

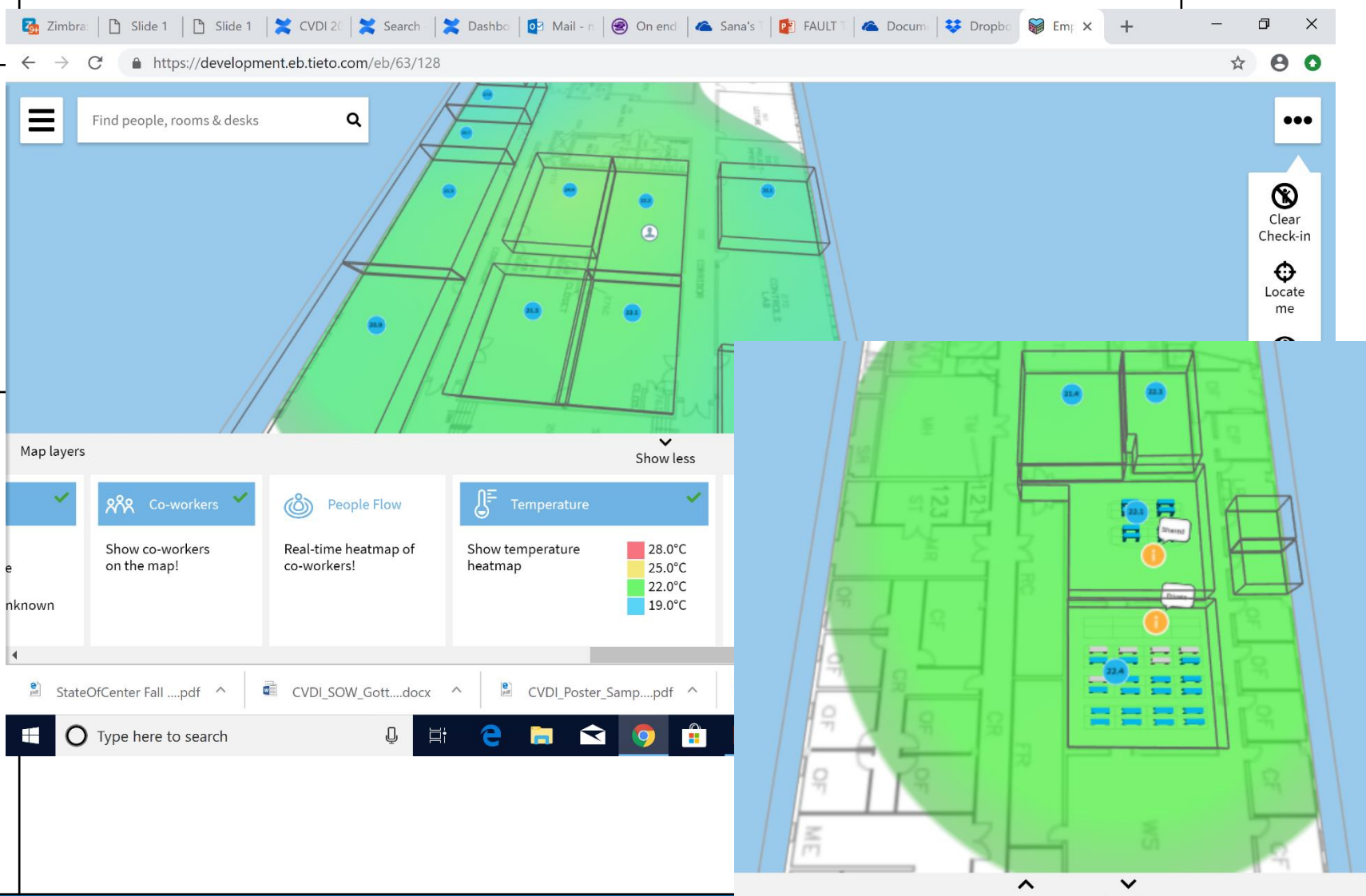
7a.001.UL- Fault-tolerance Strategies for Handling Data-streams on Edge-Networks: Application to Smart Buildings

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Project Start: 08/01/2018	End Date: 07/31/2018	Project Budget: \$40,000	Spent: \$18,000
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Project Summary: The overall goal of the project is to develop partial Replication Strategies for Managing Data Stream Processing & Analytics on Edge Devices. Specifically the team will (1) Deploy a live smart building platform in collaboration with Tieto at UL Lafayette (2) Investigate the communication protocols, data collection, buffering and processing methods, and impact of failures to actual gateway devices (3) Investigate partial data-replication strategies for distributing data processing and analytics between the edge and the cloud (4) Experiment with partial-replication strategies for data streams. These methods will be studied in the context of smart buildings.

- Details of Progress/Achievements:**
- Created a smart building environment at UL Lafayette for two buildings on campus (LITE Center and Rougeou Hall) to collect live data from gateway devices and sensors [95% complete]
 - Investigate partial data-replication strategies for distributing data processing and analytics between the edge and the cloud
 - Used SDN and buffering approaches (at the application level) to handle fault tolerance for collecting and processing live data streams [video]



PROJECT DELIVERABLES

Deliverable	Achievements	Remaining To Do
Deployment of smart building platform at UL Lafayette	Select sensors, gateway devices, locations, obtain approvals, deployed 100 sensors, created a smart building platform (in collab. with Tieto) to store and view temperature, humidity and occupancy	Test and fine tune configuration for occupancy
Techniques for fault tolerance	Experimented with partial replication strategies on live video streams (buffering + SDN) approaches – shows improvement in latency, packet loss, and resume time	Investigate the actual data collection and replication strategies in the context of smart buildings Develop techniques to handle fault tolerance of live video streams
Proof-of-concept implementation	None	Implement proof-of-concept
Submit paper demonstrating results from the approach	None	Document the results & experiments Prepare publication for peer-review