

NOVUS DATA EXCHANGE PRFAQ

NOVUS LAUNCHES NEW DATA EXCHANGE

CLOUD INFRASTRUCTURE SUPPORTS SECURITY, STORAGE AND USE OF DATA

(October 11, 2021 - Tempe, AZ) Today, the public/private partnership between ASU and Catellus Development Corporation, building the new Novus Innovation Corridor (NOVUS), announced the completion of cloud based data exchange infrastructure to provide one home for all of the data needed to power NOVUS. The new exchange allows NOVUS property managers, visitors, tenants and researchers to benefit from the access to data related to NOVUS.

In building NOVUS, ASU and Catellus saw an opportunity to reinvent how data is secured, stored and shared. Without a central data exchange, data for the planning, building and operations of infrastructure would be stored in different locations with different owners. Those people looking for data would have to know the data existed, where to find it, who to request the data from and how to request and access the data. The NOVUS team wanted to streamline innovation and the ability to power new solutions like parking and traffic management that require data to work.

The NOVUS approach creates a data exchange housed in the cloud. A data exchange is one repository that allows multiple data owners to store data in the same location while retaining control over who accesses and uses the data sets. Housing the data in one location makes it easy to see the complete inventory of available data, to access the data and to layer on analytics and applications.

“Once a building is complete it can be hard to find all of the planning, design and permitting documents that were used in construction. Multiply that times the number of buildings being developed at NOVUS and you can just imagine all of the data involved and how easy it would be to lose control of it all,” said Bob McCrane, the ASU NOVUS Project Manager. “By starting out early with data exchange infrastructure, all of the data from NOVUS will be properly tagged and stored and easily accessible. Plus new data can be added whether it’s from people, documents, sensors or applications.”

NOVUS created the data exchange in the cloud and maintains both open and restricted data sets. Users access the data exchange from a computer and create an account to login. Inside the exchange users are able to see the inventory of data sets, access open data and request access to restricted data sets. Users can also request the ability to upload data to the exchange. The exchange includes data analytics dashboards and the ability to create new ones. Users can access a suite of analytics and data visualization tools to use on data sets. The exchange also comes with and allows the development of Application Programming Interfaces (APIs) to support software applications like the new NOVUS SmartSpot parking application created by ASU Parking Services, Cox Communications and ParkMobile.

“Using the data exchange, Cox was able to quickly and easily stand up a parking application to help visitors plan, find and pay for parking at NOVUS,” said Julie Jones, Director of ASU Parking Services. “The Exchange allows availability data created by Cox’s parking sensors to sync in real-time with payment and violation data from ParkMobile and be used in our SmartSpot app to show visitors where to find a spot. Without the exchange, this data would need to be sourced from different places, preventing the app from both working in real-time and having advanced functionality powered by access to the data.”

For more information please visit: - www.novusasu.com/dataexchange.

NOVUS Data Exchange Frequently Asked Questions (FAQ)

Frequently Asked Questions (FAQ) - NOVUS Data Exchange

1. What are we building and why?

NOVUS is building an urban data exchange to support improved ability to collect, store, standardize, analyze and access data. The data exchange is a cloud-based data lake that provides a common location to ingest, store, analyze and use both public and private data sets. Layered on top of the data lake are tools for access and identity management, the ability to subscribe to data sets and a customizable dashboard that allows users access to analytics in support of their mission.

The data exchange is being built to create a process for staff to access the data and analytics needed to manage NOVUS. Today data lives in different places, in different versions and different levels of accuracy. There is no consistent understanding of the existing data inventory, how to access the data sets or confidence in its accuracy, completeness and timeliness. As a result, there are multiple copies of data sets and different numbers used for benchmarking, modeling and reporting -- which impacts trust in data being used by decision makers.

The data exchange is also a test case for a municipal data exchange built on the parking use case, and scalable to other use cases.

2. Who are we building it for?

NOVUS is building the data exchange for internal and external customers involved with the building, operations and use of the NOVUS campus. Its primary users are those who will manage the NOVUS facilities.

3. What is the value to the customer?

The Data Exchange's primary value is to provide one reliable source of data that can be depended on for accurate and up-to-date information for benchmarking, modeling, and reporting. The "customer" may be Novus Staff, owners of buildings within NOVUS, businesses located within NOVUS, or researchers studying a variety of urban development, traffic or climate related challenges.

4. How does the data exchange work?

The data exchange is a cloud-based data exchange controlled and operated by NOVUS.

Users authorized by NOVUS can upload and access data through the Amazon Web Services (AWS) Data Exchange portal. The data exchange combines several capabilities into one tool. a robust data lake to store data, access and management tools to authorize users, data standardization tools to improve data integrity and usability, customizable dashboards to assemble desired reporting and analytics and an exchange that allows for the access and sharing of data.

The data exchange works by creating a central data lake for NOVUS where the data owners can upload data sets that can then be used by other district staff and authorized stakeholders.

Access and authorization is managed through an identity and access management portal where users can both make and respond to access requests. Using the home portal, users can see the full data inventory in the data exchange with all of the related metadata. The data exchange offers base and customizable dashboards for users to access data, build reports and analytics to support specific needs.

5. Who will be the publisher(s) of the data?

One of the benefits of the data exchange is it allows authorized users to both publish and access data on the exchange. The data exchange is the common platform that allows access to those given permission through the system.

6. Who will be subscribing to/consuming the data?

The data exchange allows users to subscribe to data sets. Data owners receive requests and authorize users to access the system. The prototype use case is based on improving parking operations. Initial users will be ASU Parking and Transit staff. As additional use cases are deployed, it is expected that users internal and external to NOVUS will want to subscribe and consume data.

7. How much data will be added daily/weekly/yearly?

The amount of data that will be added is unclear. As the data exchange is developed and becomes operational the projections for the amount of data use will become clearer. For instance, NOVUS may add sensors to monitor when parking is at a premium, or when ride shares are more prevalent, which will add data sets to provide information for making decisions. The platform is built on AWS so it can scale to meet a “virtually” unlimited data set size.

8. Will this data be real time data? If so, what type of files, size, format, update cadence?

The data exchange supports all types of data, including real time data. For the prototype, one of the data sets will be real time and the others will be flat files. The capability to accept all types of files is essential to the ability to serve as a centralized data exchange. Data sources are expected to include GIS, sensor, revenue, customer, modeling, and other data sets from across municipal agencies. Today, the parking staff has most of the data they need to do their jobs; however, the data is difficult to access and lacks data integrity.

Data sets in the exchange will remain in control of the data owners and they will control who has access to the data.

9. What types of data (images, excel, databases, etc) can be used with the data exchange?

Any type of digital data can be used with the data exchange after potentially going through an extract transform load (ETL) process. Data is expected to include GIS files, spreadsheets and sensor data.

10. Does NOVUS want any portion of this data to be available open and free to everyone?

Owners of various data sets will determine who can access the data and if it comes with a cost. Data owners can also choose a subset of the entire data set. Data owners for the prototype are internal staff from ASU Parking and Transit.

11. Does the availability of this data need to be hidden from the public catalog for security or other reasons?

Data owners have the ability to determine who can access data sets and if the data is included in the datalog of available data sets. Sensitive data could include the locations of secure equipment that NOVUS wants to protect.

12. Where will the data exchange live? Who is responsible for managing?

The data exchange will be managed by NOVUS. The data exchange will be a cloud-hosted solution on the AWS cloud. All data will remain within the AWS Cloud Region.

13. Who can access the data exchange?

Access to the data exchange will be controlled by NOVUS. Each data set on the system will have a level of access from public data to secured data. NOVUS users are expected to include: -

1. ASU (various departments)
2. Novus property managers and/or building owners
3. Visitors
4. Vendors
5. Tenants

15. Will the data be secured and how?

The data will be secured by using the well-architected framework for securing workloads on AWS. The storage of data will also comply with city data storage policy and national legislation. Encryption in transit and at rest will be used.

16. How much will it cost to build and maintain?

The cost to build and maintain the Data Exchange is still to be determined. After the Solutions Workshop the TCO - Total Cost of Ownership will become clearer. The ASU CIC and Catellus are building a prototype and modeling out the cost structure for the scaled architecture of the prototype. The total cost will be highly dependent on the amount of data stored within the system.

17. Can data owners retain control and access to data loaded into the data exchange?

Yes. When data owners upload data sets to the data exchange they will retain ownership and control who has access to the data and what they can do with the data. Users will use Identity and Access Management to control who access data sets and provide levels of access.

18. How will data be uploaded?

The initial users, ASU Parking and Transit, will create accounts on the data exchange and login. Once in the exchange, users can create files and upload data. A desired function is to allow for the automatic uploading of data to ensure it remains accurate and users are all working from the same information. Automatic uploading of data will reduce the overhead required of the NOVUS staff.

19. Will analytics tools be available, and if so, which ones?

NOVUS is identifying the analytics tools currently in use and the appropriate tools for functions desired. As part of the prototyping project the CIC is working to identify interoperability and facilitate collaboration when possible.

20. Does the data exchange have a dashboard, what's on it, who controls and is it customizable?

Yes. The dashboard is a critical function and is customizable. The initial version of the data exchange comes with stock dashboard versions for different user roles.

21. Will the data exchange allow self-service report creation and customizable dashboards?

Yes. The data exchange will have the ability to create customized reports. The required skills to build reporting will be varied, between the data exchange application skills to build the reports and the subject matter knowledge for the topics reporting on.

22. How will the data exchange standardize data?

Data standardization is one of the most important customer benefits. Currently data is not standardized and this impacts data integrity and the ability to aggregate data. The data exchange will include a multi-faceted plan for data standardization, quality, and integrity. A first step will be the development of a plan that provides guidance for data standards. The plan will ensure that all users are on the same page. This combination of a comprehensive plan and tools will be the primary way the data exchange standardizes data.

23. How do you upload a new data set?

The data will be uploaded manually to an S3 bucket or a live connection to the data will be made to automate the process. This can be done within the AWS console. The data will then be visualized with AWS Quicksight.

24. Can reports be authorized and signed-off efficiently and securely on the system?

Yes. The governance model is in development. The use of pre-approved report templates is one part of the process to streamline reporting.

25. Will this eventually cover the rest of NOVUS?

The data exchange is scalable and can be expanded to cover additional use cases as desired.

26. Is it possible to eventually include user created data?

The prototype will be focused on internal data, but NOVUS expects a final version to include public access to data and reporting.

27. Eventually will it be possible to send out bills or billing information on this system?

Yes. The data exchange has the potential to serve as the supporting database for client billing, although an additional application will be required. Further research will be conducted to fully understand customer needs and explore viable solutions. The customer has also identified a desired function to allow parking customers a download option for their bills..

28. Can the data exchange support the use of the Internet of Things (IoT) within Novus? ?

The reading of electricity and parking meters that is then automatically collated from the householder to the data exchange system IoT devices have the potential to generate significant amounts of data that can be used for multiple purposes. Ingesting the data into the data exchange allows the data to be used for multiple purposes from one location. In addition, storing IoT data in the cloud has an added advantage of allowing the data exchange to scale in or out to accommodate the amount of data collected as needed on a pay-as-you-go model.

29. How will the data exchange be compliant with laws, regulations, and policies?

The data exchange is customizable with the ability to be deployed as fully compliant with all applicable laws, regulations, and policies. It can be adjusted as needed as requirements change. Known requirements include the City Data Storage policy, the Protection of Personal Information Act, and the Promotion of Access to Information Act. The data exchange governance model will require an annual data compliance audit to ensure compliance with all applicable requirements and laws.

30. What applications does the data exchange need to be interoperable and do those applications have existing Application Programming Interfaces (APIs)?

NOVUS currently uses multiple applications in support of parking operations in which the data exchange will need to be interoperable, including ParkMobile.

31. Can the data exchange be programmed with alerts and if so who develops them?

Yes. Alerts are one of the most important functions identified by the customer and the data exchange will allow users to set their own alerts. The initial configuration of the data exchange will come with a basic set of alerts identified and developed during design.

32. What benchmarking and modeling tools will the data exchange have?

This is yet to be determined and will not be static. Benchmarking is another essential function identified by the customer. Like alerts, the data exchange will allow users to customize their own benchmarking metrics.

33. How does NOVUS ensure that no one misuses the data?

There are a number of tools and processes for ensuring that data is not misused. A primary way is Access Rights. The AWS Identity and Access Management tool allows NOVUS to control who has access both to

the data exchange and individual data sets. By controlling who has access, NOVUS will limit those who have access and could misuse the data. Data Sharing Agreements are a way to set parameters on how data can be used and what will constitute misuse so there are clear definitions and understandings. Other tools like CloudTrail can be used to identify activity and can alert on possible misuse and provide a clear understanding of who is responsible.