FME in Education: How to Accelerate and Improve Data Analysis

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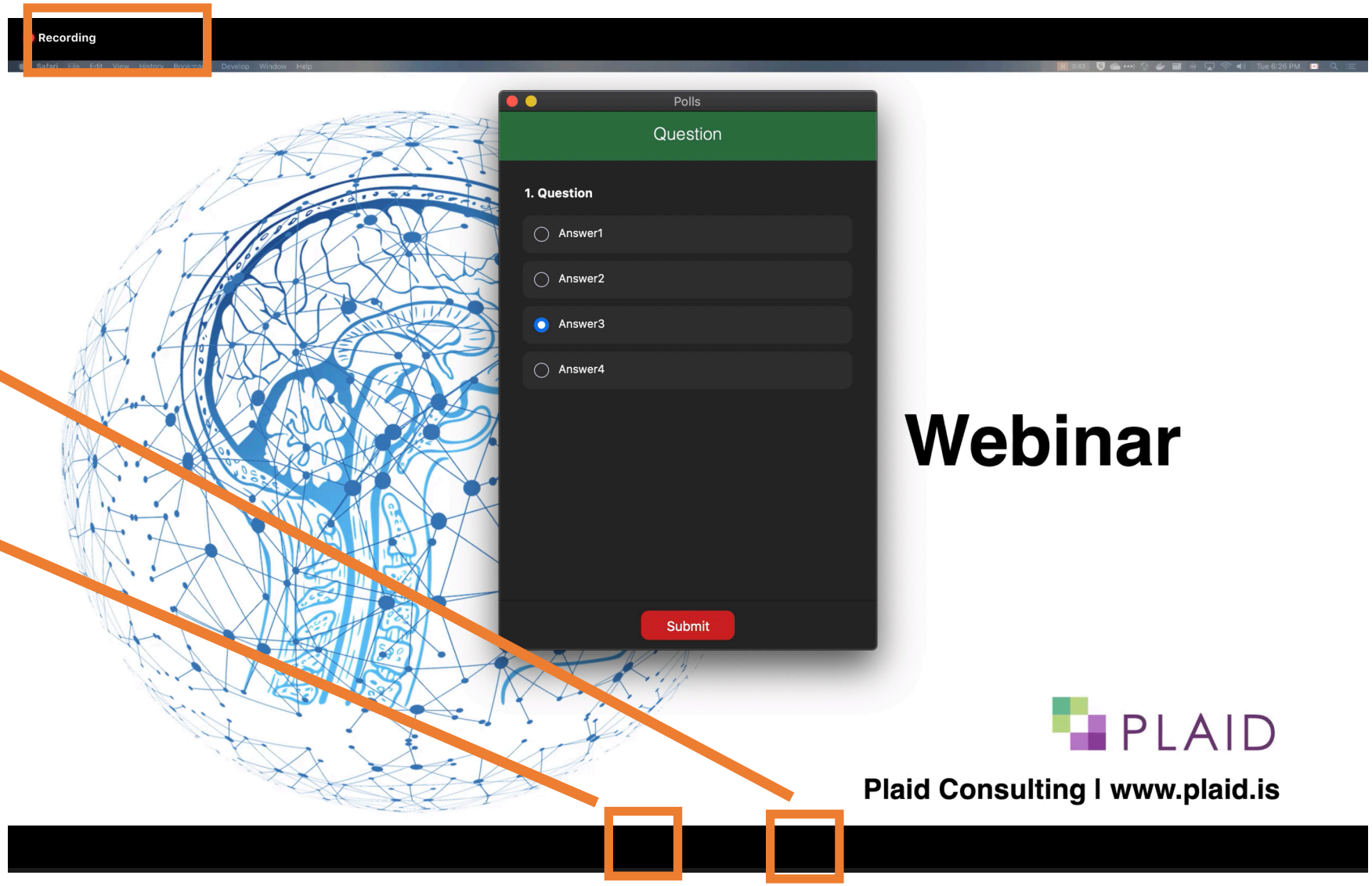
ZOOM HOUSEKEEPING

Indicates the webinar in being **Recorded**

Questions for the presenters? Use the **Q&A**

Want to chat with other attendees? Use the **Chat**

We occasionally use **Polls**



Webinar

PLAID

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*Plaid provides **data integration**, **research**, and **analysis** services to higher education institutions to improve policies, services, and processes.*

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AGENDA

- What is the FME Platform?
- FME Workflows for Academic Institutions
- Indoor Mapping for Campuses
- Higher Education Data Integration Examples
- Do Your Students Have Sufficient Broadband to Participate in Online Classes?

PRESENTERS

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Co-Founder

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Channel Account Manager
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SAFE SOFTWARE™

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Senior Analyst, Application Experts

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DATA INTEGRATION EXAMPLES

- Creating key student success measures for students in a variety of programs: apprenticeships, certificates, diplomas, degrees, trades, etc.

- Do students who waitlist for a course enroll in the future?

- Automating data cleaning, formatting, and submission of government or accreditation reporting.

DATA INTEGRATION EXAMPLES

- Building a data warehouse or data mart with history.
- Automating appropriate aggregate public reporting.
- Bringing public data into your internal analysis.

DEMONSTRATION 1:

- FME Workflows for Academic Institutions
- Intro to Indoor Mapping

Introduction to

THE FME® PLATFORM

SAFE SOFTWARE™

OUR MISSION

To help you maximize the value of your data.

SAFE SOFTWARE™

COMPANY PROFILE

Safe Software

www.safe.com

25+

Years of solving data challenges

10,000+

Organizations trusting us worldwide

128

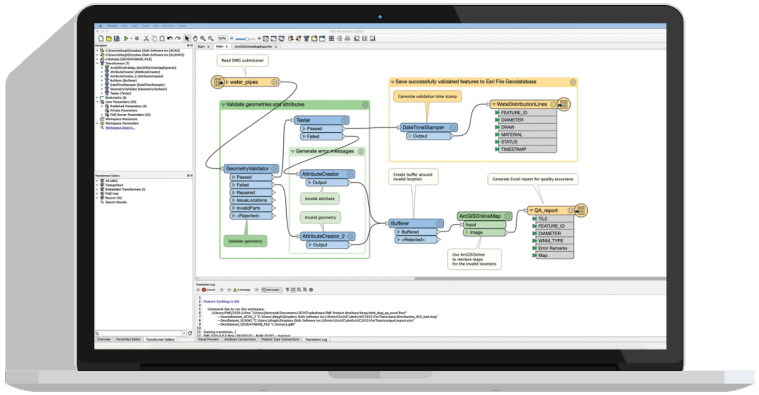
Countries with FME customers

150+

Partners supporting our network

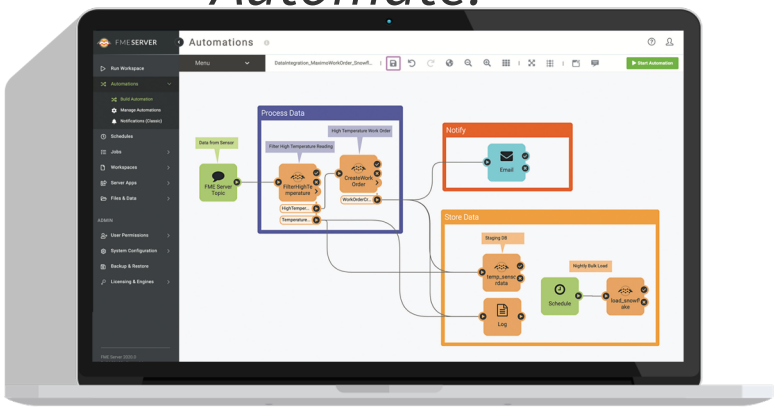
FME® Integration Platform

Connect. Transform. Automate.



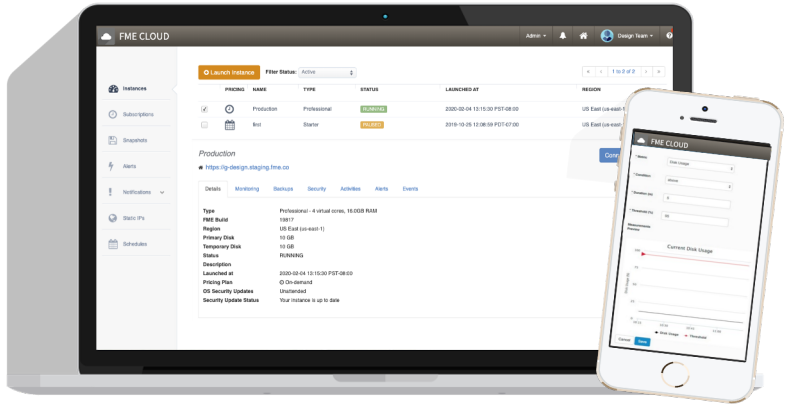
FME Desktop

Build & Run Workflows



FME Server

Automate Workflows



FME Cloud

Hosted FME Server

FME is the data integration solution with the best support for spatial data worldwide.

CONNECT YOUR DATA SOURCES

FME supports geospatial data, structured and unstructured data, linked data, and time series.

Share

Connect data between 450+ sources

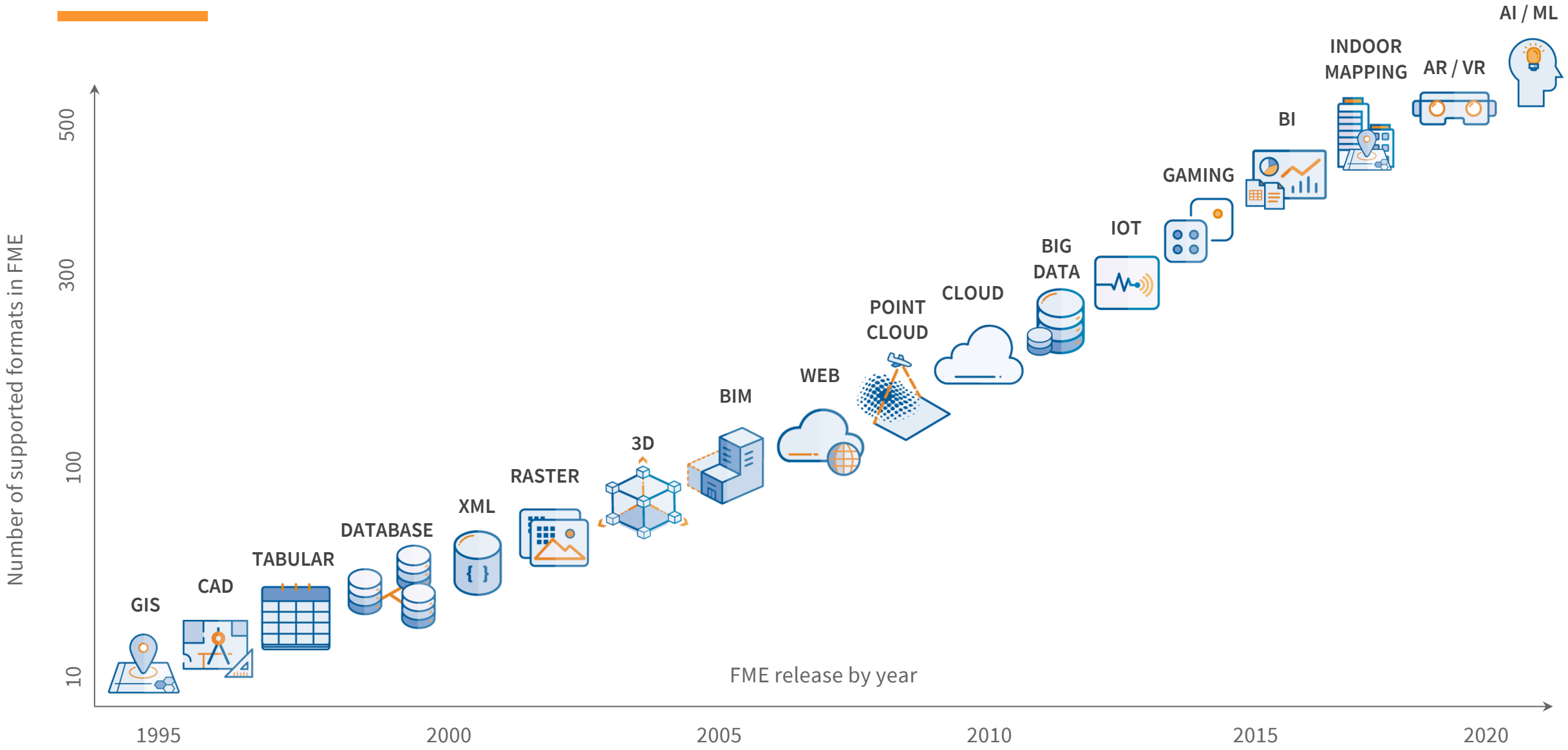
Extend

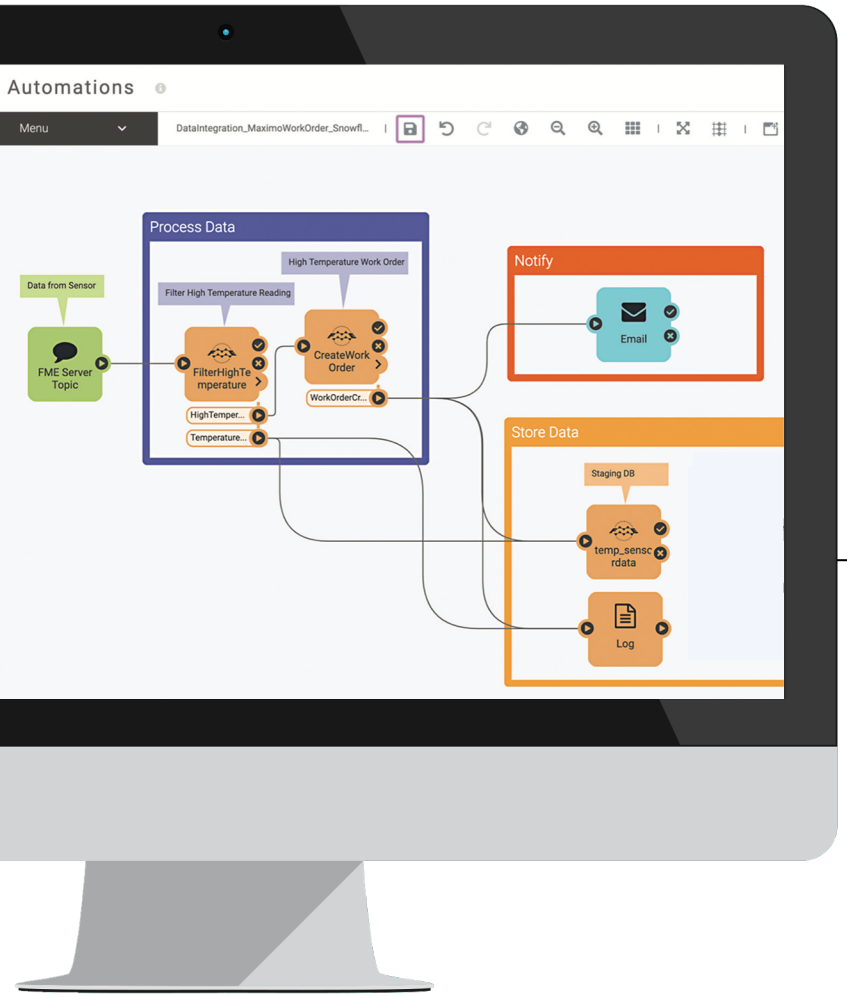
Extend FME's capabilities with custom connections

Enable

Power business decisions by removing data silos

CONNECT


Number of supported formats in FME
500
300
100
10
FME release by year
1995
2000
2005
2010
2015
2020
GIS
CAD
TABULAR
DATABASE
XML
RASTER
3D
BIM
WEB
POINT CLOUD
CLOUD
BIG DATA
IOT
GAMING
BI
INDOOR MAPPING
AR / VR
AI / ML



AUTOMATE YOUR WORKFLOWS

Automatically provide integrated data to stakeholders on a real-time or scheduled basis.

Trigger

Automate data integration using event-based workflows

Assemble

Easily build automations using a visual interface

Eliminate

Eliminate the manual effort of complex and repetitive tasks

OPERATING SYSTEMS & DEPLOYMENT OPTIONS

Windows

MacOS

FME Desktop Only

Linux

Docker

Kubernetes

FME Cloud

Fully Hosted on AWS

Education Subscription

Use More FME at a Lower Price

Since budgets are often fixed, this lets your team use as much FME as you need with zero limits on FME Desktop and FME Server licenses.

“Free” FME for All Other Departments

For one annual price, your entire organization can use FME, allowing other departments to use FME at no additional cost.

Leverage OpEx Funds

Instead of a CapEx item, population-based subscription pricing is an operating expense.

Predictable Budgeting

Take the guess out of budgeting. Simply pay the amount matching the size of your student population.

Eliminate Time Lag on Projects

Since you have unlimited FME, your projects will never get delayed waiting on licenses.

Reduced Procurement Costs

Save your finance team time by opting for a single purchase instead of multiple one-offs.

Education Subscription

Number of Students	Maximum Annual Subscription	Amount of FME Desktop & FME Server
1 to 14,999	$ 7,500 CAD	✓ Unlimited
15,000 to 24,999	$ 10,000 CAD	✓ Unlimited
25,000 to 49,999	$ 15,000 CAD	✓ Unlimited
50,000 to 99,999	$ 25,000 CAD	✓ Unlimited
100,000 +	Contact Us	Contact Us

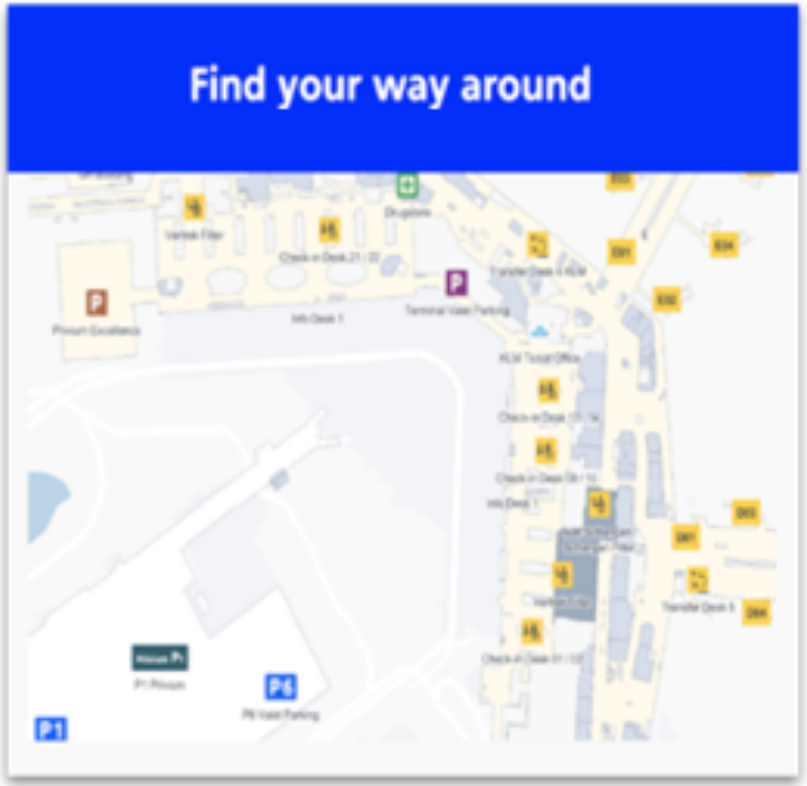
FME Workflows for Academic Institutions

FME Workflows for Academic Institutions

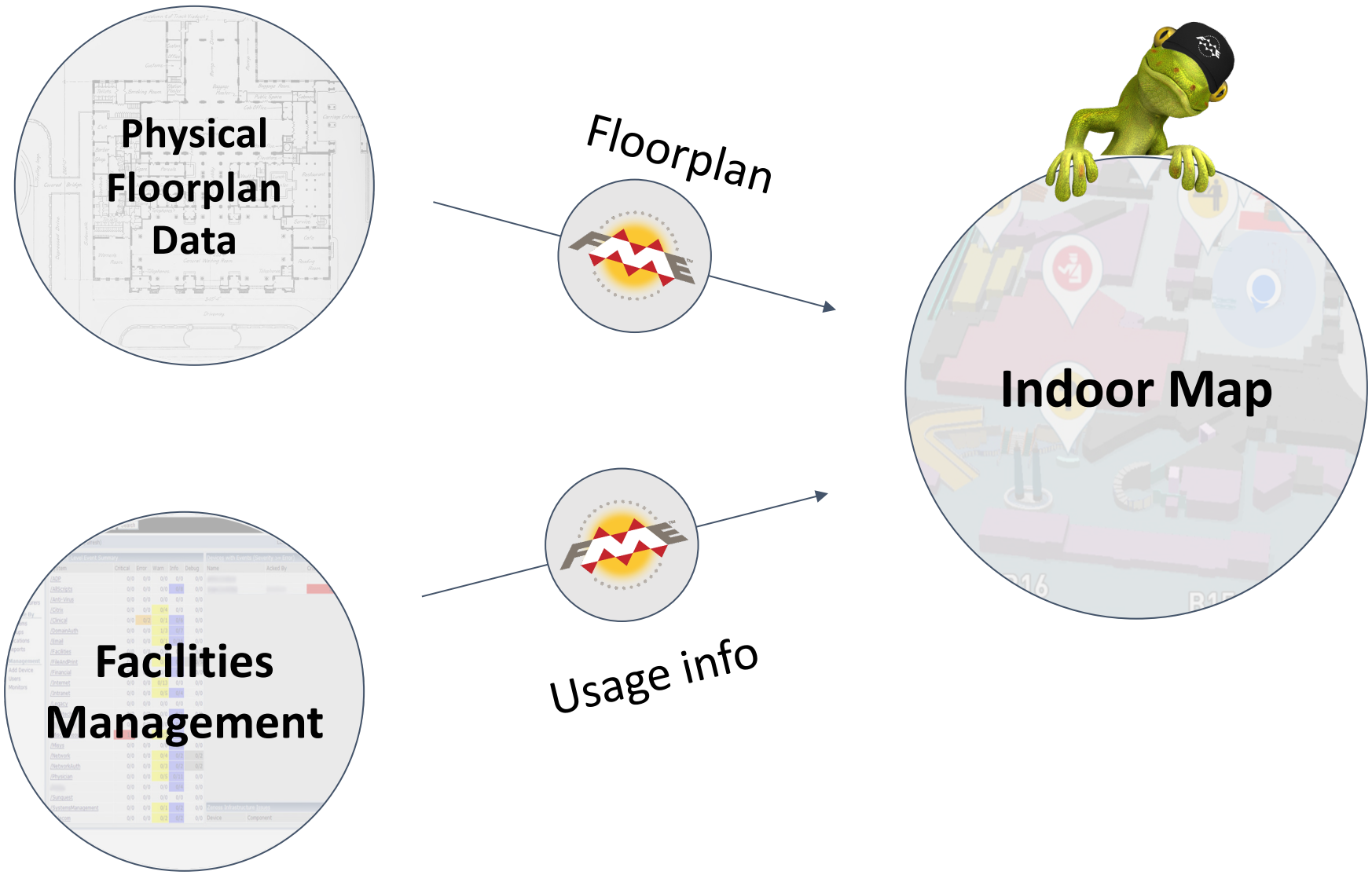
- Facilities Management
- Space Management
- **Indoor Mapping**
- Enterprise automation and integration
  - Communication between siloed systems
  - Spatial, non-spatial, web / cloud

Indoor Mapping Opportunity: Campuses

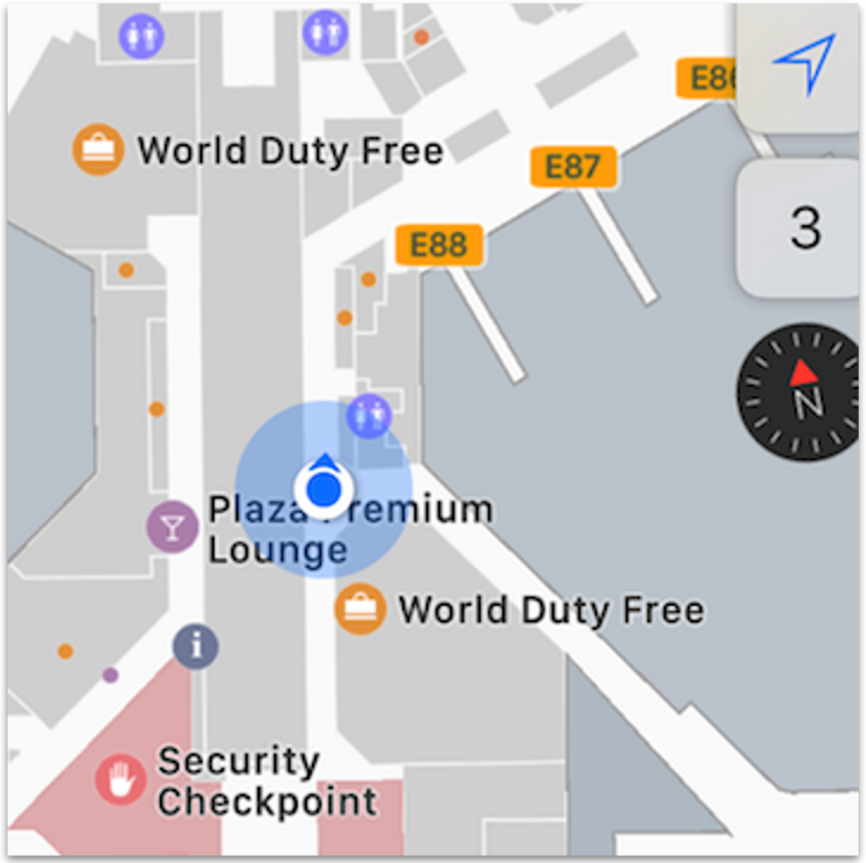
- **Navigate** room to room
- Integrate with **space** and **schedule** planning
- Provide info to **mapping applications**: Apple Maps
- Support **custom campus apps** – students can see their own schedule, routes
- **Emergency services** and evacuation
- **Reporting**, BI: traffic flow analysis and optimization



Indoor Mapping Challenge: Multiple Data Sources



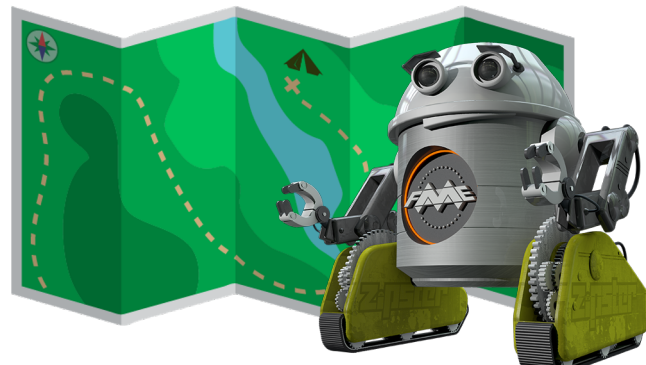
Challenge: Venues are constantly changing



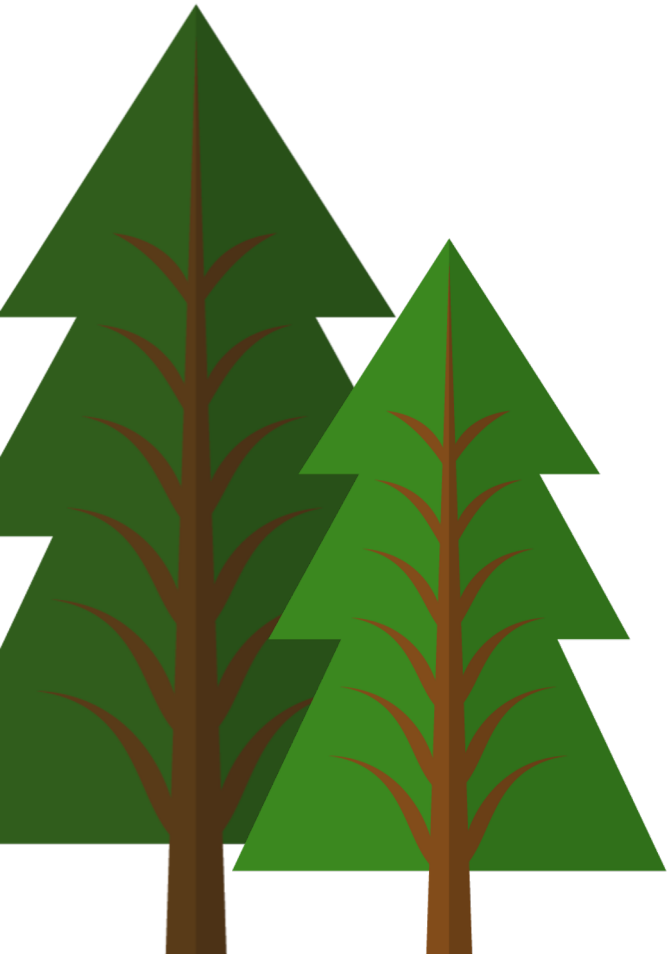
Keep your indoor map up to date as the venue and source datasets change.

Build indoor mapping datasets using FME

- **Convert** floor plans and ancillary data into indoor mapping formats.
- **Validate** against specifications to ensure data meets standards.
- **No coding** involved. FME workflows are created using a visual interface



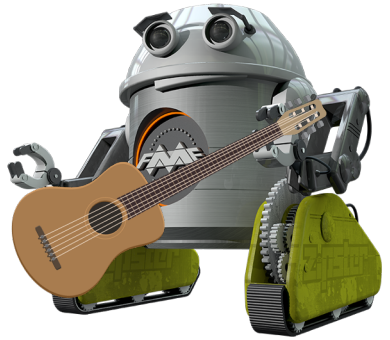
WORKFLOW:
CREATING INDOOR MAPPING DATA



- ❑ Georeferencing (lat-long)
- ❑ Semantic enrichment
- ❑ Classification
- ❑ Schema mapping
- ❑ Cleaning

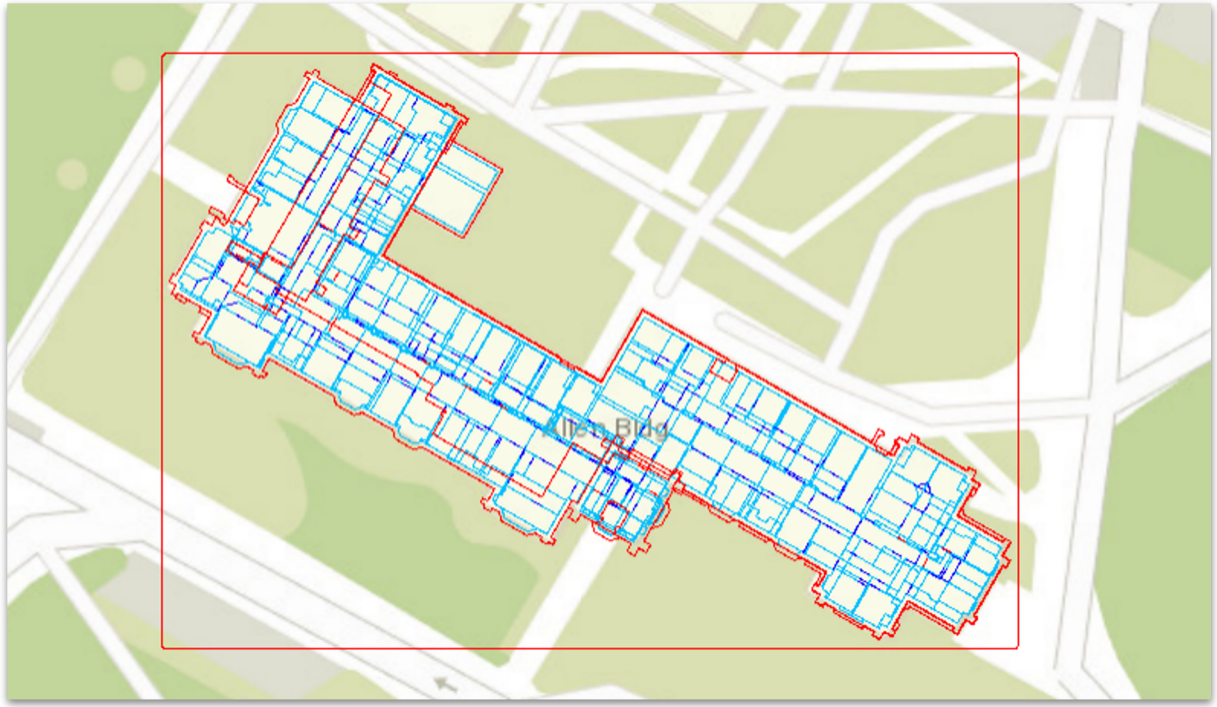
Prepare for output

Convert to indoor mapping format requirements.



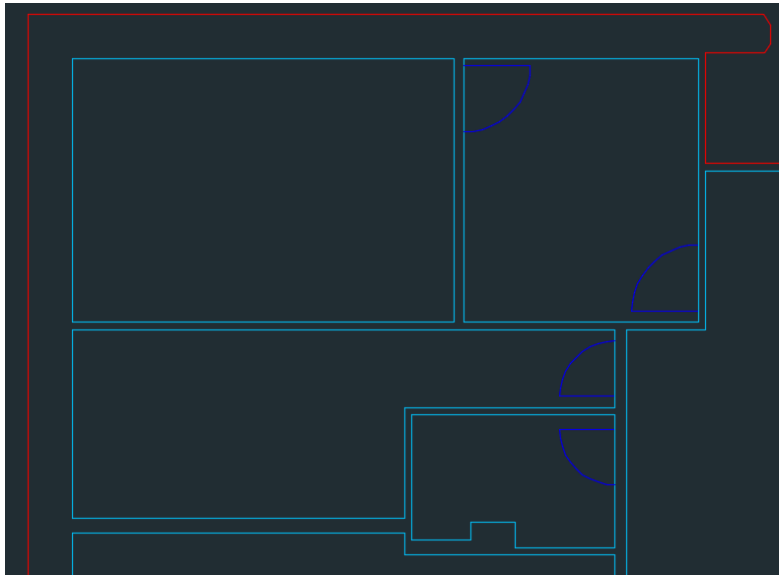
Example: University Campus

- Convert campus CAD plans to IMDF for use in Apple Maps.
- Steps (fme.ly/imdftutorial):
  - Align and preprocess DWG floor plans in AutoCAD.
  - Convert edited DWG to IMDF in FME.

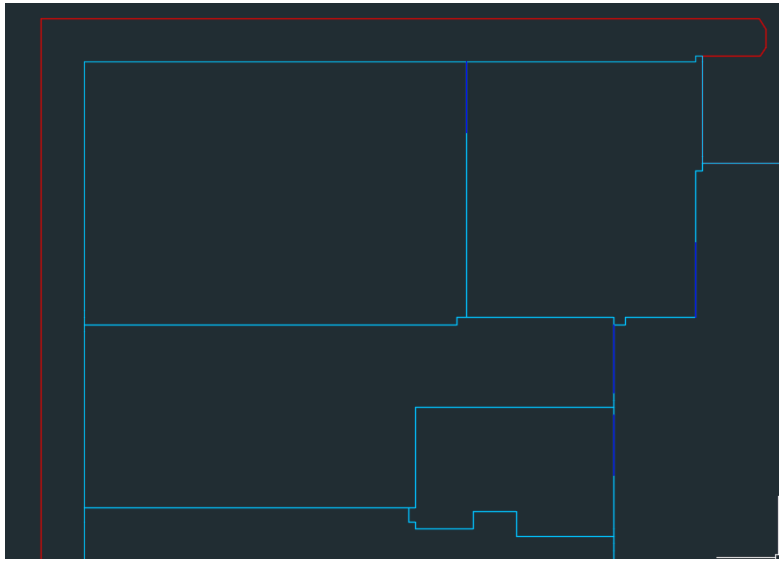


University Campus: CAD Preprocess Workspace

- Merge all the floors into a single file, applying the alignment performed on the Xrefs
- Convert double line walls on the RM$ layer to single line Units
- Copy the GROS$ layer to Level
- Extract Opening lines from the door symbols on the ADO layer and snap to walls



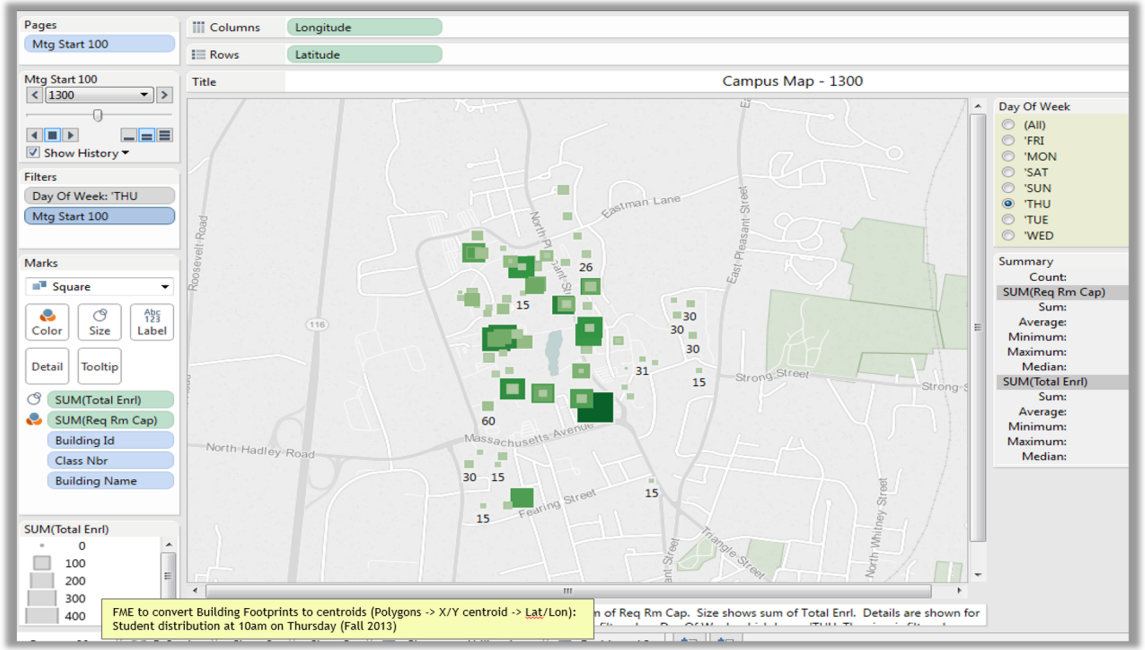
Before



After

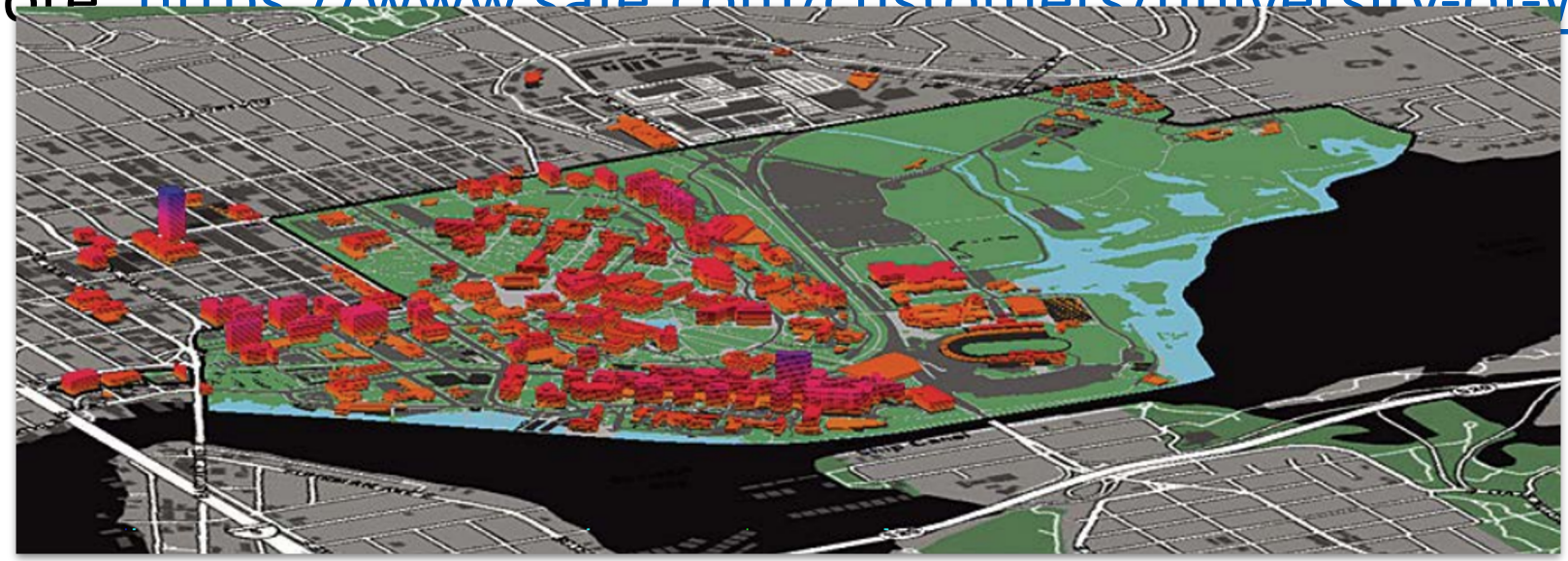
Example: University of Massachusetts Amherst

- **Integrate** data from buildings, outdoor spaces, utilities, and transportation, and maintain it in a **data warehouse**, enabling **campus-wide analytics** in **Tableau**.
  - Data comes from **CAD, GIS, BIM**.
- Read more: https://www.safe.com/customers/umass-amherst/



Example: University of Washington

- Facilities Management team needed to convert the multi-campus map from **AutoCAD to 2.5D Geodatabase** whenever the source data is updated.
- FME Workspace: **CAD to GIS conversion** plus data validation.
- Automation: run whenever the CAD plan changes. Report data errors to the team.
- Read more: https://www.safe.com/customers/university-of-washington/



ArcScene View

Keep Indoor Mapping Data Up To Date

Build FME Workflow once and…

- Run your FME workflow on demand, updating the indoor mapping dataset as venue changes.
- Run conversion workflows on a schedule or in response to an event.
- Send alerts when a new dataset is generated or fails validation.

IFC to IMDF

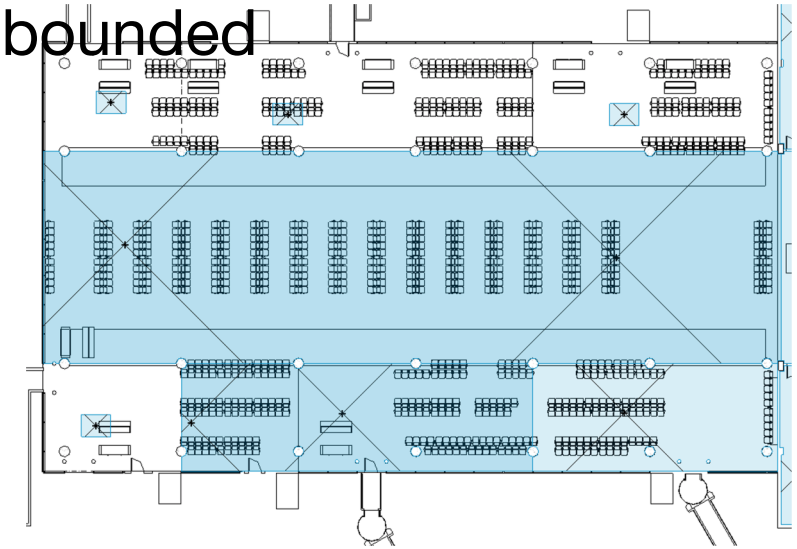
- Tutorial and workspace available at:
  - https://knowledge.safe.com/articles/88657/ifc-to-imdf.html
- **Spaces** are key building block - must be present in every room
- **Openings** created from Doors, Units and Wall openings
- **Walls** become structure units
- Process in flux, since Revit reader is improving daily
- Easier now with new **2D floorplan** geometrv reading and **CenterLineReplacer**

Revit to IMDF conversion strategy

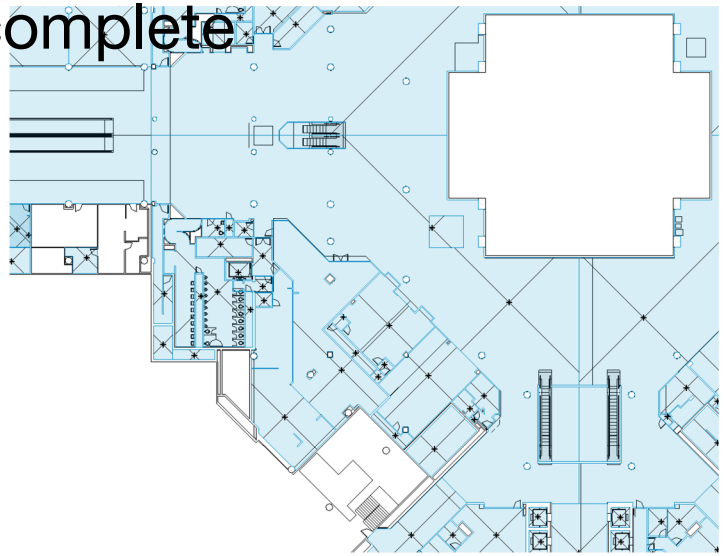
Rooms are the key building blocks

- Mapped to IMDF units
- Merged to build IMDF levels, footprints

Rooms must be properly bounded



Room coverage must be complete



Indoor Mapping: OGC Indoor GML Pilot

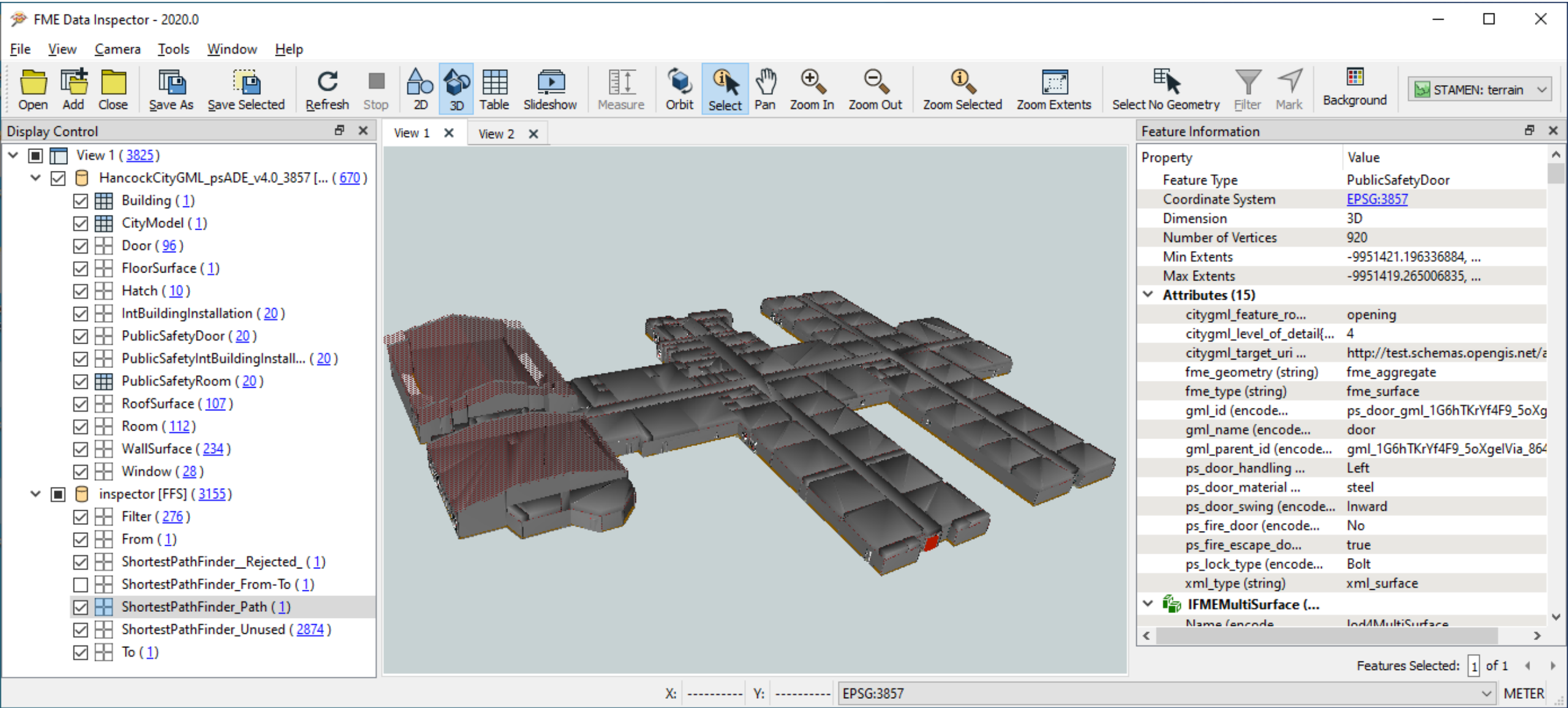
NIST National Institute of Standards and Technology

- **OGC Indoor Pilot** sponsored by NIST, D.o. Commerce
- **Goal:** LIDAR scans -> Indoor Mapping and Navigation
- Responsible for the **navigation modeller** component
- Consume **CityGML** Public Safety (PS) ADE and produce **IndoorGML** PS extension
- Support first responders and occupants during emergencies

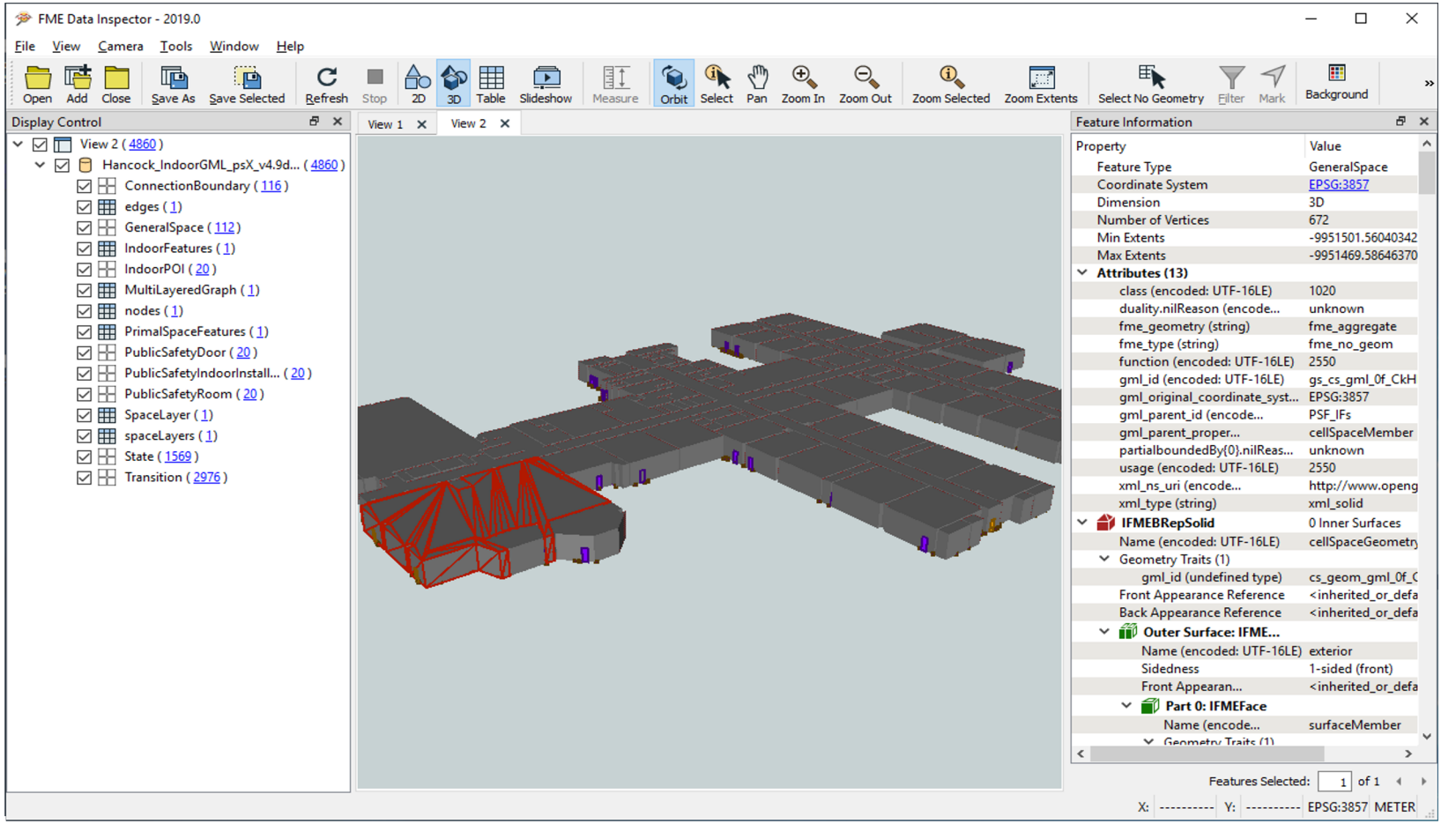
OGC® Making location count.

DEPARTMENT OF COMMERCE UNITED STATES OF AMERICA

IFC to CityGML with Public Safety ADE

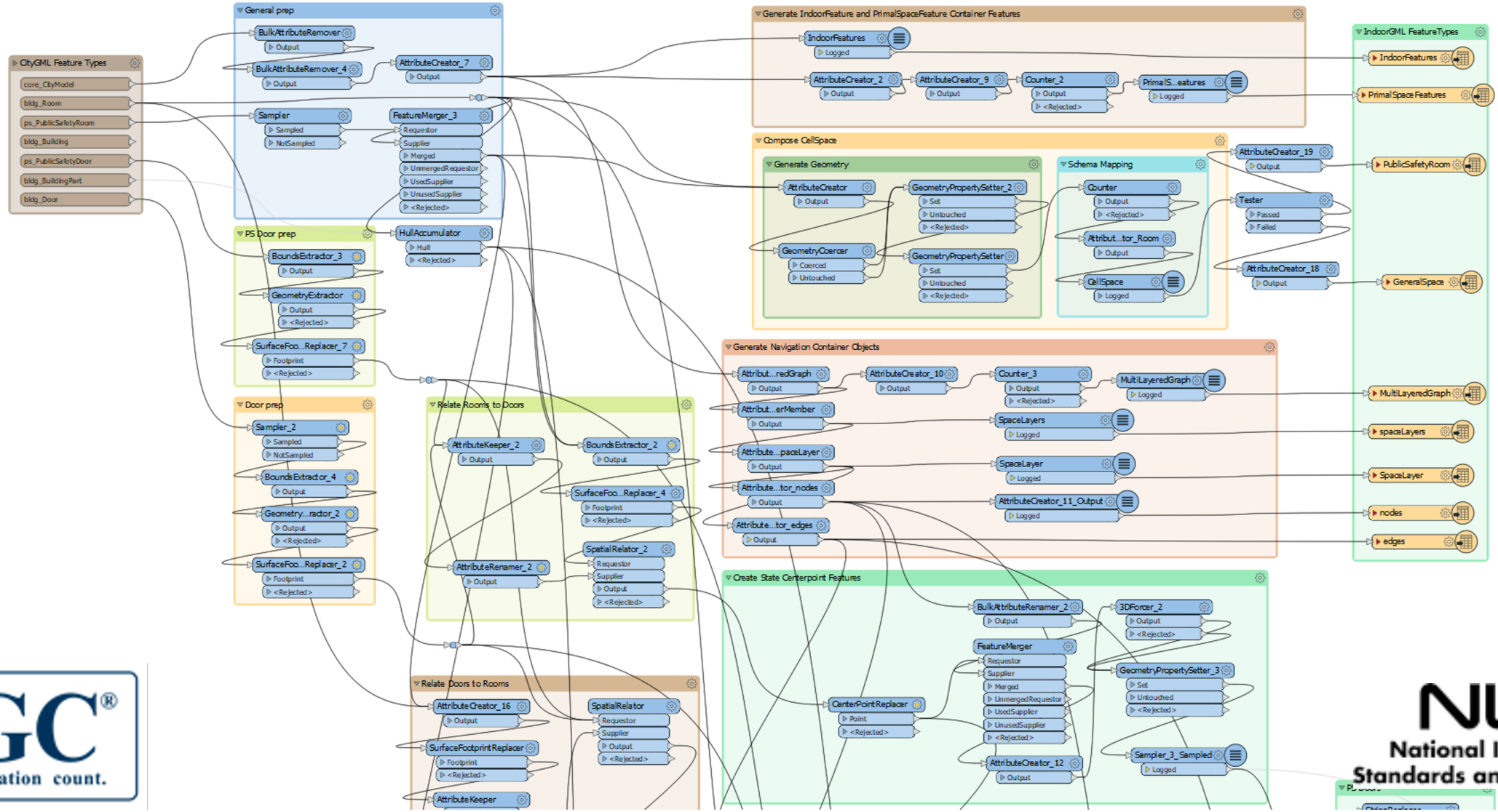


OGC Indoor GML Pilot: GML Output



OGC Pilot Sponsored by US NIST DoC to explore use of standards for indoor mapping public safety applications

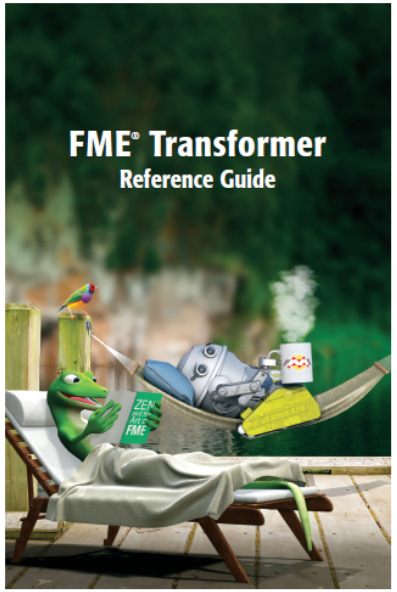
OGC Indoor Pilot: CityGML to IndoorGML



OGC®
Making location count.

NIST
National Institute of Standards and Technology

Key FME Transformers for Indoor

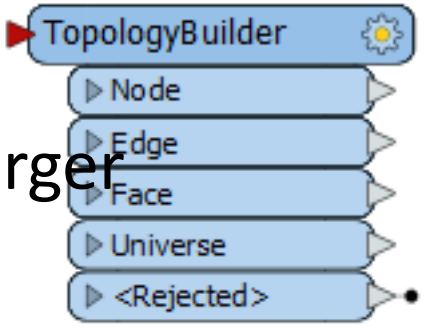


Geometry Conversion

- SurfaceFootprintReplacer, CenterlineReplacer, SpatialRelator
- GeometryCoercer, GeometryPropertySetter, GeometryValidator

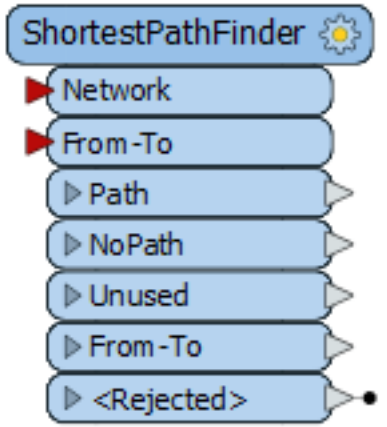
Attribute Transforms and Schema Mapping

- AttributeCreator, AttributeCopier, FeatureMerger



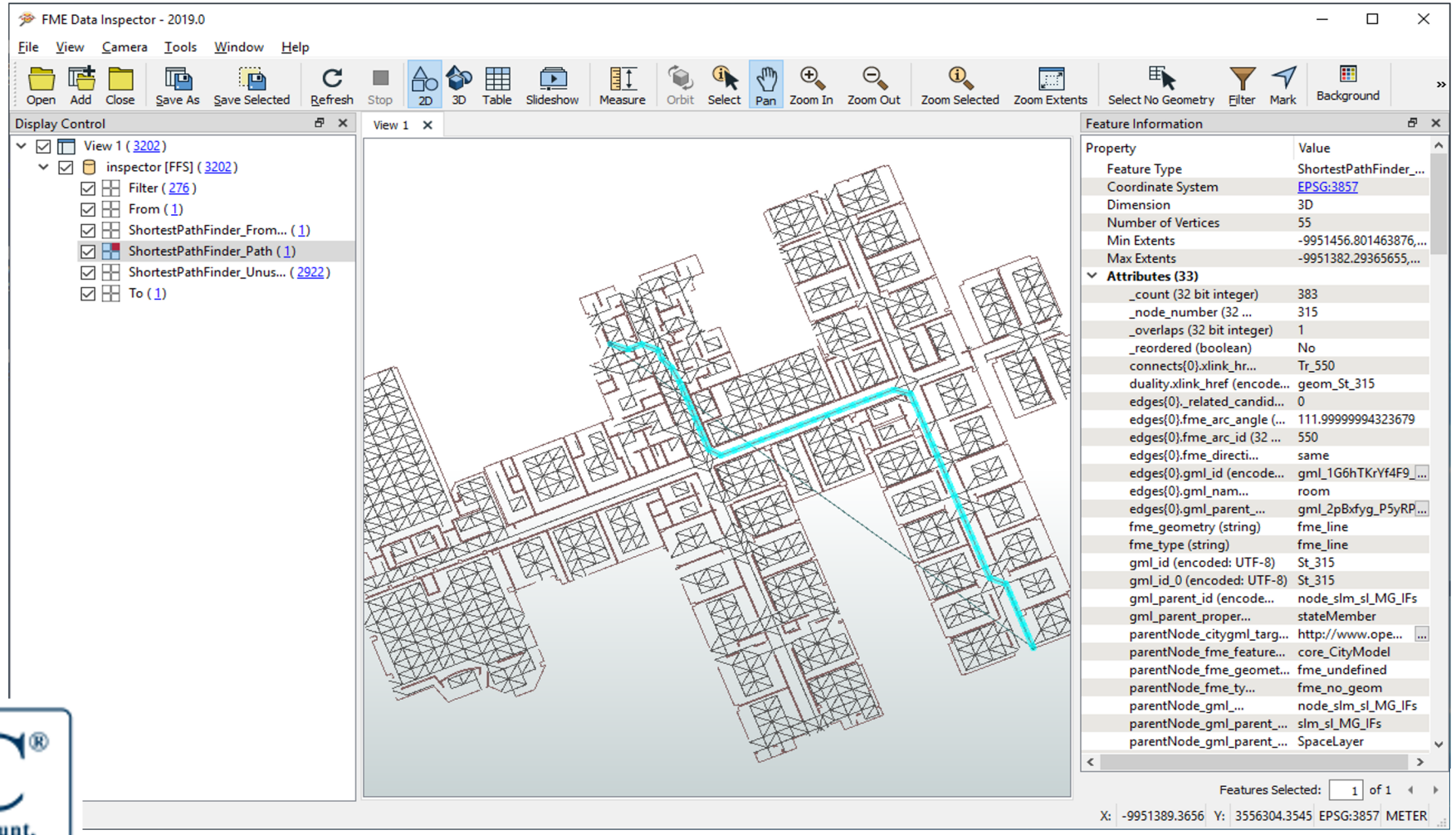
Network Modelling

- TopologyBuilder, ShortestPathFinder, PointOnLineOverlay



cdn.safe.com/resources/fme/FME-Transformer-Reference-Guide.pdf

OGC Indoor GML Pilot: Navigation



Indoor navigation showing evacuation route from building

National Institute of Standards and Technology

Validating IMDF data

- **IMDFValidator** transformer on FME Hub.
- **Web service** — upload your IMDF data and get a link to your validation report. *safe.com/imdf*

Indoor Mapping: Summary

- Converting indoor data can be a challenge – **don't underestimate** extraction and transformation effort
- CAD standards help, but **feature info** is needed
- Big win **going between standards**, e.g. TRIRIGA, BIM/IFC, IMDF, OGC IndoorGML, CityGML
- Build **multi-step workflows**, extend internal data model based on indoor requirements.
- Ensure data meets requirements – **validation**
- Leverage FME Server for **automating workflows**
- Indoor supports other campus workflows:
  - Facilities Management
  - Support enterprise integration across systems

Resources

IndoorGML Pilot

- https://knowledge.safe.com/articles/96851/ogc-indoor-gml-pilot.html

IMDF Tutorial:

- https://knowledge.safe.com/articles/73930/creating-and-validating-imdf-format-datasets.html

IMDF Validator:

- https://www.safe.com/free-tools/imdf-validator/
- https://hub.safe.com/publishers/safe-lab/transformers/imdfvalidator

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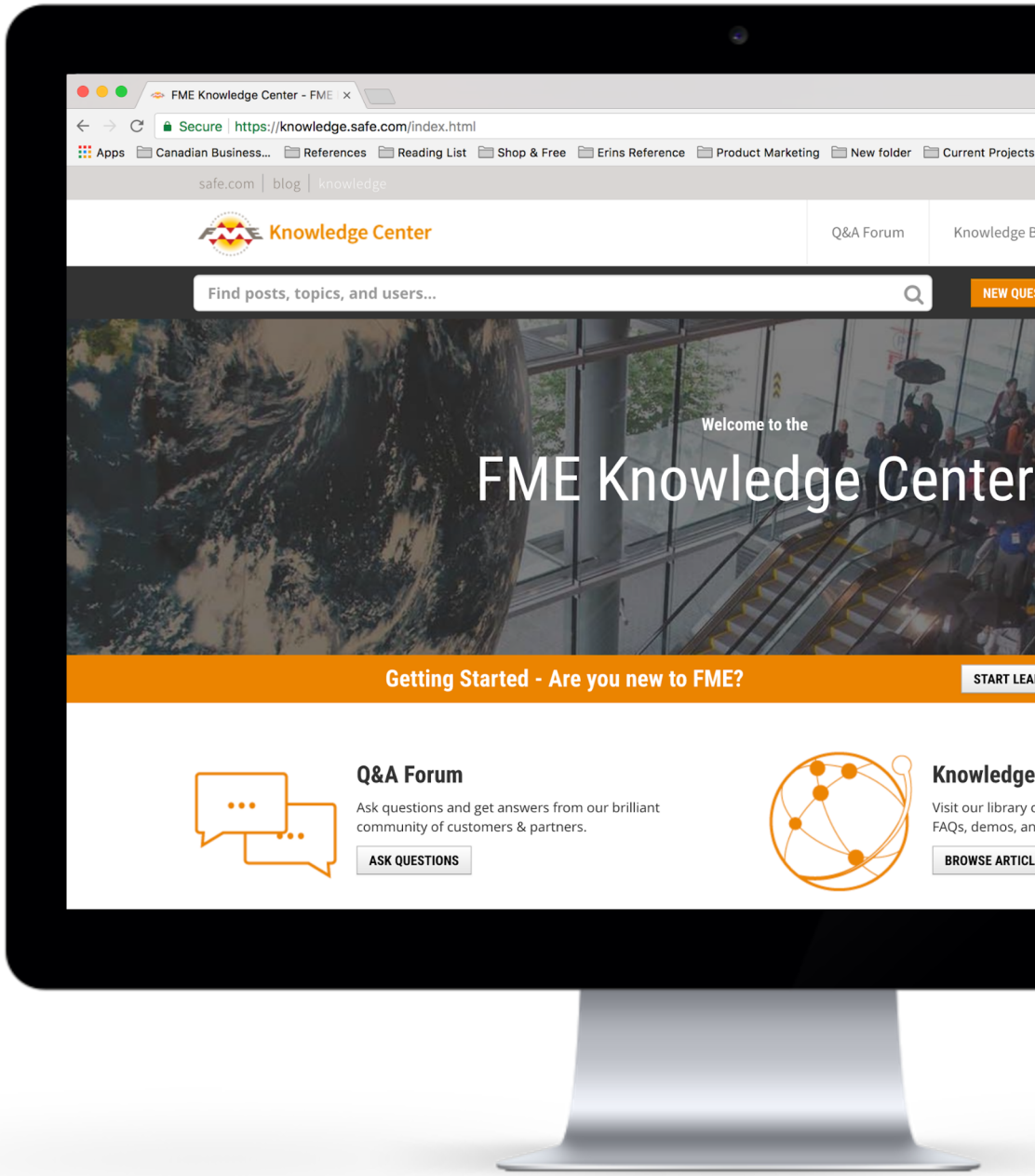
- ✓ Free FME Trial / Home / Edu
- ✓ Free Online Training
- ✓ Free Tutorials
- ✓ Free Webinars
- ✓ Free Knowledge Center



DEMONSTRATION 2:

- Do Your Students Have Sufficient Broadband to Participate in Online Classes?
  - Where do 75% or more of households have access to fast broadband?


In a matter of days, every post-secondary course in the country went 100% online

Canadian Higher Ed Institutions Move to Distance Learning by Date

LISTedTECH

Source: LISTedTECH (2020). Canadian Higher Ed Institutions Move to Distance Learning by Date. Retrieved from: https://www.listedtech.com/blog/how-canadian-highered-moved-to-distance-learning

I will teach you in a room.
I will teach you now on Zoom.
I will teach you in your house.
I will teach you with a mouse.
I will teach you here and there.
I will teach you because I care.
So just do your very best.
And do not worry about the rest.

Source: Zoom (2020). Zoom for Education. Retrieved from: https://blog.zoom.us/wordpress/2020/04/24/zoom-for-education-top-10-frequently-asked-questions/

Not all students are connected

(EDUCAUSE, 2020)

Broadband at 50/10 Mbps, unlimited

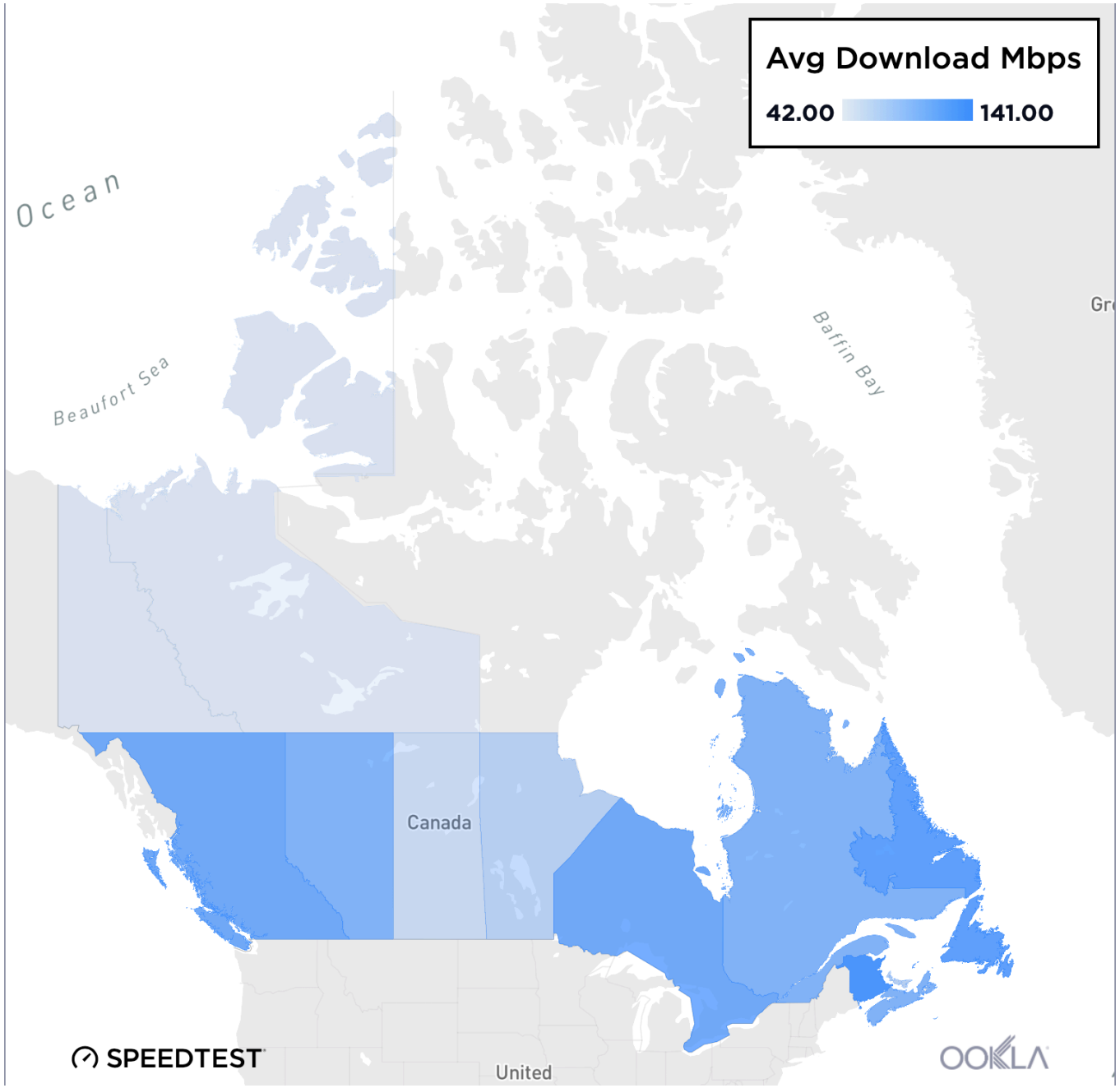
Canada

85.7%

Rural communities

40.8%

Canadian Radio-television and Telecommunications Commission (2020). Broadband Fund. Retrieved from: https://crtc.gc.ca/eng/internet/internet.htm



Ookla (2019, October 23). Speedtest Reports. Retrieved from: https://www.speedtest.net/reports/canada/#fixed

INTERNET SPEEDS

Urban Avg: 44.1

Rural Avg: 3.78

Internet Speed	Short Name	Time to Download 60 Minute Lecture (Mins) (1gb)
50 Mbps download / 10 Mbps upload	Fast	2.7
25 / 5	Decent	5.3
10 / 2	Slow	13.3
5 / 1	Very Slow	26.7

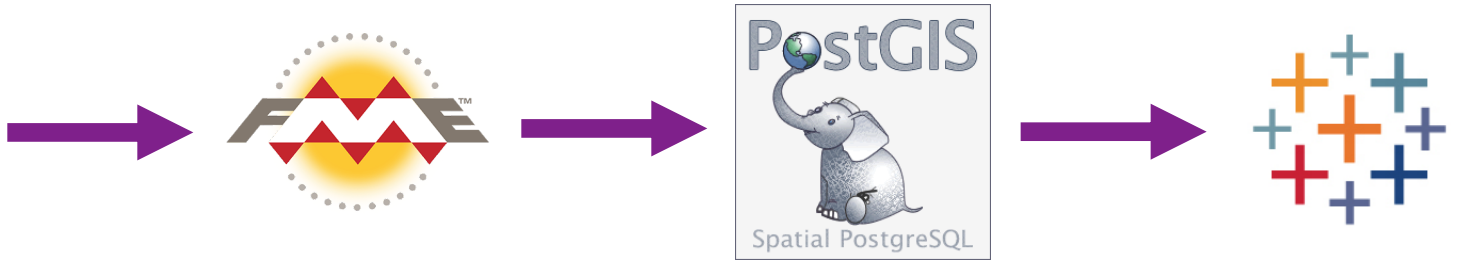
Globe and Mail (2020). Fund for rural internet projects to open soon. Retrieved from: https:/www.theglobeandmail.com/amp/business/article-ottawa-to-prioritize-rural-internet-service/

WORKFLOW: BROADBAND ACCESSIBILITY

Dissemination Areas

Broadband Data

Population Data



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- ✓ Free Webinars
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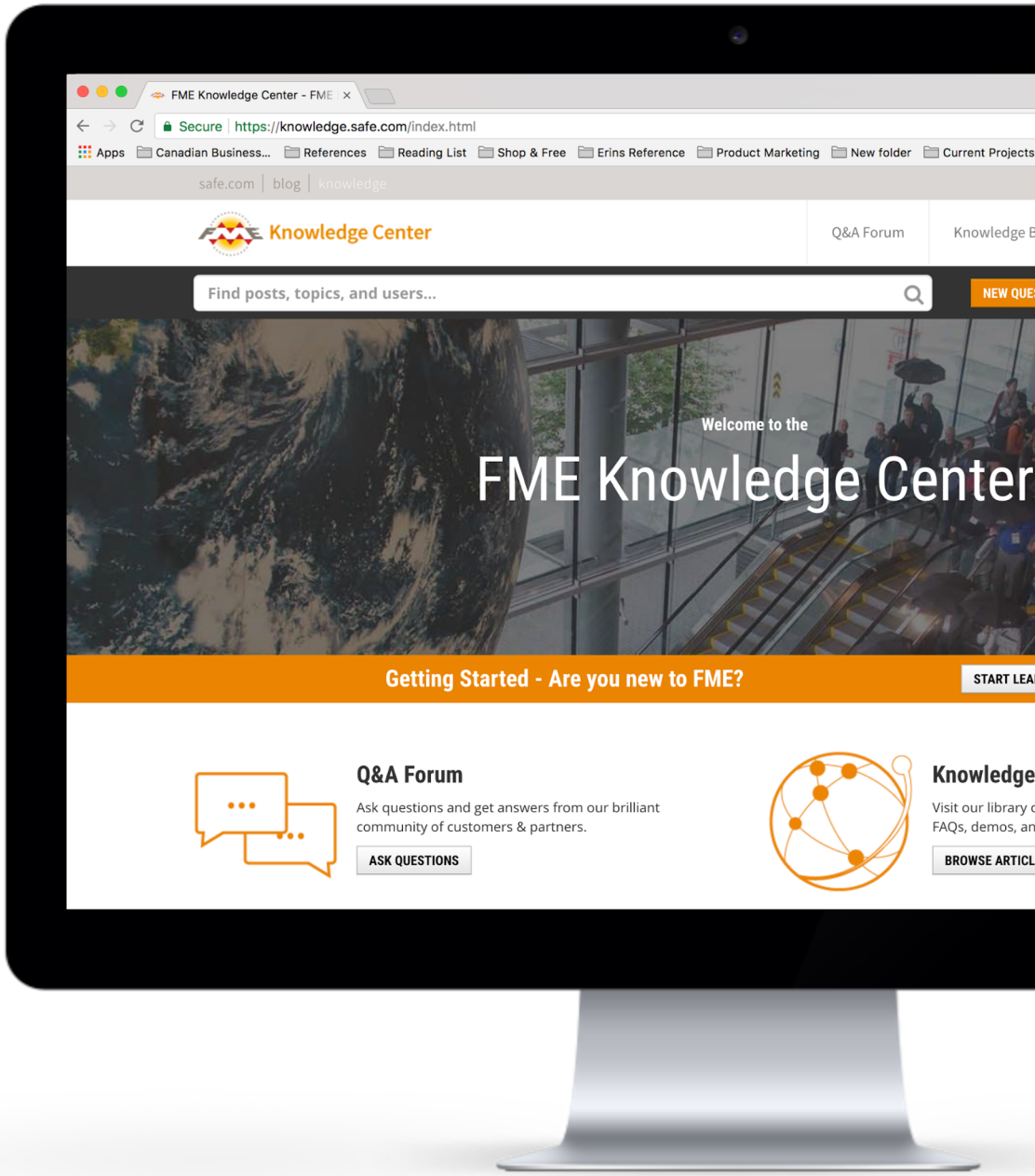

WEBINAR RECORDING

Coming soon!

www.plaid.is/#webinars

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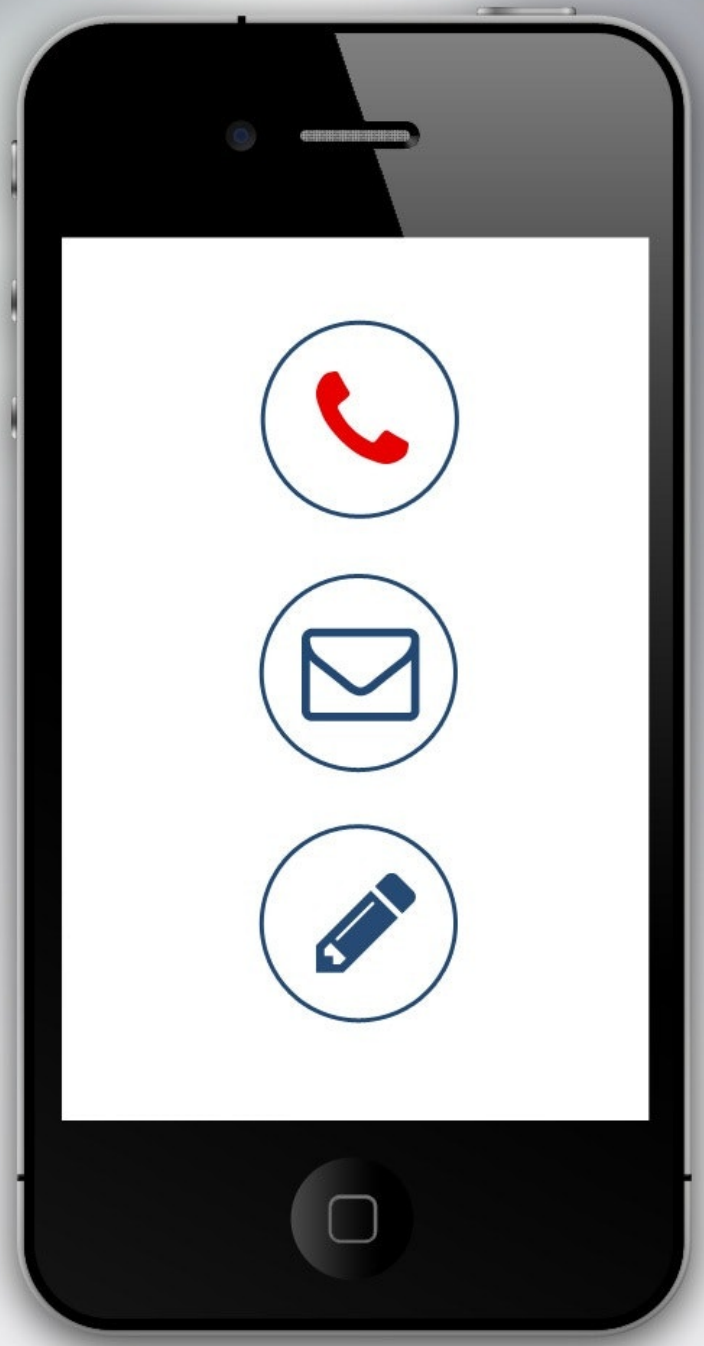

Thank you!

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