
OpenThePaths 2026: “Build Antifragile Systems: The joy and pain of wrangling Open Data sources”

Laura Loe (Hopelink) + Juniper Campbell (Arcadis)

<https://tcat.cs.washington.edu/otp2026/>

This session explored how to build more resilient (“anti-fragile”) transportation data systems through collaboration, open data, and user-centered design. Led by Laura Loe (Hopelink Find a Ride) and Juniper Campbell (Arcadis), the discussion combined technical framing with real-world experiences from participants.

A central theme was that **transportation data systems are deeply human systems**. Laura grounded the conversation in lived experience, emphasizing that data and tools must ultimately serve people—especially those most impacted by mobility barriers. While technical infrastructure is critical, gaps in actual services (e.g., limited transit availability or eligibility constraints) can undermine even the best-designed tools.

Juniper introduced the concept of **anti-fragility**. She cited *Antifragile: Things That Gain from Disorder* by Nassim Nicholas Taleb. Juniper highlighted the need for systems that not only withstand disruption—such as staff turnover, inconsistent data, or changing requirements—but actually improve because of it. However, participants noted that current systems are often fragile, relying heavily on individual expertise, inconsistent data inputs, and complex, interdependent processes.

The session highlighted both the **benefits and challenges of open data ecosystems**. Open standards and tools enable innovation, collaboration, and scalability, allowing multiple agencies and developers to contribute and build on shared resources. At the same time, this openness introduces complexity: inconsistent data quality, unclear standards, and coordination challenges across organizations.

Breakout discussions reinforced several key tensions:

- **Abundance vs. usability:** While there are many tools and datasets available, this can overwhelm users and fragment the experience.
- **Standardization vs. flexibility:** Standards enable interoperability but often struggle to meet diverse, real-world use cases.
- **Innovation vs. sustainability:** Systems depend on ongoing maintenance, documentation, and institutional support, which are often under-resourced.

Participants also identified **organizational and structural barriers**, including procurement processes that are not well-suited for open-source approaches, and the risk of institutional knowledge being concentrated in a few individuals.

A notable insight was the “**FIFA effect**”—how external pressure (e.g., the World Cup) has temporarily driven stronger regional coordination, faster decision-making, and improved data practices. The group emphasized the need to sustain this level of collaboration beyond crisis or high-visibility events.

Overall, the session underscored that building effective mobility data systems requires:

- Investing in **data quality, documentation, and redundancy**
- Strengthening **cross-agency collaboration and trust**
- Designing for **real-world user needs and feedback**
- Aligning **policy, funding, and procurement** with open and interoperable systems

The key takeaway: **Resilient transportation systems are not just technical—they are social, organizational, and deeply tied to the people they serve.**

Main Takeaways: Anti-Fragile Systems & Open Data Workshop

Theme	Key Insight	Evidence from Session	Implication
Anti-fragility	Systems should improve under stress, not break	Discussion of redundancy, succession planning, and failure points	Build systems that <i>learn</i> from disruption (staff turnover, data gaps)
People-centered design	Data work must center impacted users	Laura’s story about her grandfather and access challenges	Technical solutions must connect to real human outcomes
Institutional fragility	Knowledge is often held by single individuals	Repeated concern about “what if we lose X person?”	Invest in documentation, cross-training, redundancy
Open data = power + complexity	Open systems enable innovation but introduce coordination challenges	Juniper’s explanation of open source, open standards, and ecosystem complexity	Balance openness with governance and clarity

Theme	Key Insight	Evidence from Session	Implication
Data quality inconsistency	Data varies widely across agencies and regions	Multiple groups cited inconsistent, incomplete, or inaccurate data	Standardization alone is not enough—quality control is critical
Interoperability challenges	Systems don't easily work together	Pain points around GTFS, GOFS, sidewalks, and cross-system integration	Ongoing coordination and shared standards are essential
“FIFA effect” (urgency catalyst)	External pressure drives alignment and action	Example of World Cup forcing weekly cross-agency coordination	Need to sustain urgency <i>without</i> external crisis
User experience gaps	Tools don't always reflect real-world conditions	Examples: bad walking directions, missing services, wrong data	UX must incorporate lived experience and feedback loops
Abundance paradox	More tools/data ≠ easier use	“Joy and pain” of having many apps and datasets	Simplification and guidance are as important as availability
Equity & access gaps	Services—not just data—are missing	Example of someone moving and losing paratransit access	Infrastructure and service gaps limit impact of tech solutions

Theme	Key Insight	Evidence from Session	Implication
Procurement barriers	Systems and policies not designed for open ecosystems	Difficulty adopting open source/open data workflows	Policy and procurement reform needed
Community collaboration	Relationships are a major strength	“We make friends along the way” / coalition building	Social infrastructure = technical resilience
Weak-link problem	Systems depend on least-resourced contributors	Variability across jurisdictions and contributors	Need support for smaller or under-resourced partners
Real-time & dynamic data gaps	Hard to represent disruptions and temporal changes	Mention of real-time disruptions and limited data sharing	Invest in real-time data pipelines and standards
Feedback loops improve data	Usage leads to better data	“The more people use it, the fresher it gets”	Encourage public interaction with systems

Breakout Themes: Joys vs. Pains

Category	Joys	Pains
Open Data Ecosystem	Shared tools, innovation, scalability	Complexity, ambiguity, maintenance burden
Standardization	Enables collaboration and scale	Hard to meet all use cases, leads to multiple competing standards
User Experience	Trip discovery, freedom of movement	Incorrect routes, poor walking directions, lack of customization
Data Availability	Rich datasets (e.g., sidewalks, multimodal)	Inconsistent quality, missing data, uneven coverage
Tools & Apps	Many options, flexibility	Too many options, fragmented experience
Organizational Dynamics	Cross-agency collaboration, shared learning	Coordination burden, “cat herding,” competing priorities
Technical Systems	Modular, reusable architectures	Fragility from dependencies and pipelines
Access & Equity	Enables new mobility insights	Real-world service gaps limit usefulness

Big Picture Synthesis

What's working:

- Strong regional expertise and collaboration
- Powerful open data ecosystem
- Growing toolset and innovation capacity

What's not working:

- Fragility due to people, processes, and uneven data
- Lack of sustained coordination (outside crisis moments)
- Gaps between data, tools, and real-world service

What matters most going forward:

- Redundancy + documentation (reduce single points of failure)
- Sustained regional coordination (post-“FIFA energy”)
- Better integration of user experience + real-world conditions
- Investment in data quality and equity of service

Questions? Email FindaRide@hopelink.org