



## UKKO AGRO'S SMART AGRICULTURE SOLUTION READY FOR THE FARM

Ukko Agro demonstrated the successful operation of their smart agriculture solution on the CENGN Testbed. The company is now preparing to deploy their solution on multiple farms across Canada and the United States this spring as part of their limited commercial rollouts.

Ukko Agro is an agricultural technology company based in Toronto that is dedicated to helping farmers grow more, in a sustainable way. Their technology-enabled smart agriculture ecosystem includes a Pest Prediction Model that gathers data from on-site weather sensors to predict potential pest and disease attacks before they occur on a crop. Ukko Agro leveraged the CENGN Testbed and eleven-X's Long Range Wide Area Network (LoRaWAN) to validate the functionality and performance of their Pest Prediction Model. This model analyzed input data from on-site, active IoT sensor devices in conjunction with weather APIs, which access data from local weather stations.

### FARM VS. PESTS

This company's overarching mission is to optimize pesticide usage so farmers can grow more while simultaneously decreasing their environmental impact. Right now, farmers across the globe lose hundreds of billions of dollars annually due to pest and disease attacks harming their crops. Striking the perfect balance of pesticide usage is not an easy feat: too little can leave crops prone to a takeover by pests and too much can be harmful for the crops and the environment. Complicating things is the fact that weather patterns have a large impact on pesticide requirements. Pesticides that were successful one year may not be the next, as weather conditions like temperature, humidity, and precipitation, bring out an entirely different set of pests and diseases to contend with.

### PROJECT CONTRIBUTIONS

	<ul style="list-style-type: none"> <li>● Cloud Tenancy &amp; Dedicated Project Space</li> <li>● Technical Support &amp; Projects</li> </ul>
	<ul style="list-style-type: none"> <li>● Smart Agriculture Solution</li> <li>● Sensor Devices</li> </ul>
	<ul style="list-style-type: none"> <li>● LoRaWAN</li> <li>● LoRa Gateway &amp; Server</li> </ul>

### OPTIMIZED PESTICIDE USE

Ukko Agro's smart agriculture solution gathers and processes data directly from the farm to alert farmers on the probability of pest and disease attacks, suggesting optimum pesticides, amount to use, and when to use it. Their smart agriculture solution is able to alert farmers up to 72 hours prior to an attack. The focus of this CENGN project was on the integration of IoT sensors into the smart agriculture system and validating the functionality of the Pest Prediction Model component of their solution.



### SETTING UP THE NETWORK

The project had two main objectives. The first was to connect Ukko Agro's sensor device (LoRa enabled) to the eleven-X LoRaWAN. The second objective was to validate the performance and functionality of the Pest Prediction Model by collecting data from the on-site LoRa sensors and weather APIs. eleven-X provided their LoRaWAN and their expertise by working closely with Ukko Agro to properly configure the network throughout the project. Once configured, the on-site LoRa sensors and weather API data was fed through the LoRa gateway to the LoRa server. Sensor data was then sent from the LoRa server to the IBM cloud for pre-processing activities before it was processed by Ukko Agro's Pest Prediction Model component.

### CENGN MEMBERS

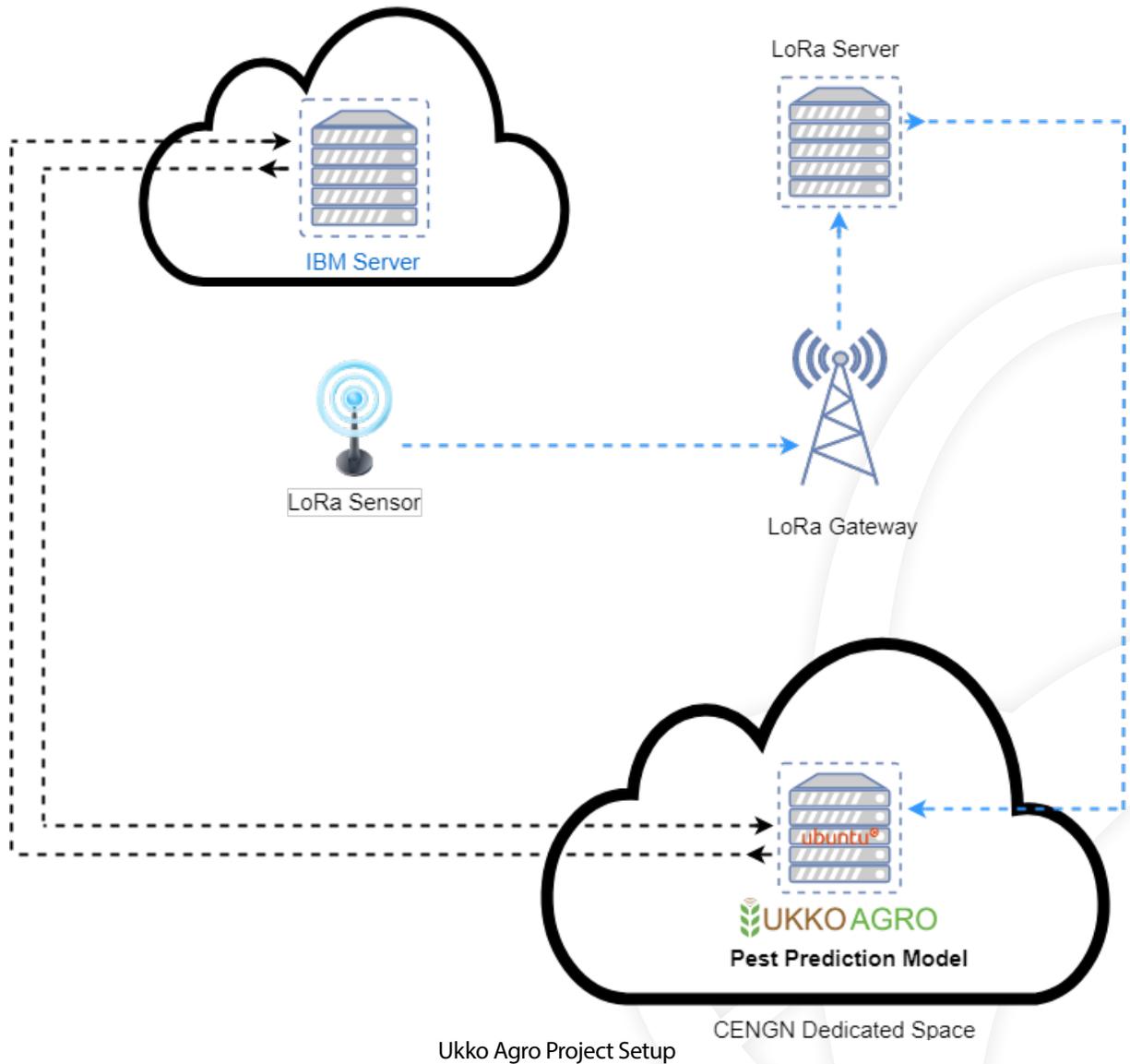


## THE RESULTS

Ukko Agro had the opportunity to work closely with eleven-x to connect the sensors to the LoRa gateway and server. Through successfully executing the test cases the project demonstrated the following:

- Successfully connected Ukko Agro's LoRa sensor device to the LoRa network
- Validated the performance and functionality of the pest predictive analysis module utilizing input data from both active LoRa sensor devices and weather APIs

Ukko Agro's smart agriculture solution passed all connectivity tests therefore validating the operation of their solution.



## CONCLUSION

Having a spring and summer agenda loaded with limited commercial rollouts, Ukko Agro required validation of the functionality of their smart agriculture solution prior to deployment. By coming to CENGN for a project, Ukko Agro was given access to our state-of-the-art OpenStack infrastructure, technical expertise, and connections. They were also able to collaborate with eleven-X, leveraging both their LoRa gateway and their support for configuration throughout the project. This CENGN project has given Ukko Agro confidence in the reliability of their solution and has provided new opportunity to test future solutions with CENGN before commercial rollout.