

From SNS to Semantic Networks: Expanding \$1000D Value with Knowledge Graphs



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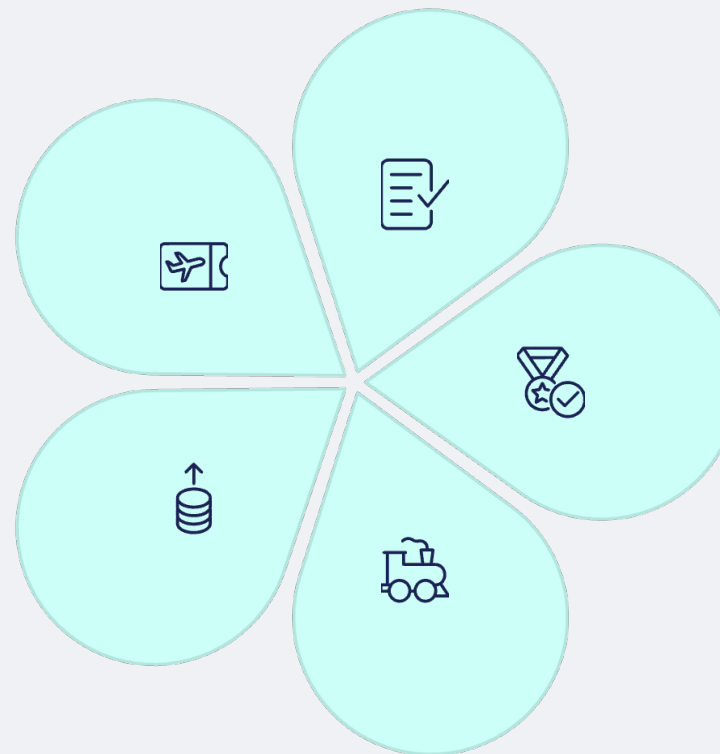
Entity Blindness in Technical Documentation

Systems

Landing gear, hydraulics, avionics, powerplant, and other systems

Components

Parts, assemblies, tools, and equipment needed for maintenance



Procedures

Maintenance tasks, troubleshooting steps, and inspection protocols

Compliance

Airworthiness directives, service bulletins, and certification standards

People

Technicians, engineers, inspectors, and other personnel roles



Your documentation contains entities that are hiding - and the connections between them represent untapped intelligence.

S1000D Entities and Relationships

S1000D is rich with critical information. It's not just data; it's a universe of "things" (entities) and how they interact (relationships).

Key Entities

The core components and actors in your technical data:

- Systems, Subsystems
- Maintenance Tasks, Procedures
- Technicians, Tools
- Regulations, Suppliers

Connecting Relationships

The links that bind entities together:

- "requires" (e.g., part to system)
- "affects" (e.g., system to performance)
- "performed by" (e.g., task to role)
- "complies with" (e.g., procedure to directive)
- "supersedes" (e.g., revision to previous)



While S1000D effectively organizes entities hierarchically, the critical relationships between them often remain hidden.



HIERARCHY

The SNS Foundation: More Than Hierarchy

SNS Strengths

- Provides hierarchical structure and organization
- Ensures interoperability across systems
- Enables traceability of information
- Proven framework adopted globally
- Supports configuration management
- Facilitates data exchange between organizations

Current Limitations

- Hierarchical rigidity constrains cross-functional relationships
- Limited ability to represent complex, non-hierarchical connections
- Difficulty integrating with non-S1000D corporate content
- Challenges in capturing semantic context beyond structural organization



This isn't about replacing the SNS but unleashing its full potential by adding dynamic semantic relationships to the hierarchical foundation.

From Structure to Meaning:

Why "Semantic" Matters

S1000D Today: Structure

- WHERE information lives (e.g., 32-10-00)
- HOW it's organized (hierarchical breakdown)
- WHAT it references (cross-references between data modules)

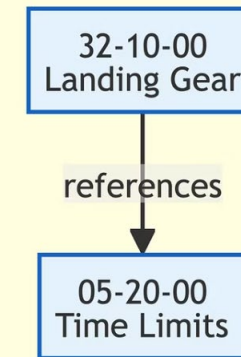
Semantic Networks: Meaning

- WHAT things actually are (e.g., Landing Gear = safety-critical system)
- WHY they connect (e.g., requires inspection because safety-critical)
- HOW they relate (e.g., affects, requires, prevents, performs)

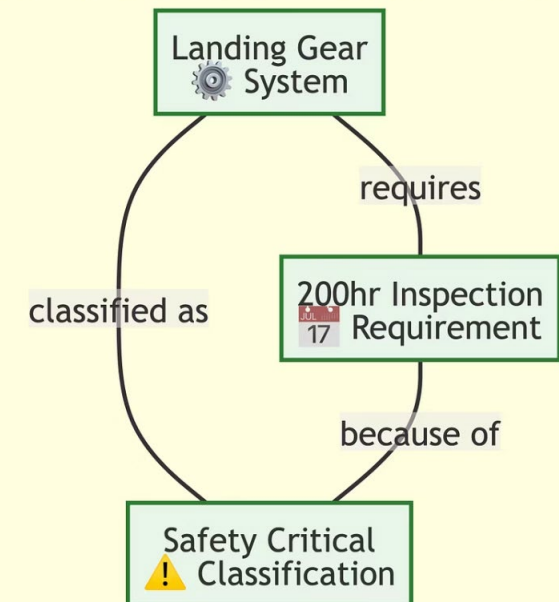


Semantic networks enrich the SNS with the deeper meaning and critical relationships you need to truly understand and act on information.

Traditional S1000D: Structure Only



Semantic Network: Structure + Meaning



Knowledge Graphs: Making Invisible Connections Visible

Relationship Modeling

Knowledge graphs represent information as networks of entities and relationships, moving beyond hierarchical structures to capture real-world complexity.

Semantic Context

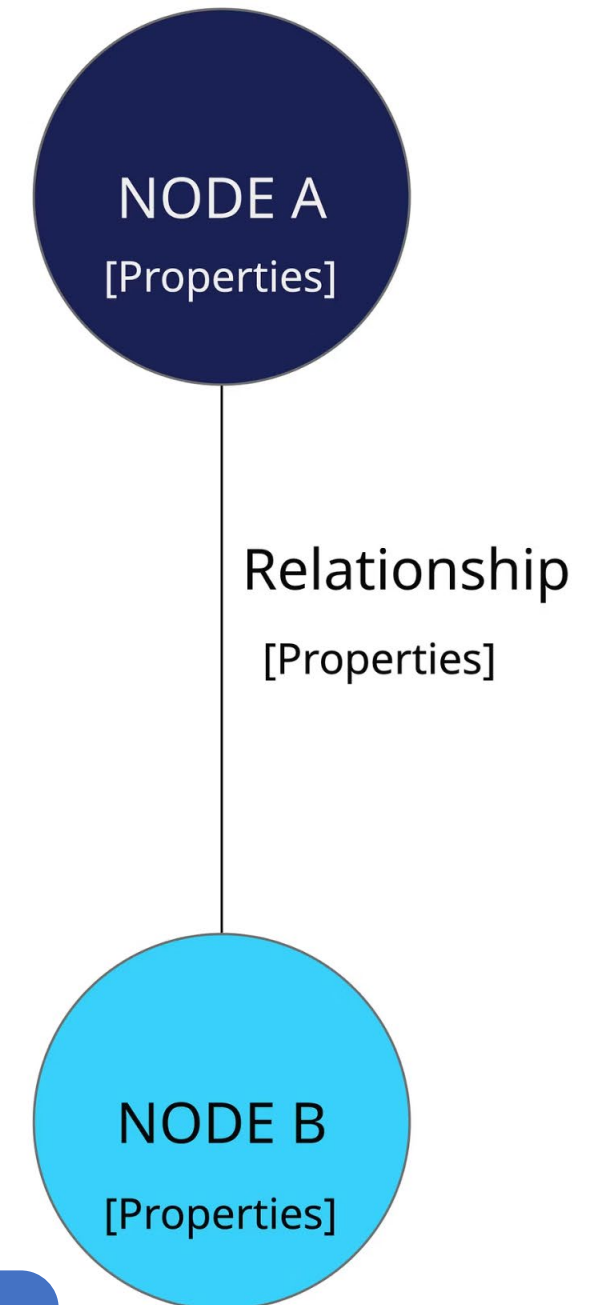
Meaning is embedded directly into the relationships, enabling reasoning and inference capabilities that traditional systems lack.

S1000D Integration with the Outside World

Captures many-to-many relationships between data modules and connects S1000D content with broader enterprise knowledge.



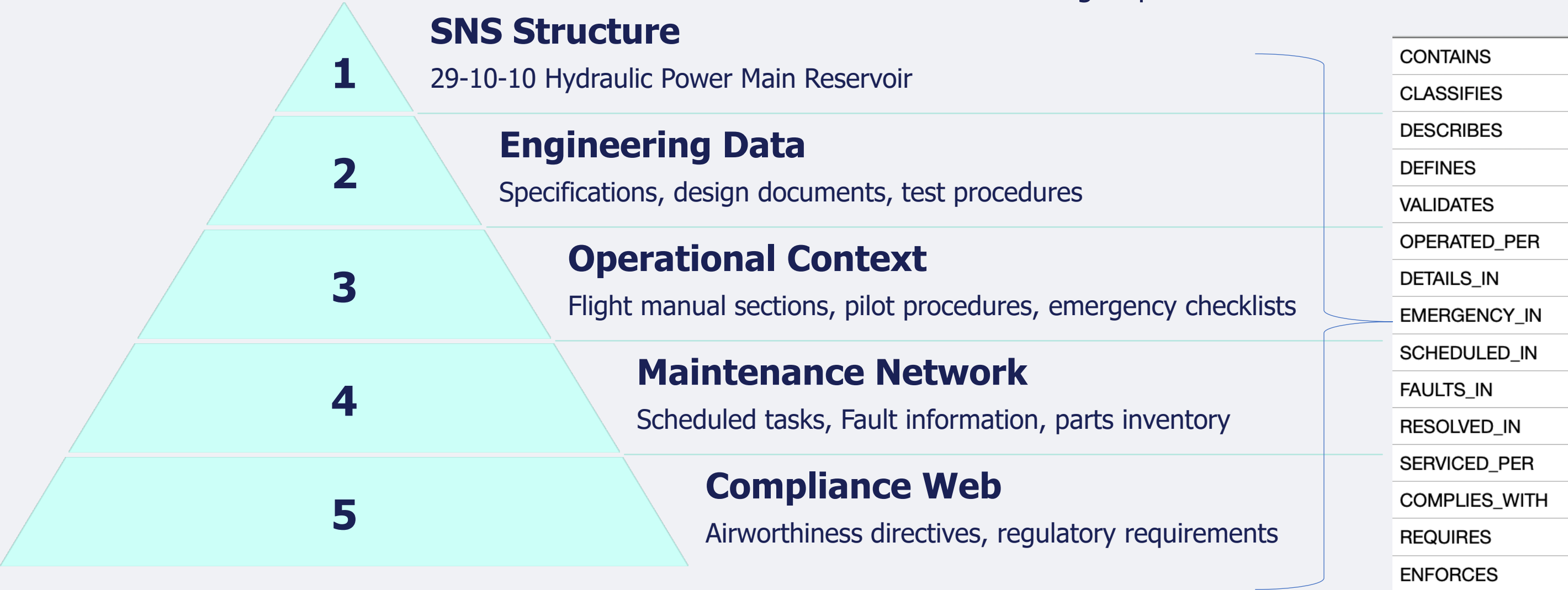
Imagine seeing your CSDB not as a filing cabinet, but as a living map of relationships where every connection tells a story.



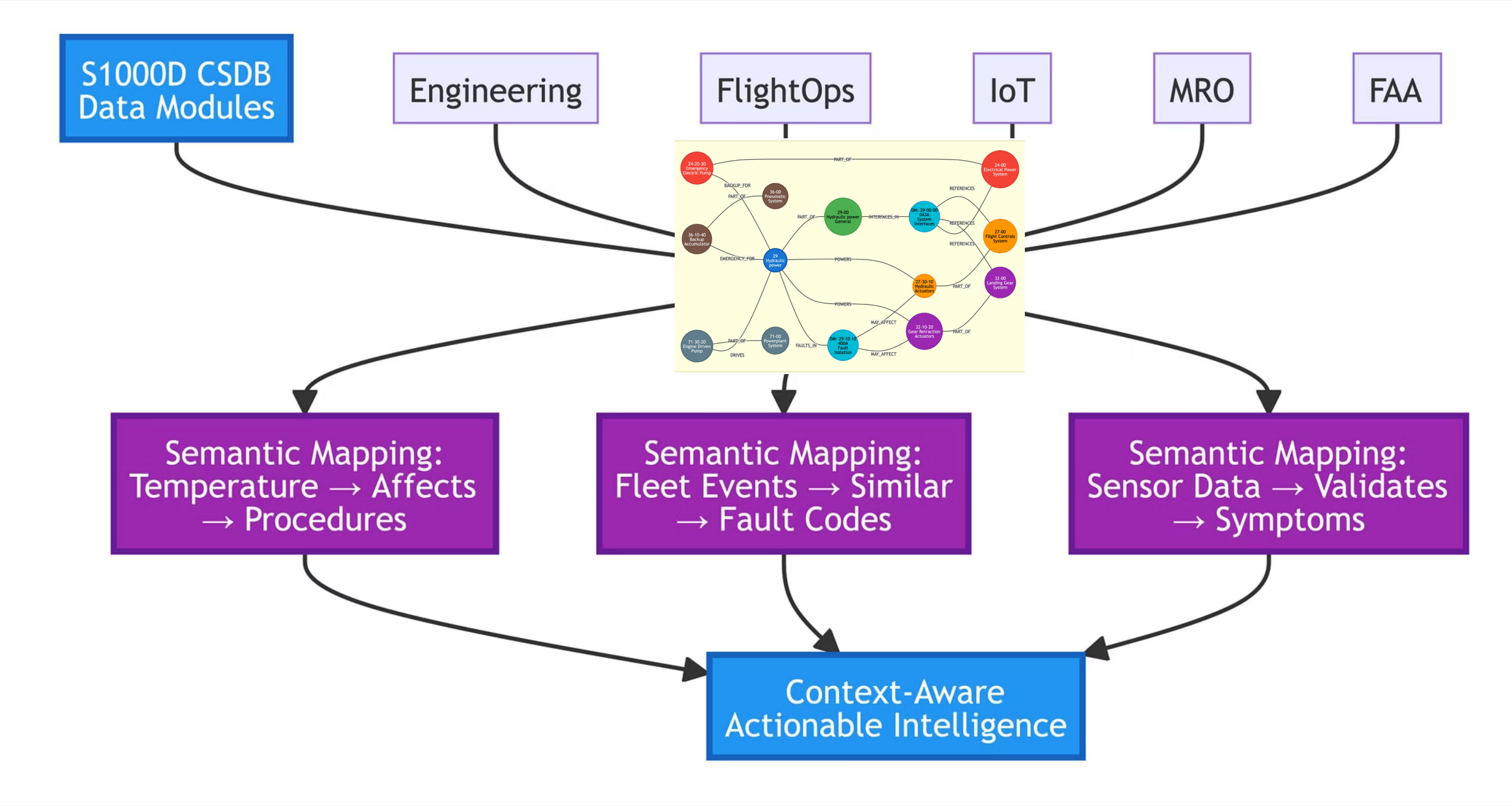
Real-World Implementation: Aircraft Hydraulic System

Traditional query: "Hydraulic Pump"

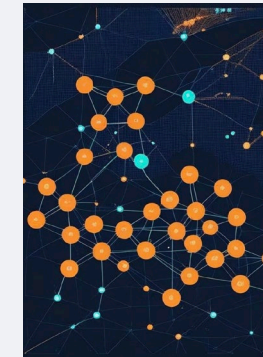
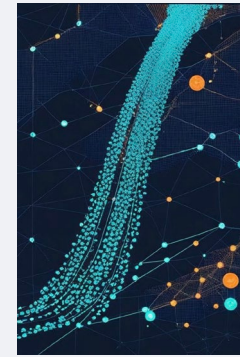
Knowledge graph query: "Find all content related to hydraulic pumps that has been updated in the last 6 months, impacts safety-critical operations, and affects training requirements."



Extracting Semantic Meaning



Relationship Patterns



The Revision Cascade

When safety-critical components get revised, a predictable sequence follows: component spec updates first, then test procedures, installation guides, training materials, and finally customer notifications.



The Feature Conflict

Some features were never meant to work together. When real-time monitoring appears with power-saving mode, a cluster of workaround documents emerges. The pattern repeats across product lines.



The Compliance Domino

ISO 9001 compliance in a specification inevitably connects to specific test procedures, documentation standards, audit trails, and supplier certifications. Miss one? Compliance gap waiting to happen.



These patterns aren't just interesting - they're actionable intelligence that can predict problems before they occur. The connections in your documentation form patterns that repeat like a business heartbeat.

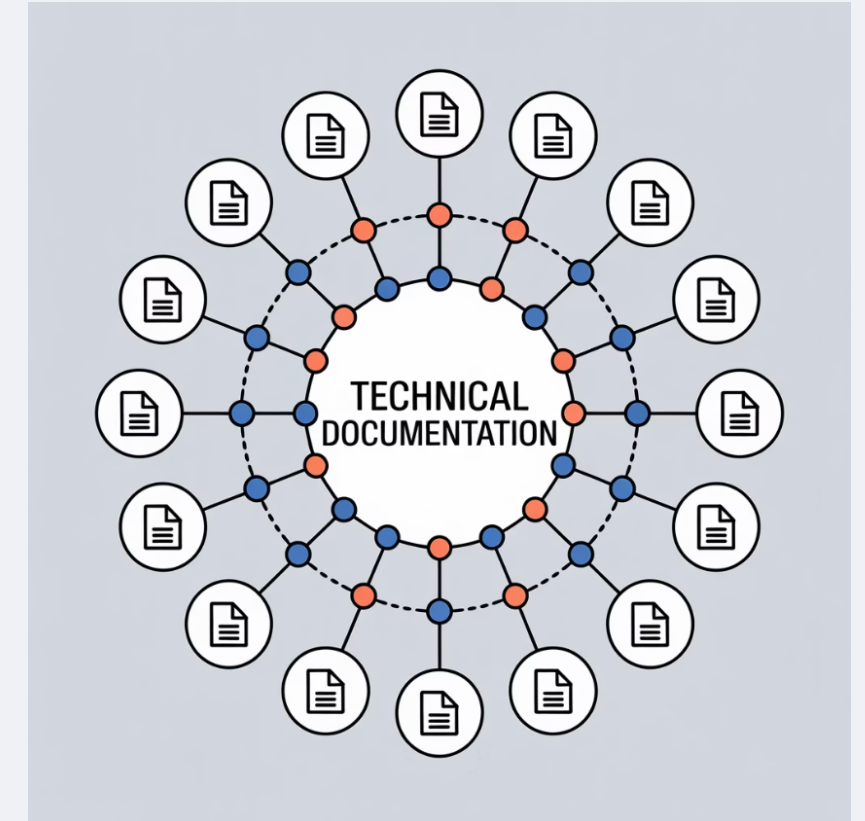
Trust Networks: Not All Connections Are Equal

Connection Strength Hierarchy

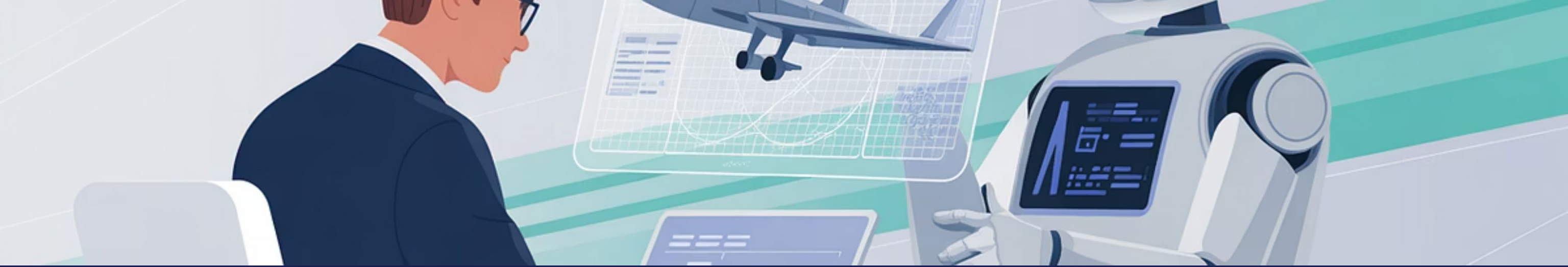
- Approved engineering specifications carry maximum weight
- Validated test procedures have high credibility
- User documentation and field reports provide context
- Unvalidated connections require verification

Trust Factors

- Source credibility - who created the connection?
- Validation frequency - how often is it confirmed?
- Context relevance - does it apply to this situation?
- Currency - how recent is the relationship?



In safety-critical applications, distinguishing between "this might be related" and "this is definitely connected" can be the difference between confidence in solutions and costly mistakes.



Human-AI Partnership in Connected Documentation

Human Contributions

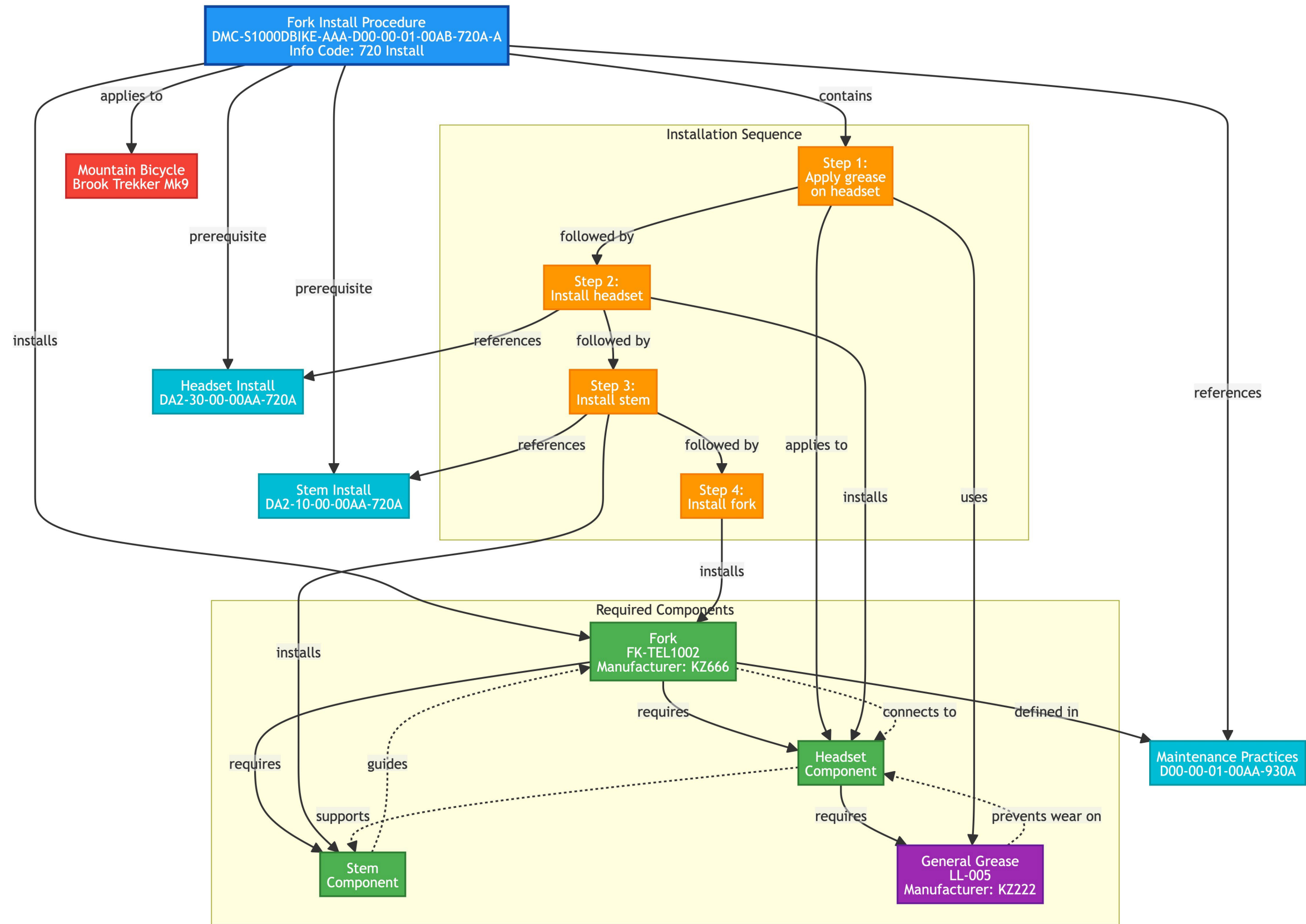
- Domain expertise and engineering judgment
- Recognition of what matters in technical context
- Validation of semantic connections for accuracy
- Understanding of safety and operational implications

AI Contributions

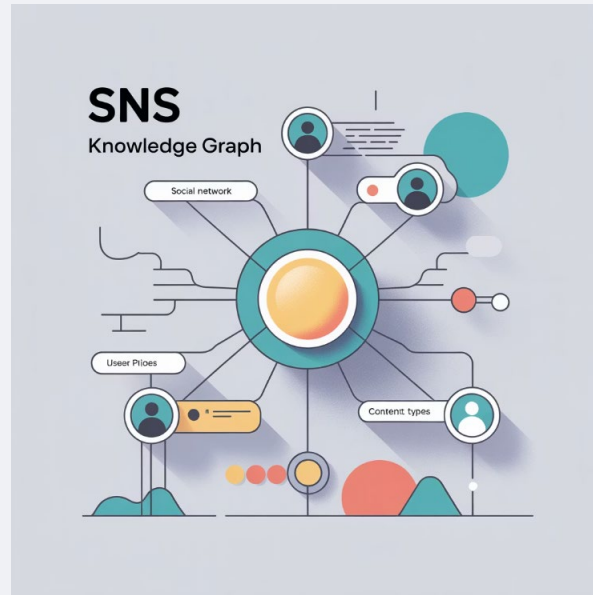
- Traverse thousands of SNS connections instantly
- Identify patterns across entire CSDB repositories
- Suggest new relationships based on content analysis
- Process natural language queries against structured relationships



Knowledge graphs become the common ground where both humans and AI can work together, using your S1000D implementation as a shared language that both parties speak fluently.

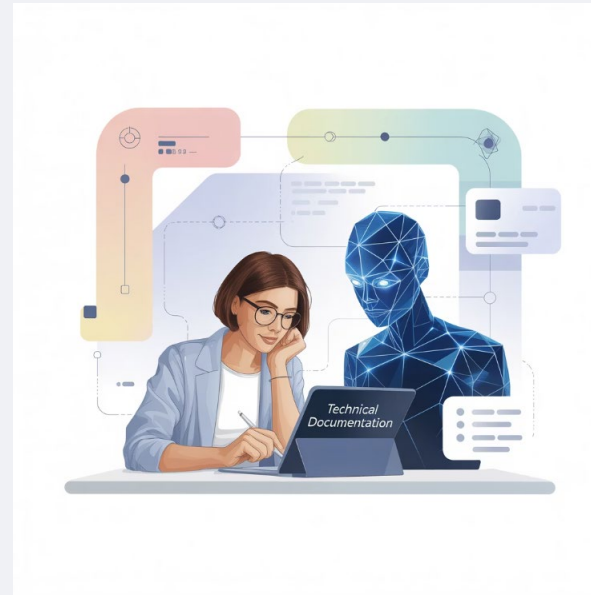


The Journey



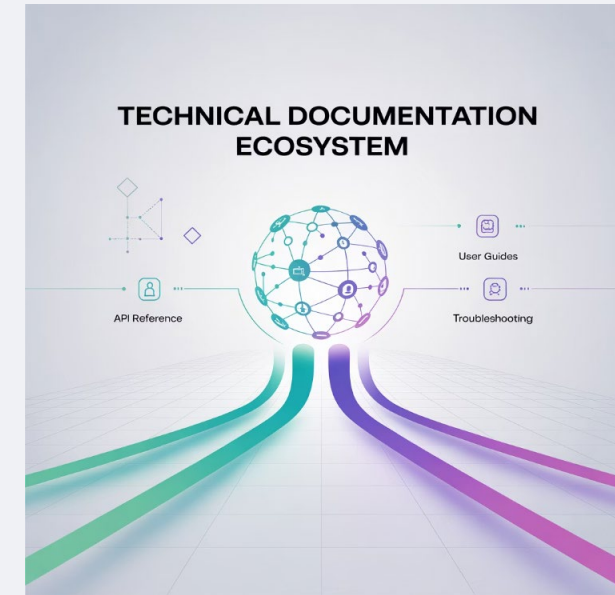
SNS + Knowledge Graphs

Preserves S1000D's proven structure while unlocking hidden intelligence across your technical ecosystem.



Connected Information Enables AI Partnership

Semantic relationships become the foundation for effective human-AI collaboration in technical environments.



Future-Ready Documentation Ecosystem

Investment in connections enables tomorrow's intelligent applications.

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Thank You!

What connections will you make visible?

Available Resources

- [It's All About Relationships: Why Your Documentation is More Connected Than You Think](#)
- [The Hidden Cast of Characters in Your Documentation: Uncovering Connections to Reveal the Full Picture](#)
- [Connect the Dots: Why the Lines Matter More Than the Points](#)
- [Relationship Patterns: The Repeating Stories in Your Connections](#)
- [The Trust Network: Not All Connections Are Created Equal](#)

Entity Blindness Assessment Checklist

Use this practical checklist to begin identifying hidden connections in your S1000D implementation. Score each area from 1-5 (1 = poor visibility, 5 = excellent visibility).

- **System Interconnections**

How visible are the relationships between different systems in your documentation? Can users easily see how hydraulic systems affect flight controls?

- **Maintenance Dependencies**

Are the dependencies between maintenance tasks clearly mapped? When a procedure changes, can you instantly identify all affected workflows?

- **Compliance Traceability**

How easily can you trace a regulatory requirement through all impacted documentation? Can you generate a complete impact report in minutes?

- **Change Impact Visibility**

When a component specification changes, how comprehensively can you identify all affected documentation, training, and operational impacts?

- **Cross-Reference Accessibility**

Are cross-references between data modules easily navigable, or are they trapped in paragraph text? Can users follow relationship paths intuitively?

Add your scores to assess your current state. A score below 15 indicates significant opportunity for relationship enhancement through knowledge graphs.