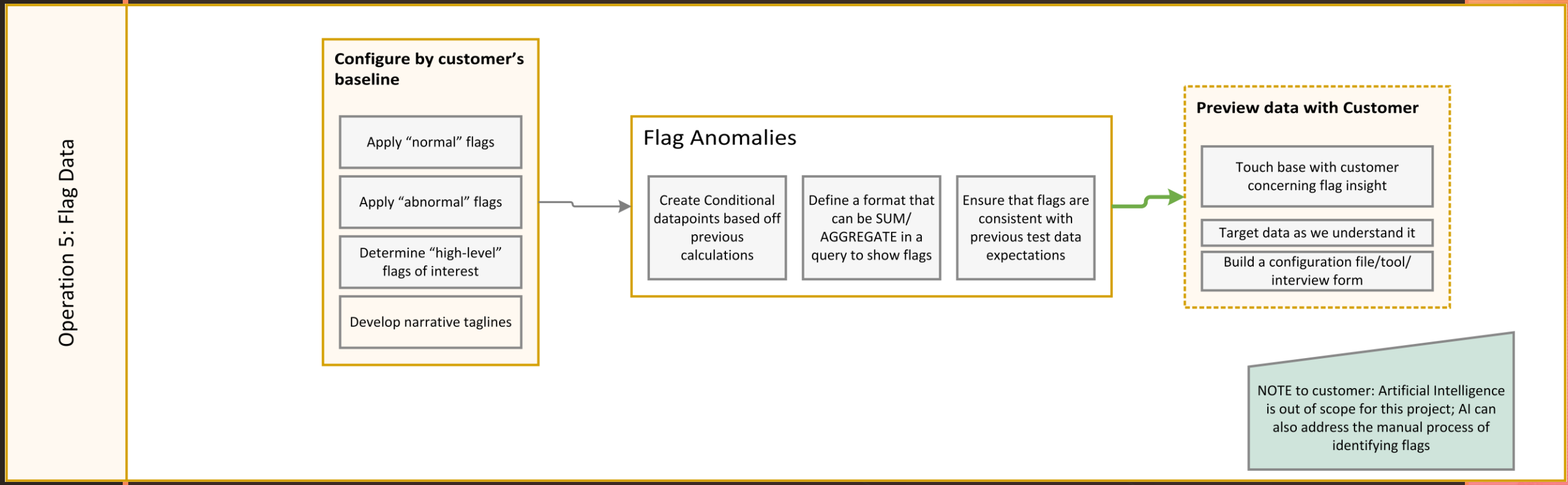
C.17/23 Function Definitions Table:

Operation 5 (Flag Data)



C.18/23 Activity Diagram 5:

Operation 5 (Flag Data)



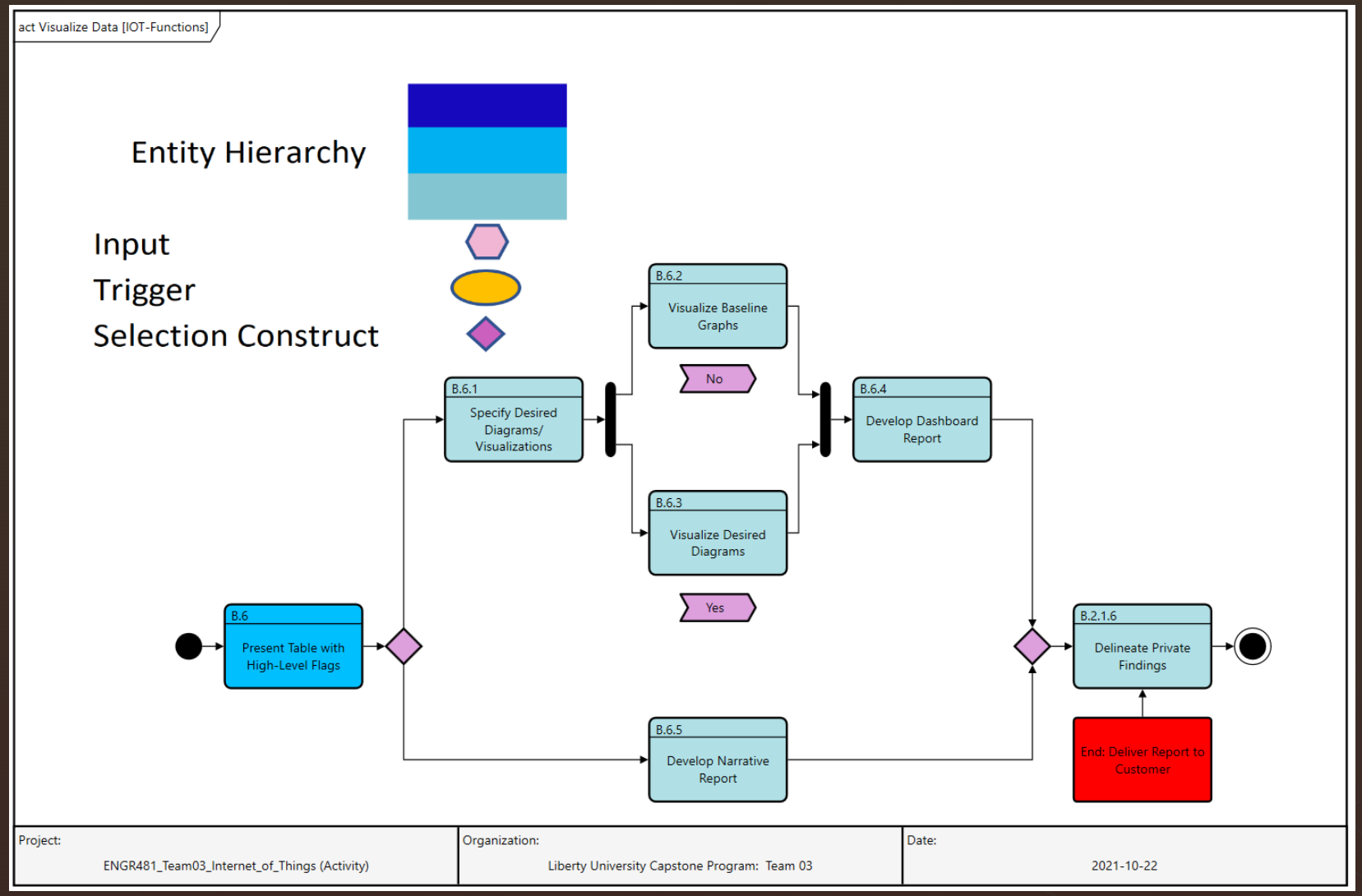
C.19/23 Flowchart Lane：

Operation 5 (Flag Data)

ID	WBS	Nickname	Name	Description
75	B.6	Present Table with High-Level Flags	**The solution will present a table with high-level flags.**	The tool will present a table that consists of data that were flagged as high-level interest points.
76	B.6.1	Specify Desired Diagrams/ Visualizations	**The solution will customize report with the customer's desired diagrams and visualizations.**	The tool will customize the report with either diagrams or visualizations that are developed at the request of the customer.
77	B.6.2	Visualize Baseline Graphs	**The solution will visualize the requested baseline graphs in dashboard.**	The tool will create visualizes of baseline graphs per the customer's specifications. These "baseline graphs" will already exist in the firm (Essential-IoT) library of graphs.
78	B.6.3	Visualize Desired Diagrams	**The solution will visualize the requested diagrams in dashboard.**	The tool will create visualizes of desired diagrams per the customer's specifications. These "desired diagrams" will not exist in the firm (Essential-IoT) default library of graphs but will subsequently be added to the library following generation.
79	B.6.4	Develop Dashboard Report	**The solution will develop a dashboard report of visualizations.**	The tool will compile all the visuals into a dashboard report. This report may be a web interface, may live in the software directly (i.e., PowerBI Desktop or ELK Stack Desktop), may live in a local file, or may live in another location.
80	B.6.5	Develop Narrative Report.	**The solution will develop a narrative report with a table of flags.**	The tool will compile a verbal report that aligns with and contains a table of flags that consist of normal, abnormal, and high-level interests.
81	B.6.6	Deliver Report	**The solution will deliver the report to customer.**	The tool will deliver the report to the customer as the final product. The report will be redacted and sanitized as specified by the customer and agreed upon with the firm (Essential-IoT).

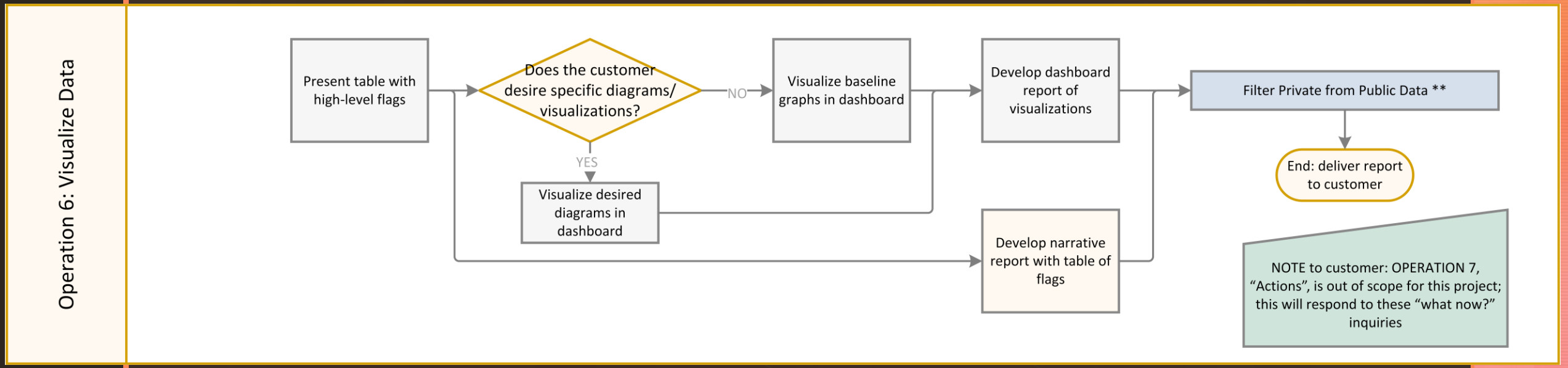
C.20/23 Function Definitions Table:

Operation 5 (Flag Data)



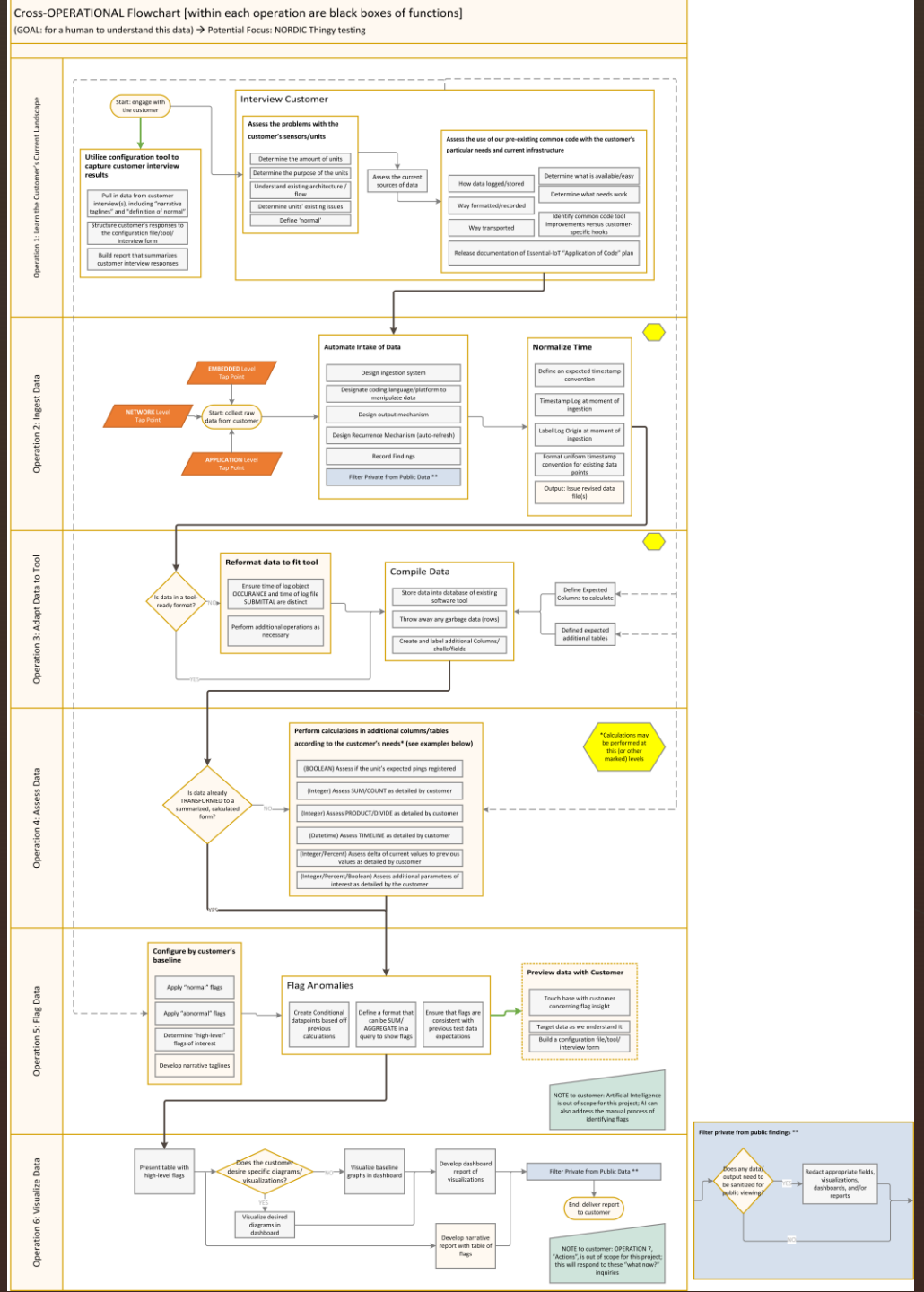
C.21/23 Activity Diagram 6:

Operation 6 (Visualize Data)



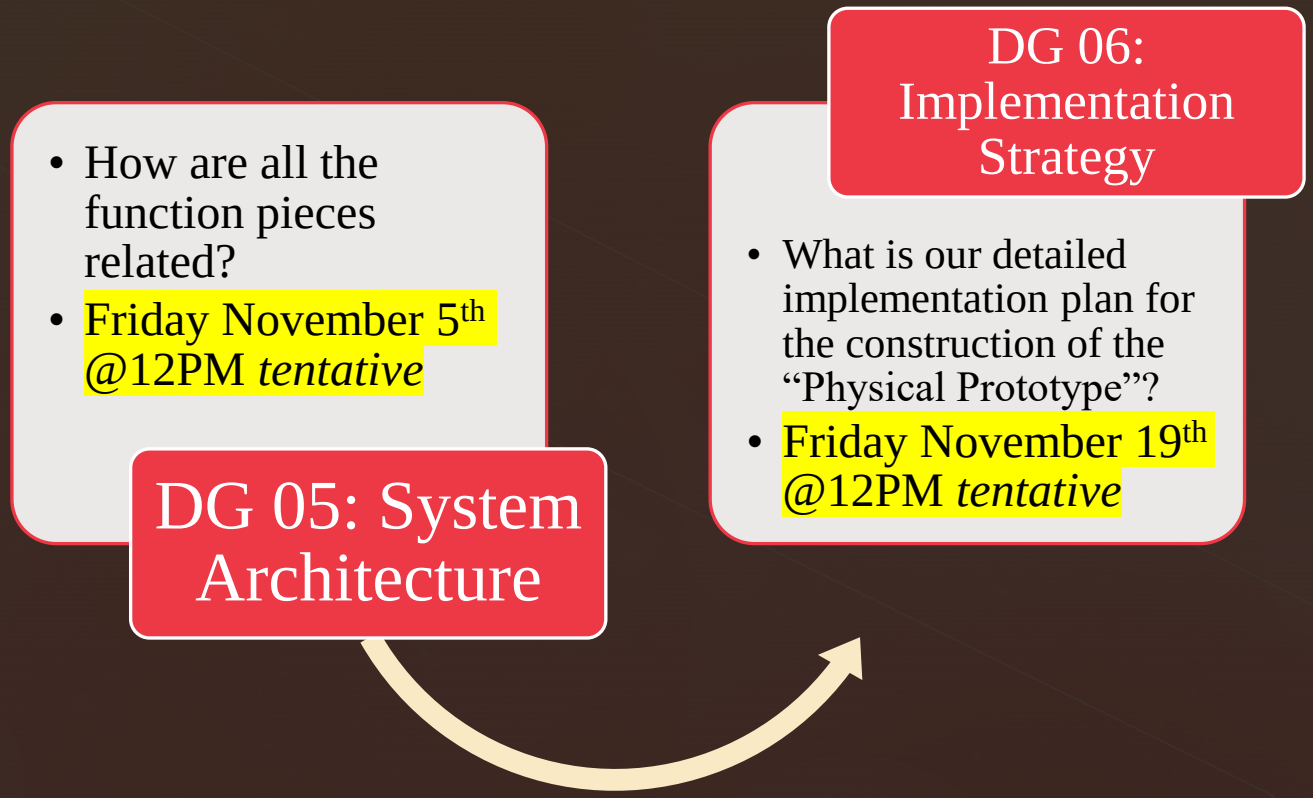
C.22/23 Flowchart Lane：

Operation 6 (Visualize Data)



C.23/23 Operations Domain Mapping to *Functions*

D.1/3 Next Steps



D.2/3 Updated Timeline

Checkpoint	Estimated End Date	Description	Content STATUS	Materials STATUS	Meeting STATUS
DG 05: System Architecture	Friday 2021-11-05 Pending	HOW are all the pieces RELATED?	Brainstorming Phases, PowerBI and ELK Stack training	Rough Draft from Client Available	Pending approval from Dr. Bae and Mr. Stansell
DG 06: Implementation Strategy	Friday 2021-11-19 Pending	WHAT is our detailed implementation PLAN for the SW build?	<Not started>	<Not started>	Pending approval from Dr. Bae and Mr. Stansell

D.3/3 Conclusion

- 81 Functions Documented
  - Each function can be mapped to one of six delineated operations
  - Each set of functions can be mapped to one Activity Diagram associated with an operation
- Remaining DGs have been solidified in calendar