



CodeVice: Getting a Grip on Your Code (with Google Earth)

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GammaTech, Inc.

- **Ithaca NY, San Jose CA, Madison WI**
- **Founded 1988**
 - › Tim Teitelbaum (Cornell) & Tom Reps (Wisconsin)
- **27 employees, 8 PhDs**
- **Government Contracts:**
 - › DARPA, Navy, AF, Army, NSF, NASA, DHS, NIST
- **Customers: > 150, all major Mil-Aero**

What we do

- **Software Analysis**

- › Both source code and machine code

- **Applications:**

- › Reverse-engineering / understanding

- › Assurance: finding bugs and vulnerabilities

- Product: **CodeSonar**: static bug finding for C/C++

- › Protection: rewrite executables to defeat tamper

- › Producibility: lower cost of software intensive systems

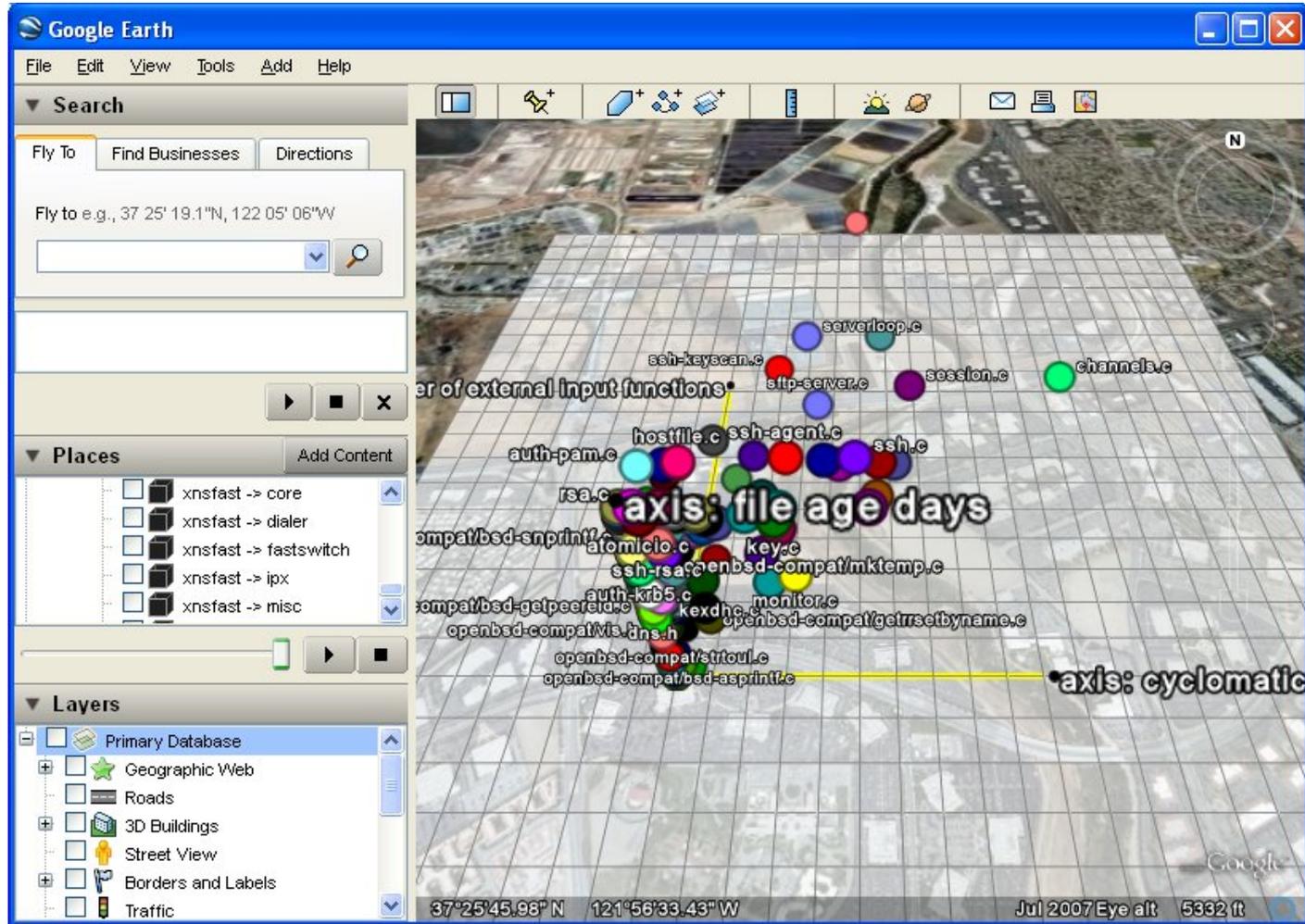
Background

- Visualization for software intensive systems
 - › Large systems, diverse data
 - › Integrate with existing processes
- Sept 2006: \$100K Army/OSD SBIR Phase 1
- May 2008: \$50K Cisco pilot project
- Summer 2009:
 - › In process: \$300+K Army/OSD follow-on funding
 - › In negotiation: \$??K Cisco follow on

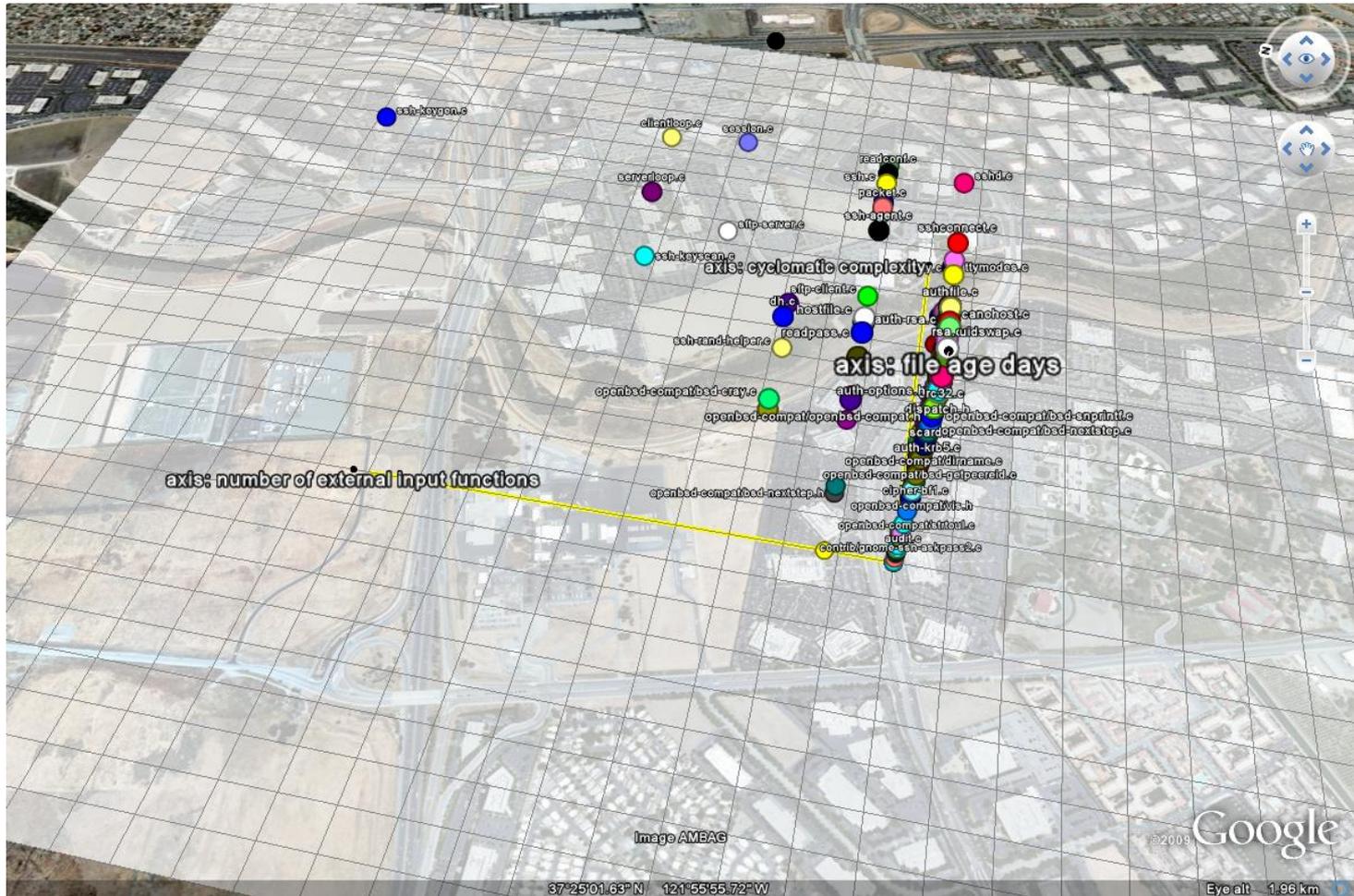
Visualization

- Have you ever wanted too..
 - › See a call graph for 20,000,000 lines of code?
 - › See your code from 30,000 feet?
- You can with CodeVice

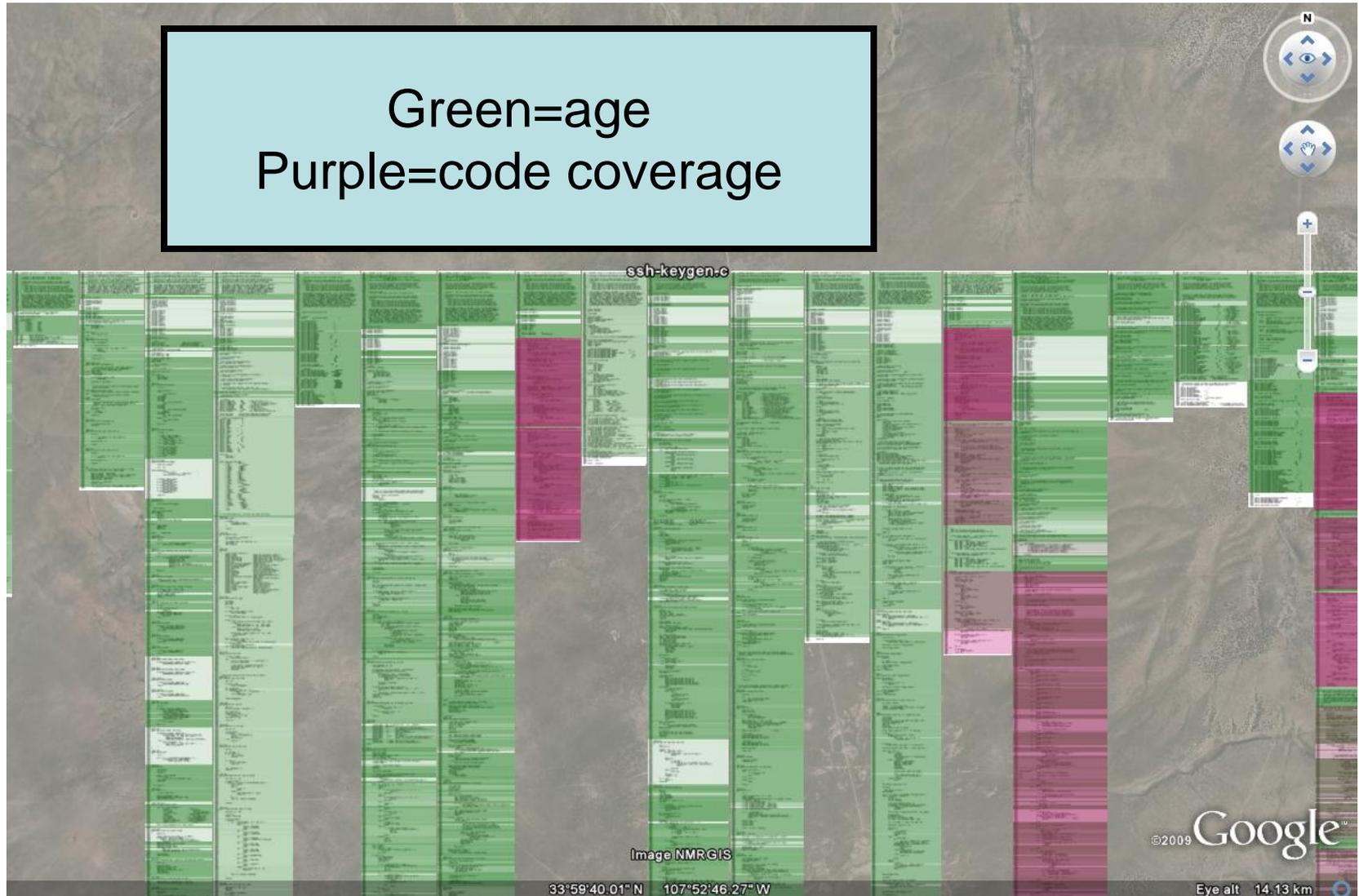
Demo: 3D Plots



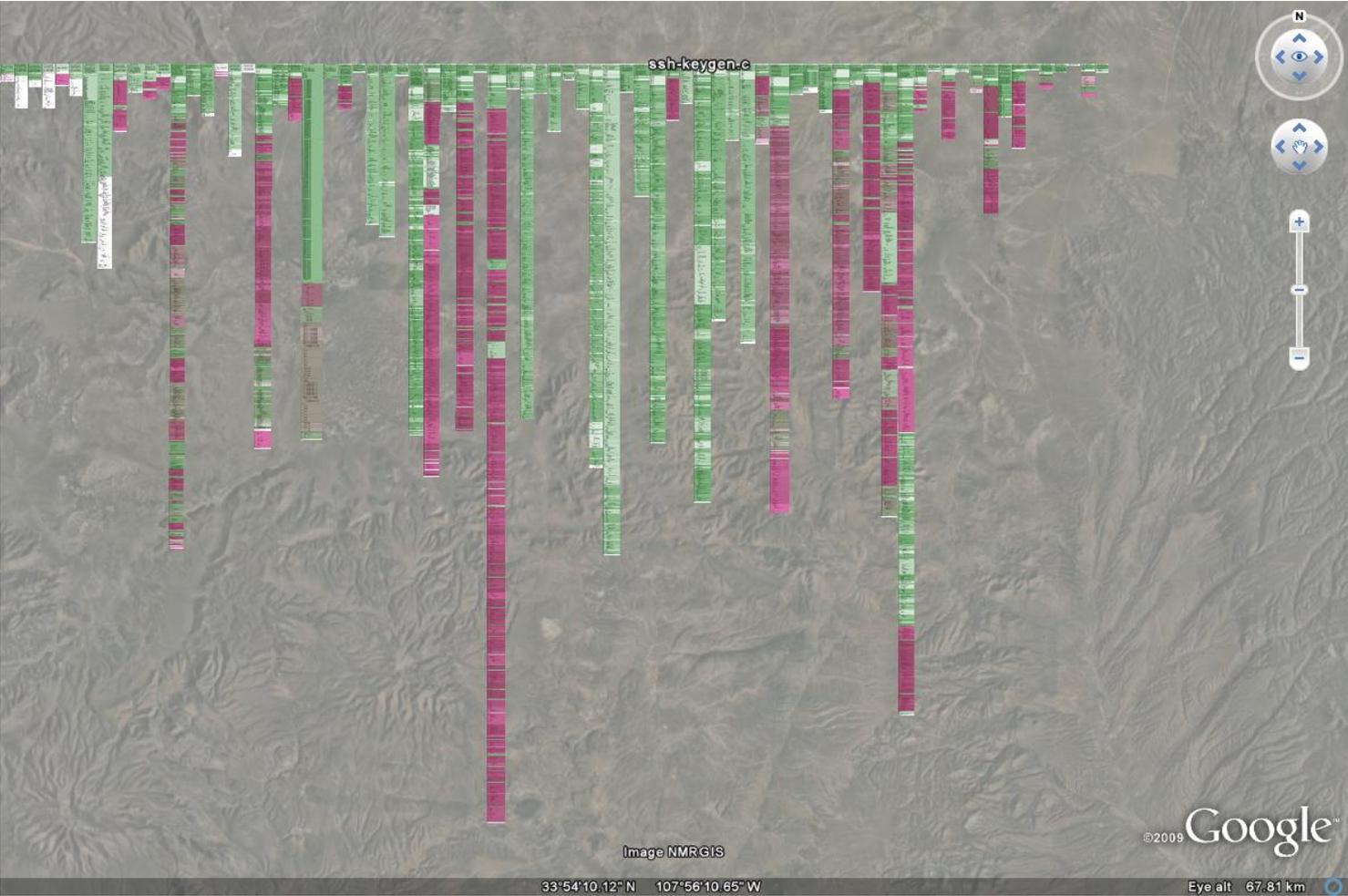
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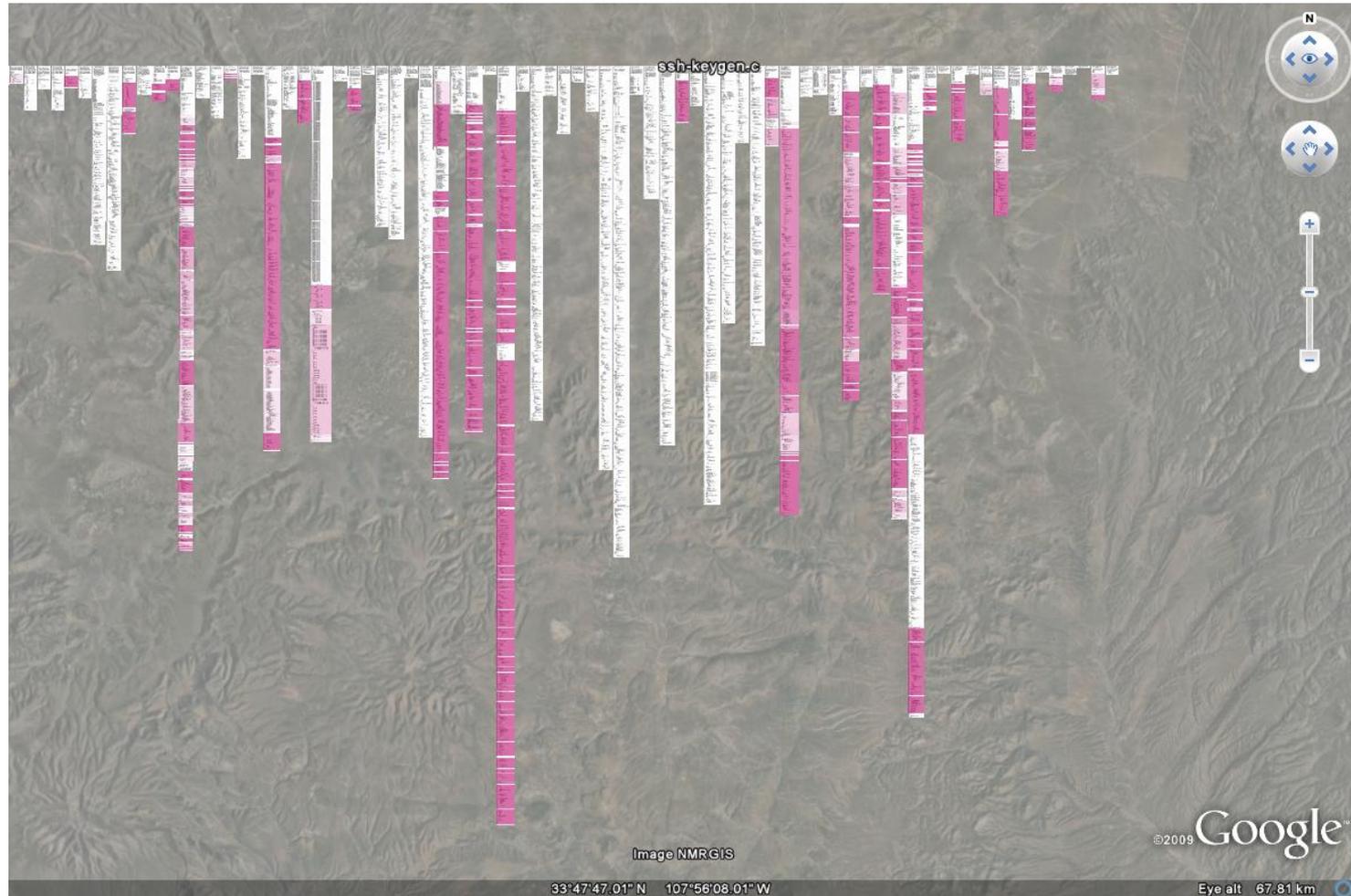
Demo: Source code with overlays



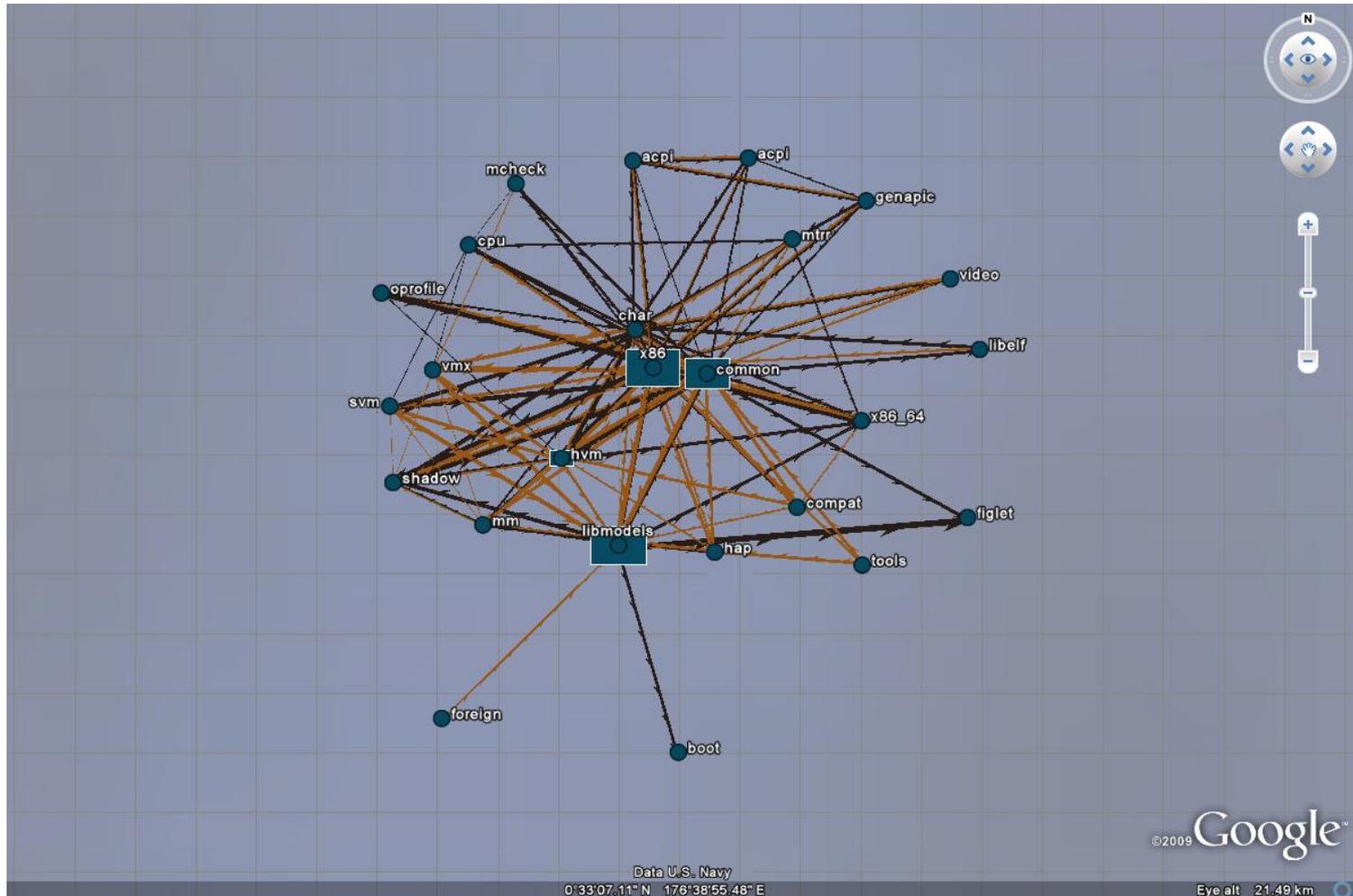
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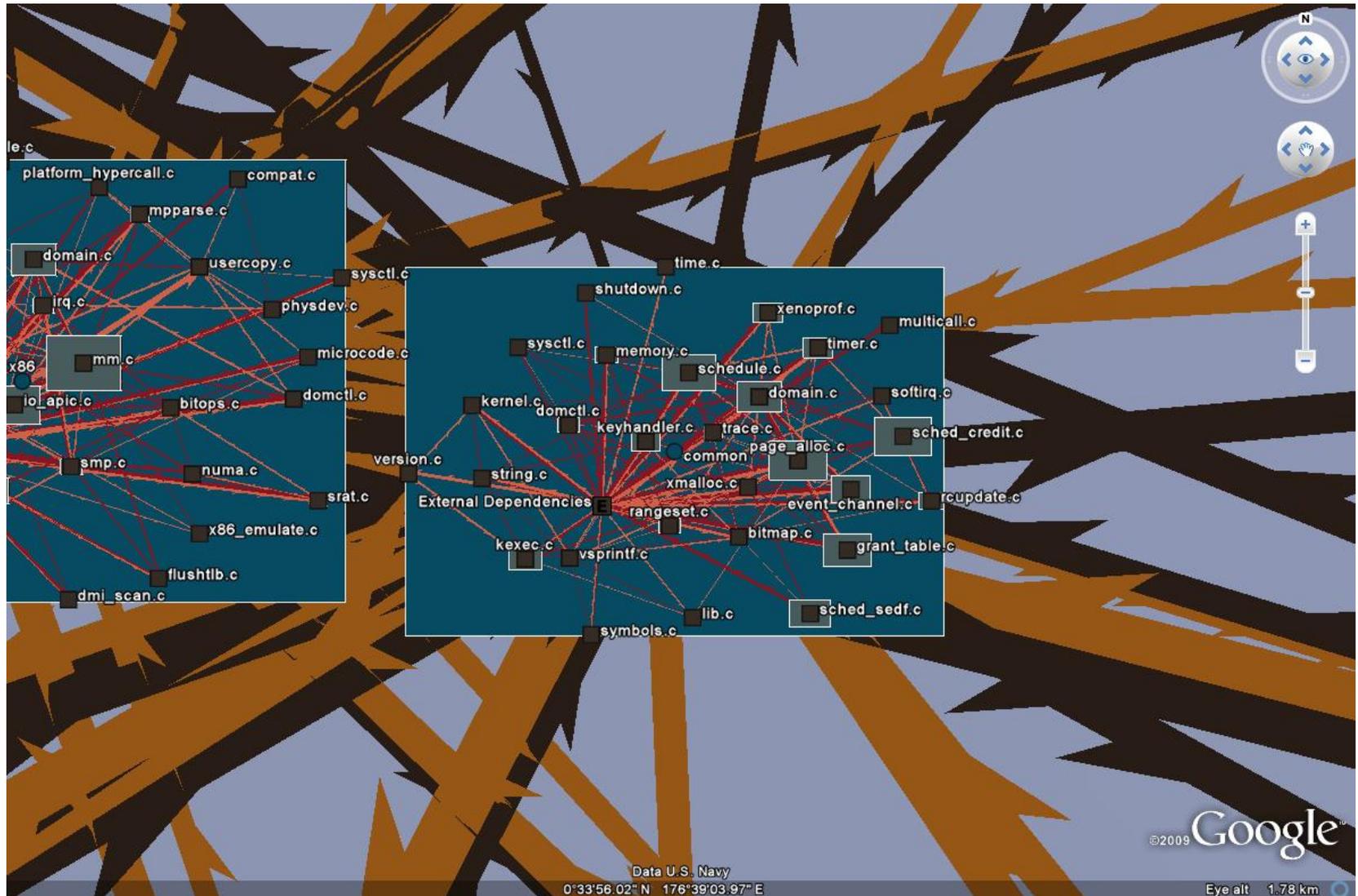
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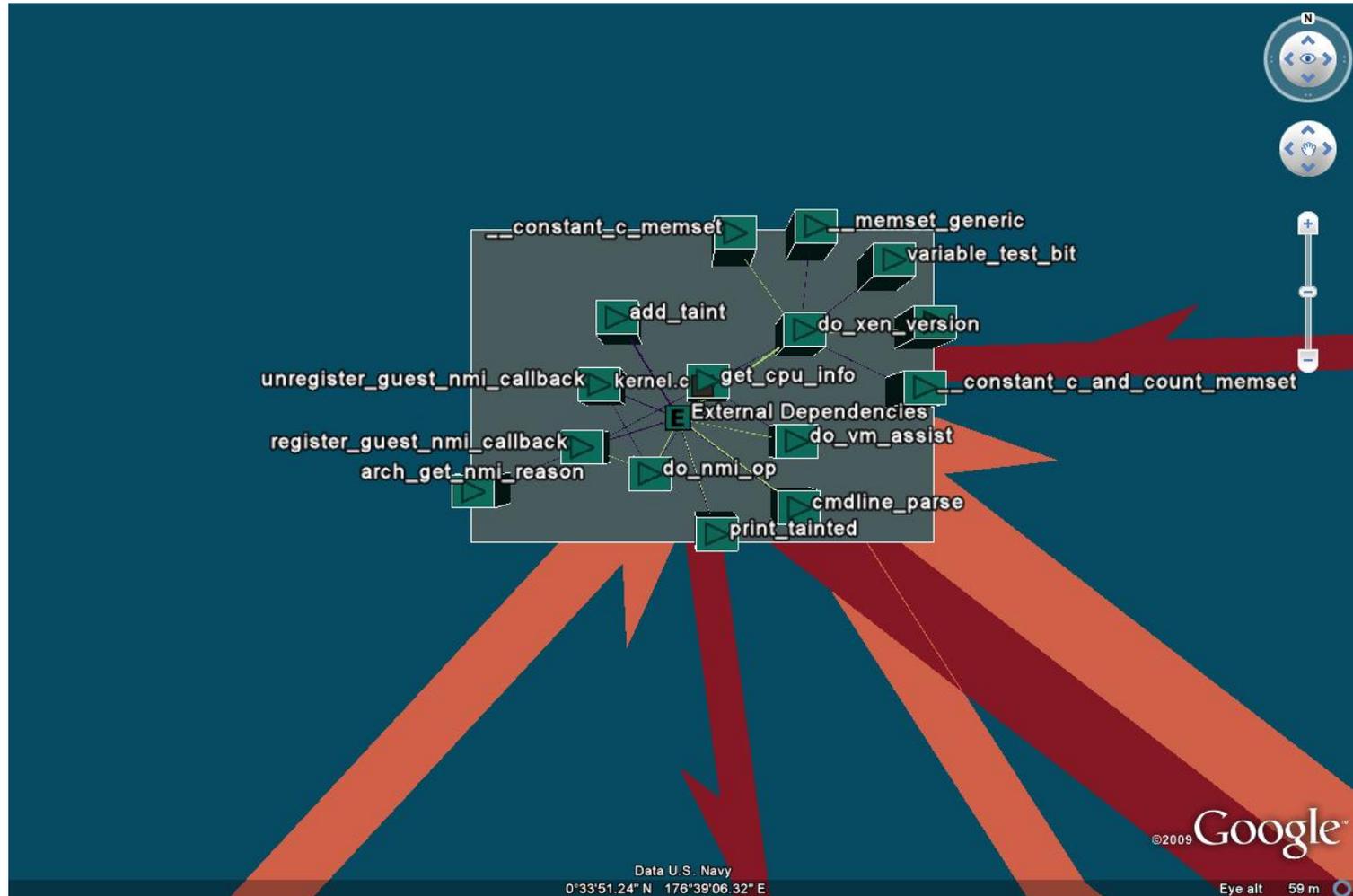
Demo: Large dependency graphs



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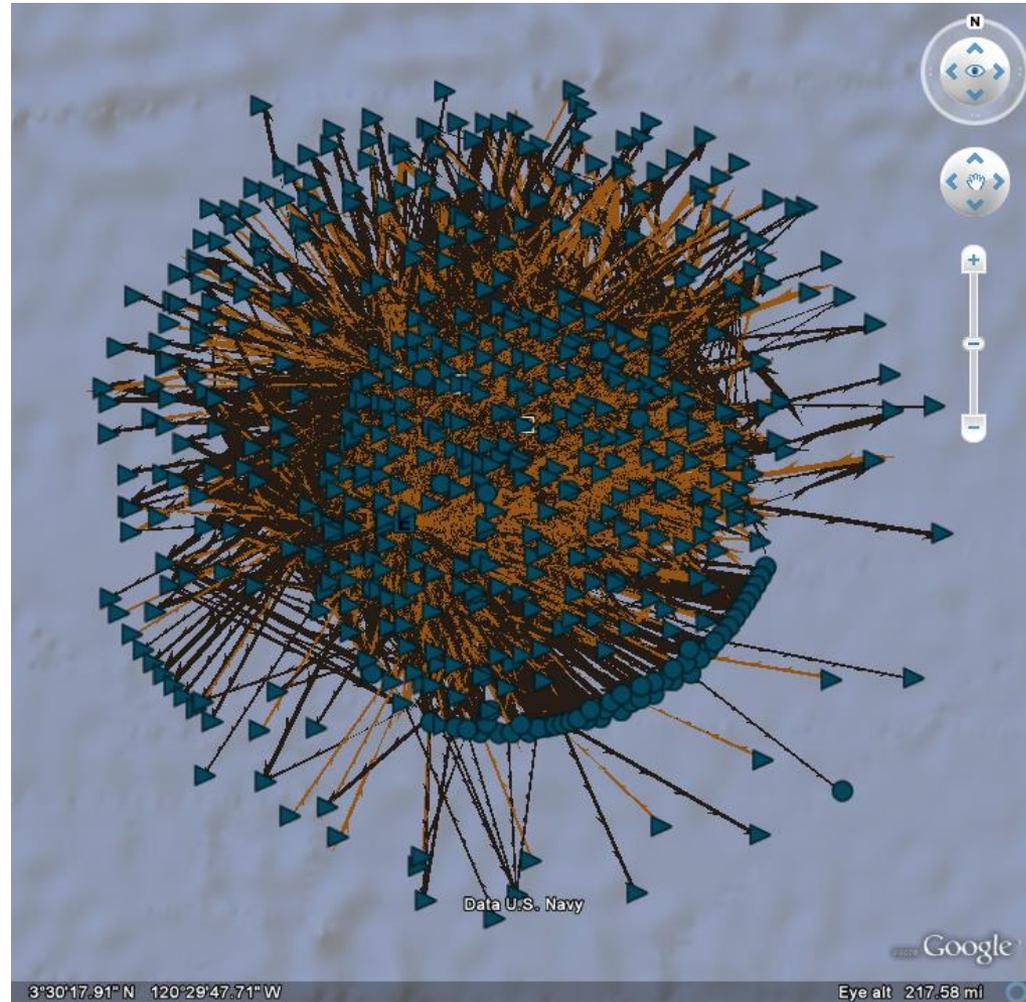


Demo: Large dependency graphs



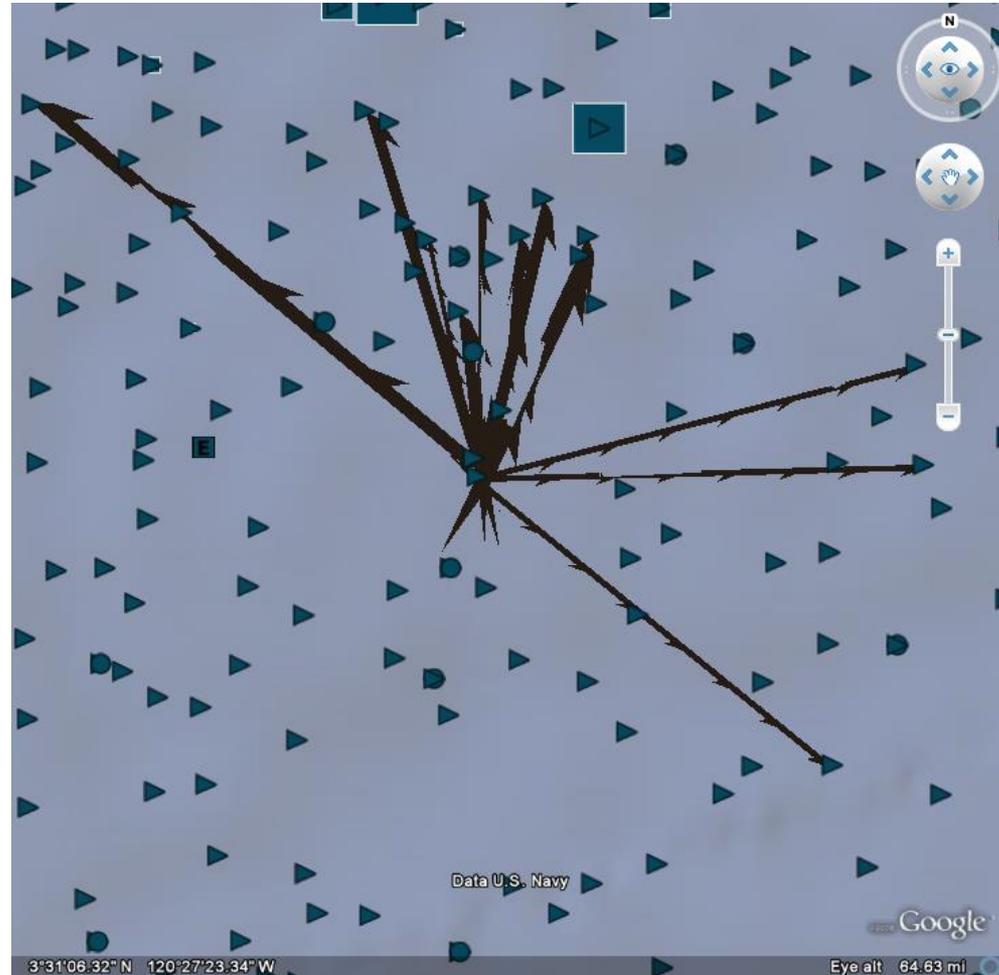
Demo: Large dependency graphs

20 million
lines of code



Demo: Large dependency graphs

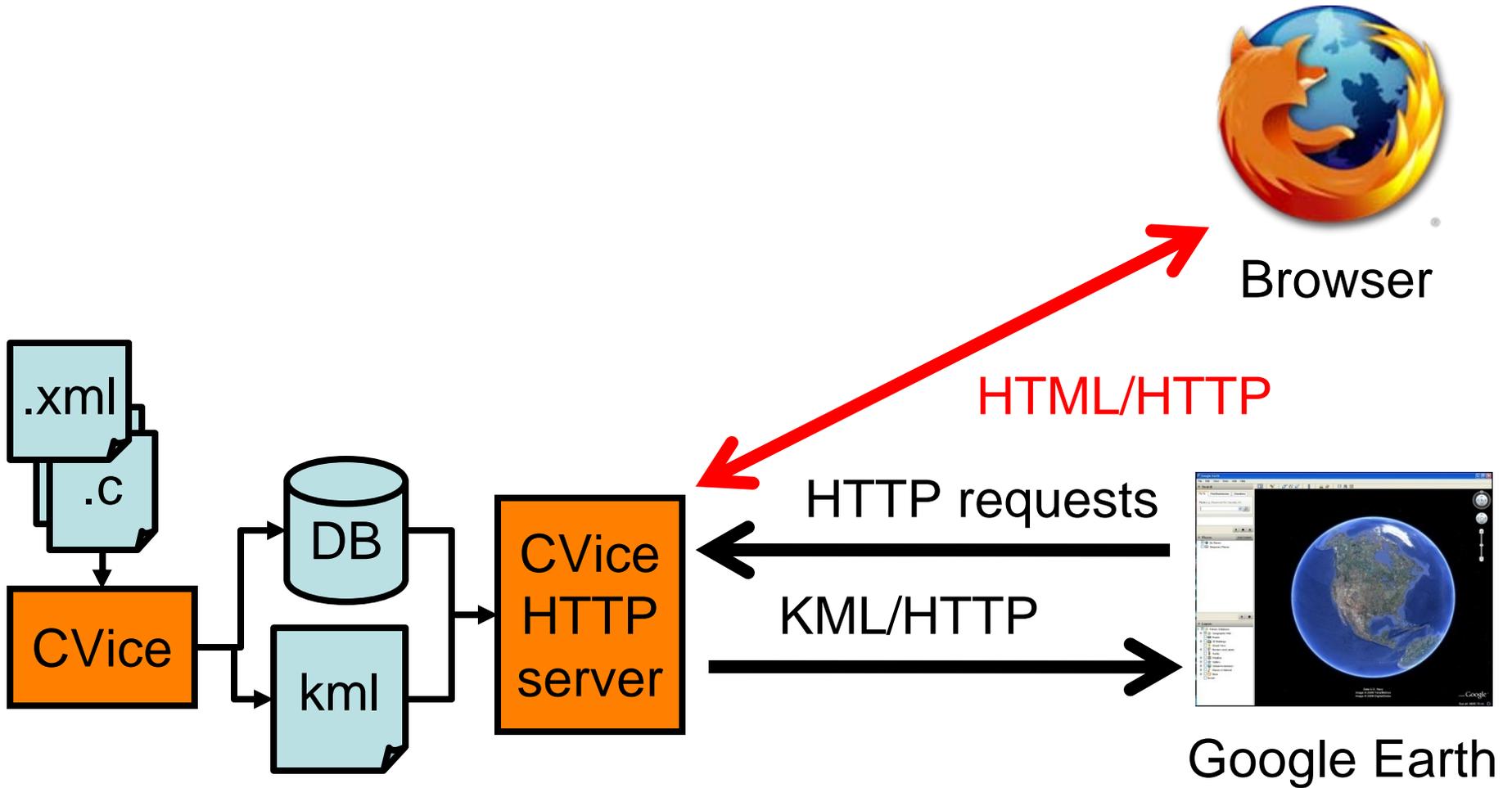
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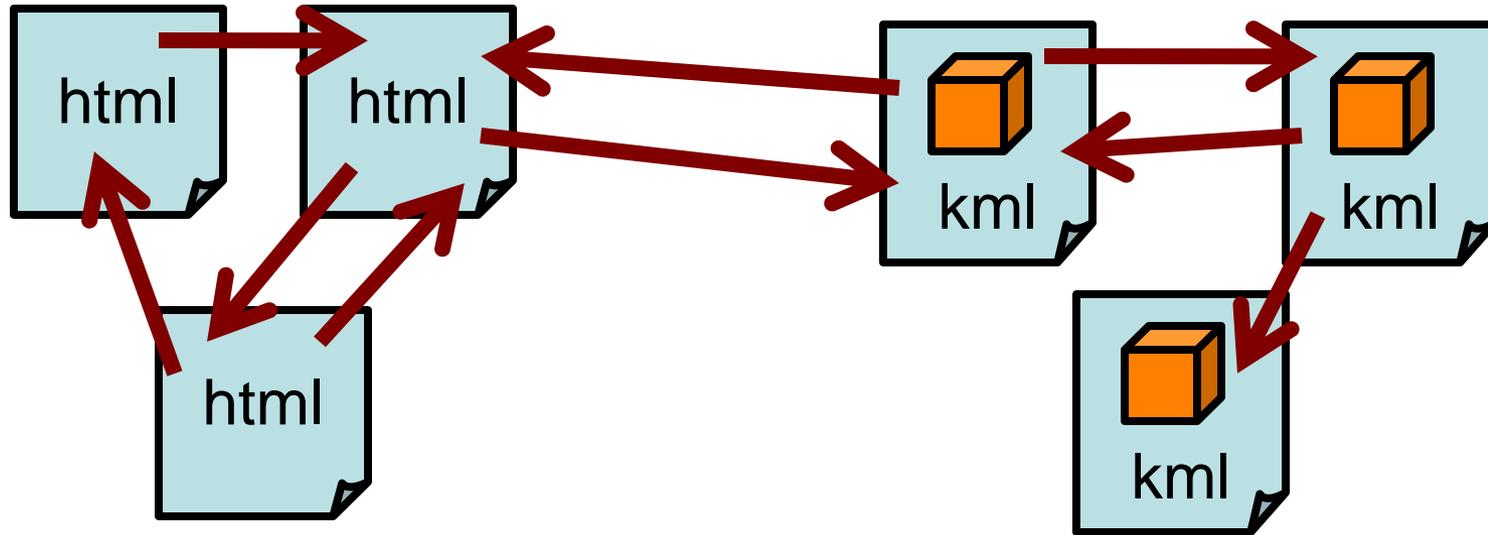
CodeVice: Using KML for Software Visualization

- KML = Keyhole Markup Language
 - › Google Earth file format
 - › Project content into Google Earth
 - › Boxes, lines, images, etc

How the Tool Works



Integration with Hyperlinks



Browser



Google Earth

Builds on open standards

- KML is XML
 - › Schema is an international standard
- HTTP Client/Server architecture
- URLs & hyperlinks

Experience so far

- Scalability not a problem when data is staged
- Get prototypes up quickly
- Users like the tool: gentle learning curve
- Cisco
 - › Visualization gives a clear picture of architecture quality
 - › Scalable to 20 MLOC
- Drawbacks
 - › KML can be constraining
 - › Sometimes we need a bigger planet!

Conclusion

- Looking for early adopters drowning in data.
- Vehicles:
 - › Army/OSD contract
 - › Custom projects (like with Cisco)
- Questions?
 - › About CodeVice?
 - › About GrammaTech?