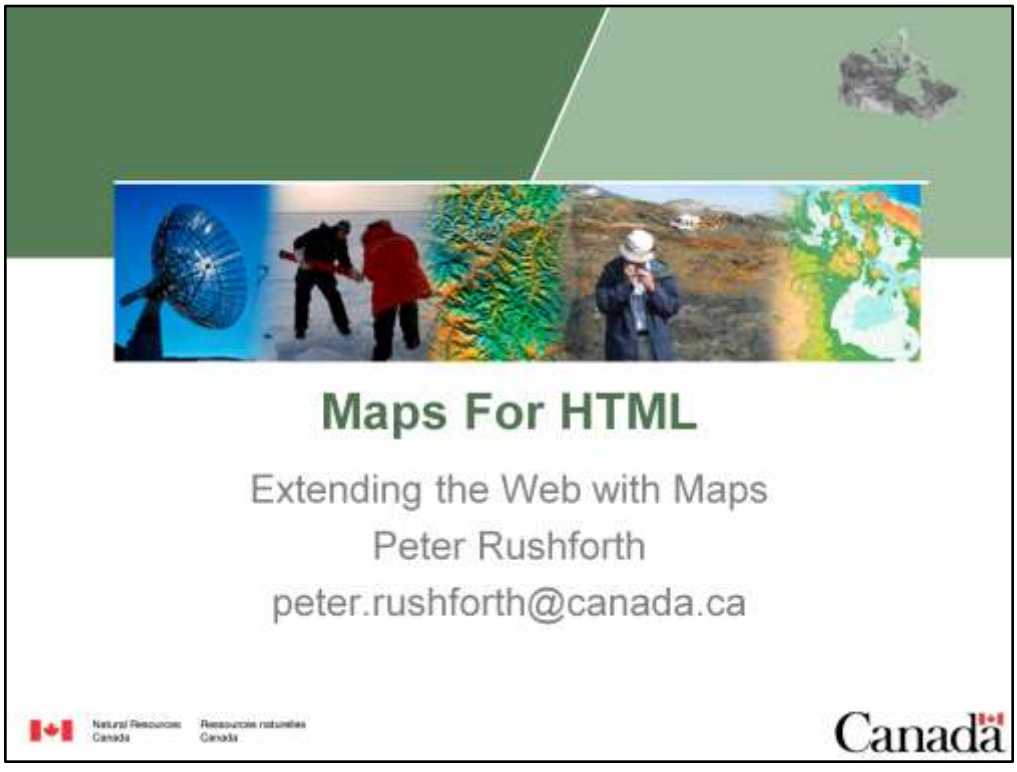
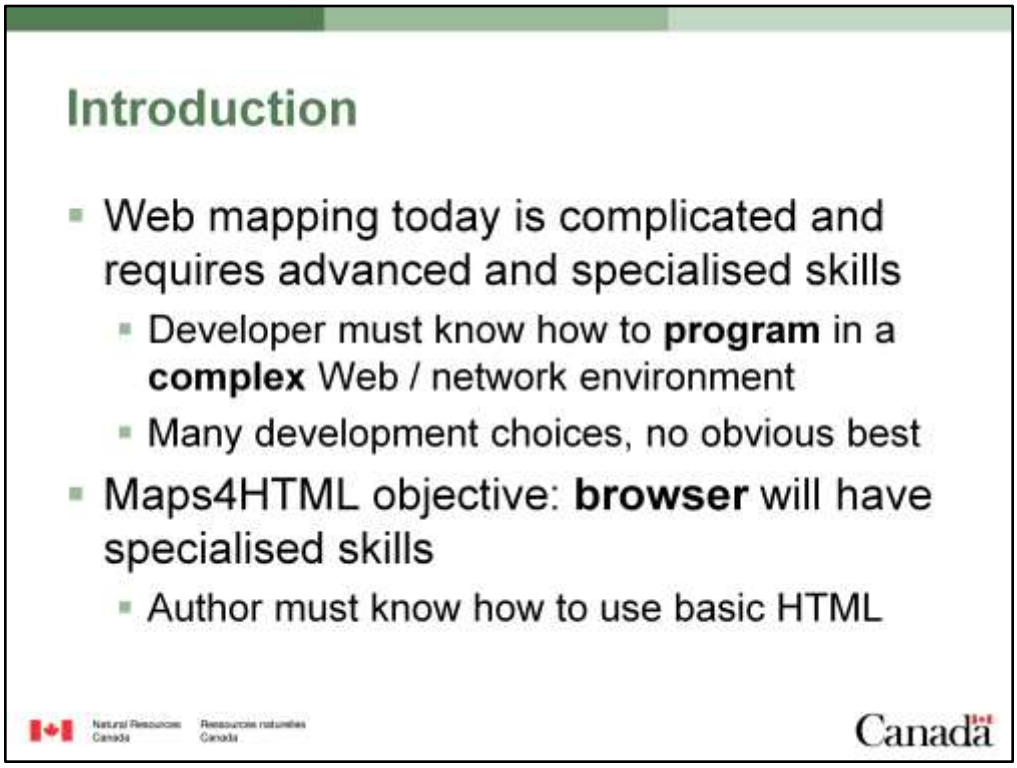
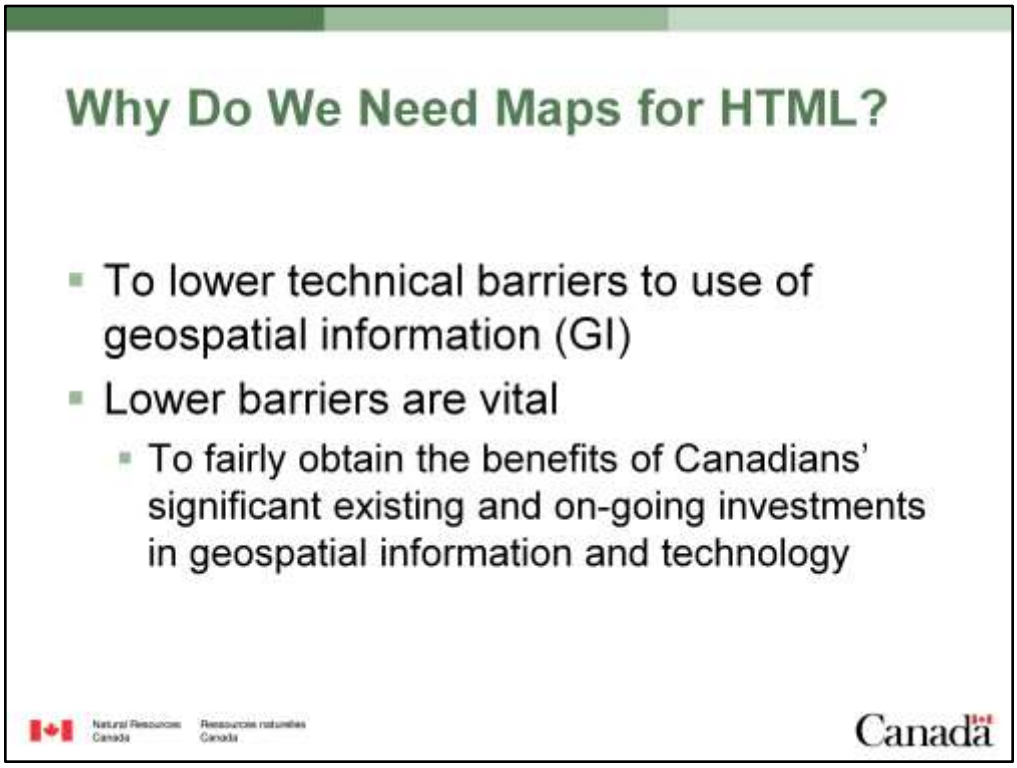


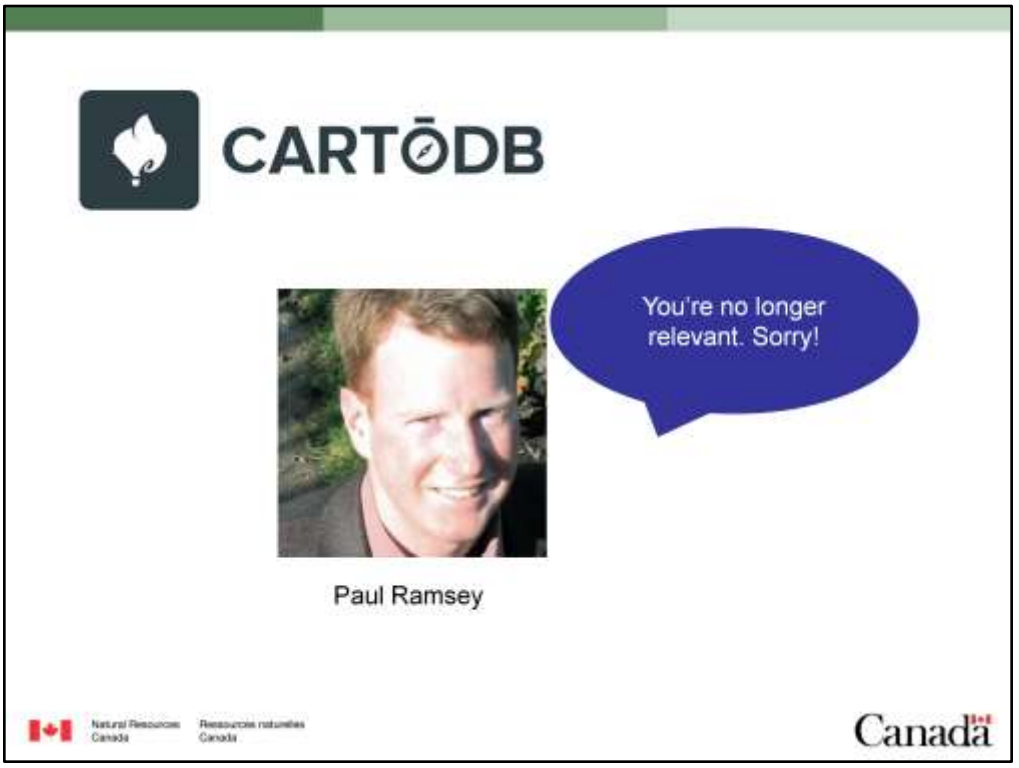
I work for Natural Resources Canada in the Canada Centre for Mapping and Earth Observation, where as a technologist and developer, I have been supporting the development of geo-standards, spatial data infrastructure, or “SDI”, and open spatial data for about 10 years.



Today, I'm going to talk about the community, concepts and technology of the Maps for HTML Community Group. The objective of the Maps for HTML initiative is straightforward: to extend HTML to include Web map semantics and behaviour, such as users have come to expect of Web maps.



Before getting in to the technology discussions, I think it's really important to back up and take stock of the situation facing mapping professionals today.

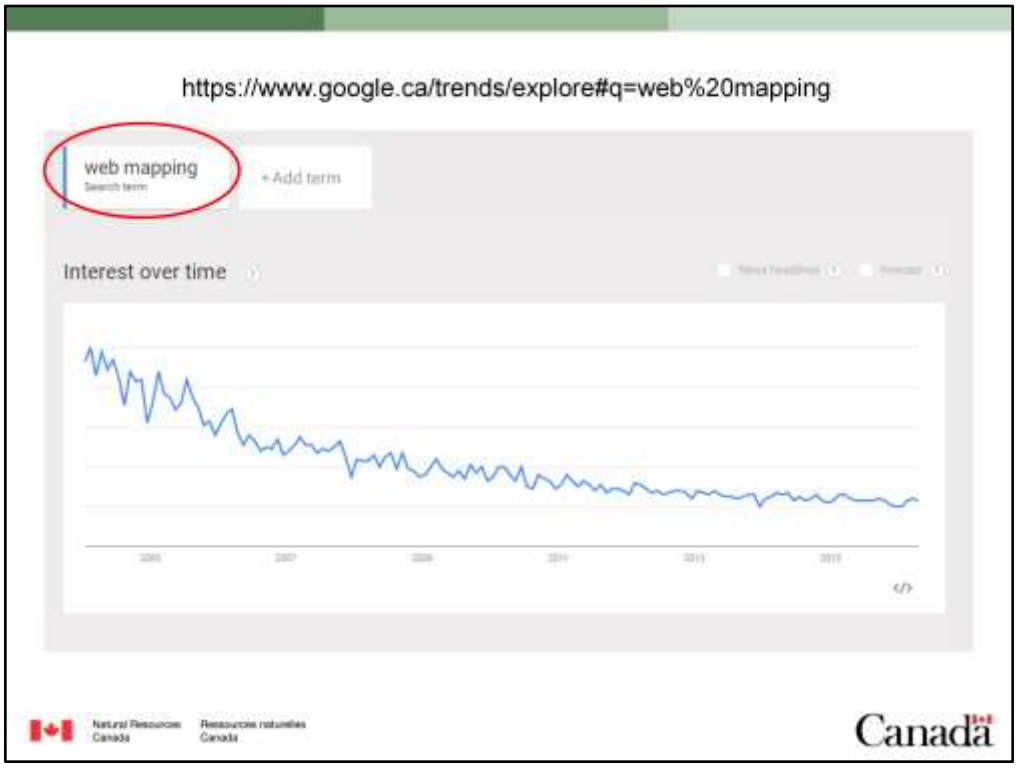


Paul Ramsey is a leader in the open source geospatial software development community who currently works for the CartoDB consumer web mapping platform.

In a recent presentation to a meeting of Canadian government mapping executives, Paul told us that government mapping programs were no longer relevant. In fairness, Paul did say sorry for having to say that.

You know, sometimes it is hard to hear the truth, and I would have to say that Paul wasn't completely wrong, so what I really want to say in response to Paul is 'thank you'.

Thank you for the opportunity to talk about a subject that has been in the back of my mind not just since I began promoting standards for geospatial information and Spatial Data Infrastructure, and open spatial data, but since the first day I did 'View Source' on an HTML page containing a Web map and did not see anything that could possibly produce a map.



You see, while Paul rightly points out a declining sense of relevance in the current era, I think he makes a scope error when he ascribes this decline only to government mappers, and SDI. From where I sit, I can see that this decline affects geographic information professionals who don't work for Google, Apple, Uber or HERE, which is most of us.

To make a long story short, in the internet era, Paul asserts you are relevant proportional to the amount of attention you attract. In the old days, paper maps were valuable, but infrequently consulted. Today, almost everyone has a mobile phone, and they consult maps or spatial information on their phone on a minute-by-minute basis. According to Paul, and I agree, the key to garnering attention is to get our maps and spatial data on to those phones. But how? Paul says that because Developers are the gatekeepers in today's world, the answer lies in making it easy for Developers to add a map to this. Except he says that developers don't know bupkus about maps and spatial, so there's a problem.

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My belief is that much of BOTH the spatial and Web communities have so far failed to realize something which has led to the decline in relevance of Web mapping and has also failed to bring the Web to its full potential.

This is where Paul and I begin to not see things the same way. Whereas Paul sees the key to regaining relevance is to be negotiated through developers, I believe that the key to relevance for Web mapping is through a community effort towards giving citizens the power to create Web maps. If those citizens happen to be sophisticated JavaScript programmers, then great! – make the tools created by the community work for them too. But, give the power of map creation and use to any citizen, in a similar way that HTML gave anyone the power to express themselves.

Friedrich Hayek

"The problem… is determined… by the fact that the knowledge of the circumstances of which we must make use never exists as dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess."

Chocolate

"A little reflection will show that there is a body of very important but unorganized knowledge…: the knowledge of the particular circumstances of time and **place**."

Peanut Butter

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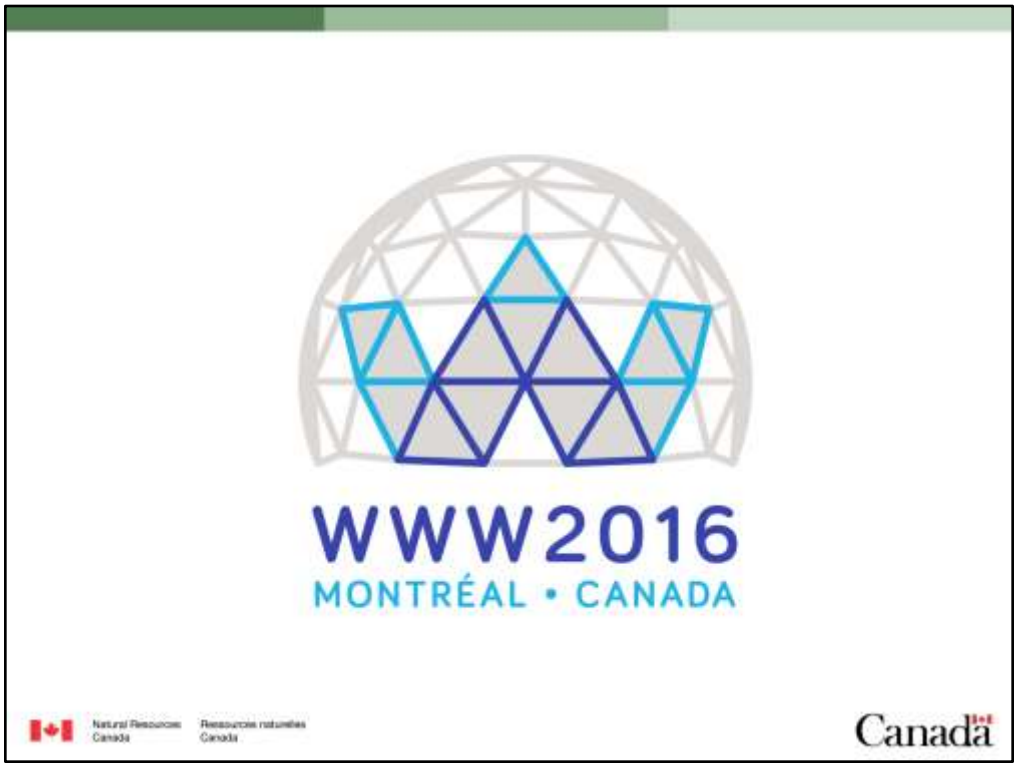
In a widely-recognised landmark paper of the 20th century, the Nobel prize wining economist Friedrich Hayek outlined the central problem to be understood when addressing issues of economic planning and decision-making.

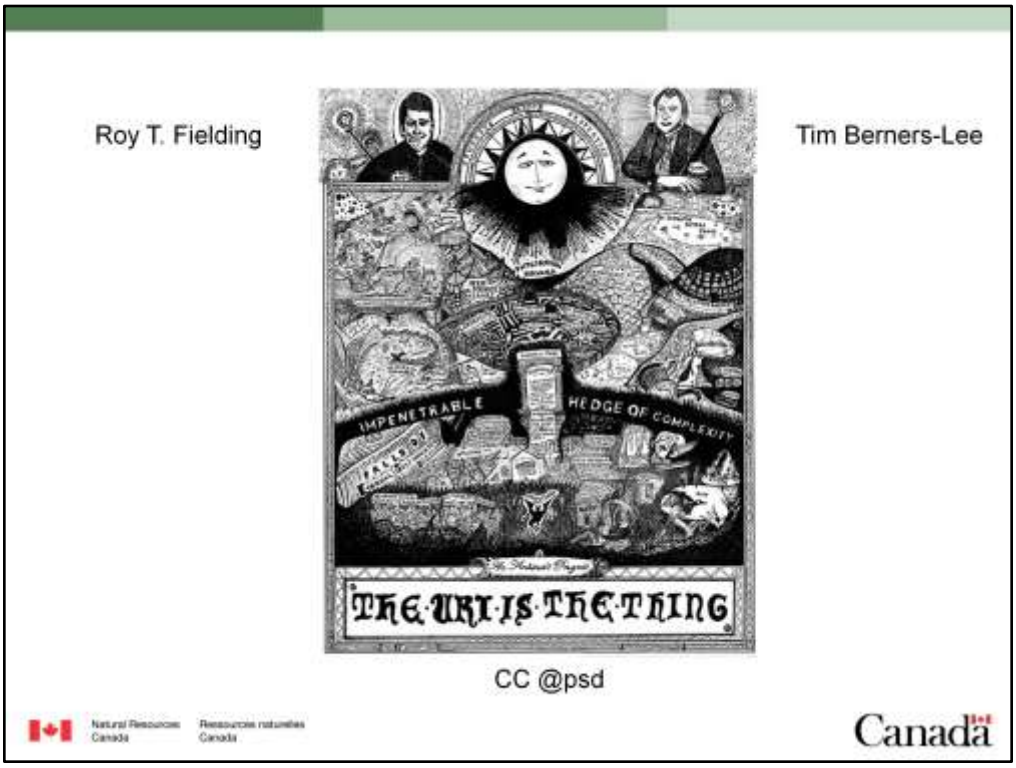
The problem to be solved was that the knowledge required for decisions existed only in diffuse form, among separate individuals, and in particular the knowledge of the circumstances of time and place were elemental. Let's call these kinds of knowledge "Chocolate" and "Peanut Butter".

The problem described by Hayek, was neatly addressed later in the last century, with the invention of the WWW.



The first mistake was one that the spatial community made, in not realizing that the Web is an invention which is every bit as important to future civilization as the printing press was at its invention. Some have even compared the scale of achievement of the Web invention to that of the invention of language itself, because unlike the printing press at its dawn, language is inherently de-centralized.

Whatever the scale of achievement, it is bigger than many in the spatial community recognize. So, it's of the utmost importance for our community to understand the nature of that invention, and the reasons for its success, in order for us to bring maps and spatial information to their full potential on the Web.



A key reason for the success of the Web is that is deceptively simple. When I say simple, I mean the kind of simplicity that is elegant, like E=mc2 for example, not that it is simplistic. So, perhaps it is understandable that the spatial standards and software community would fail to understand this, and to influence the Web to achieve its full potential: they thought of the Web merely as another distributed computing platform to be brokered, not as an underlying and ubiquitous information space.

Waldo
Tobler

Tobler's First Law of Geography:

"Everything is related to everything else, but near things are more related to each other"

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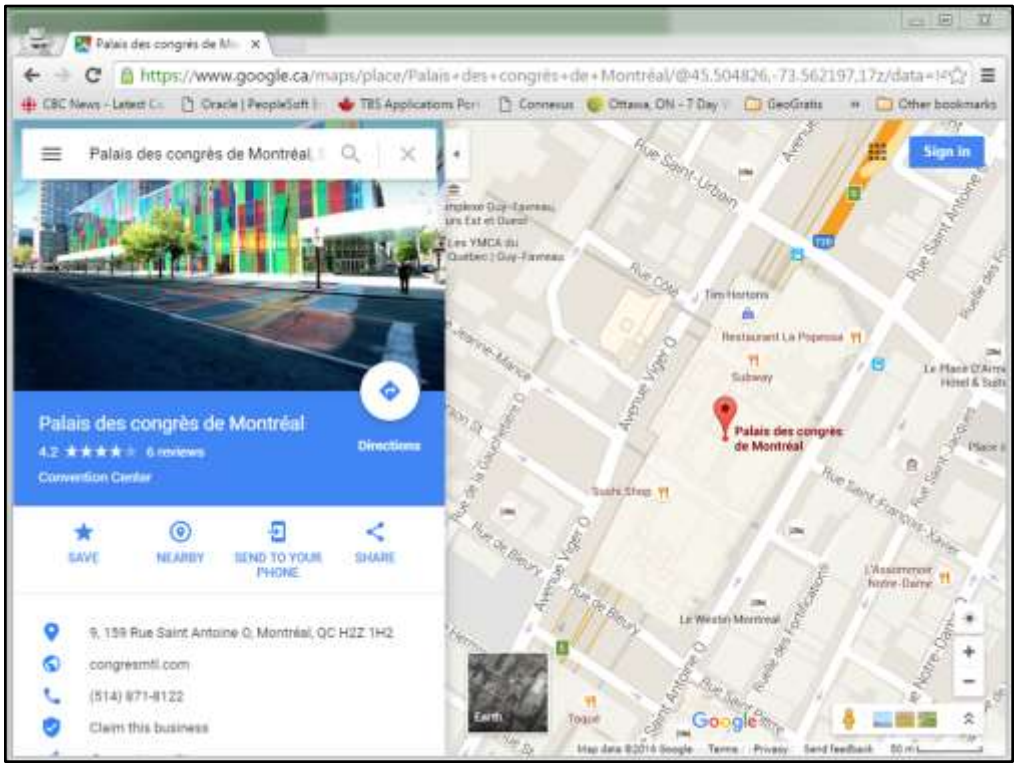
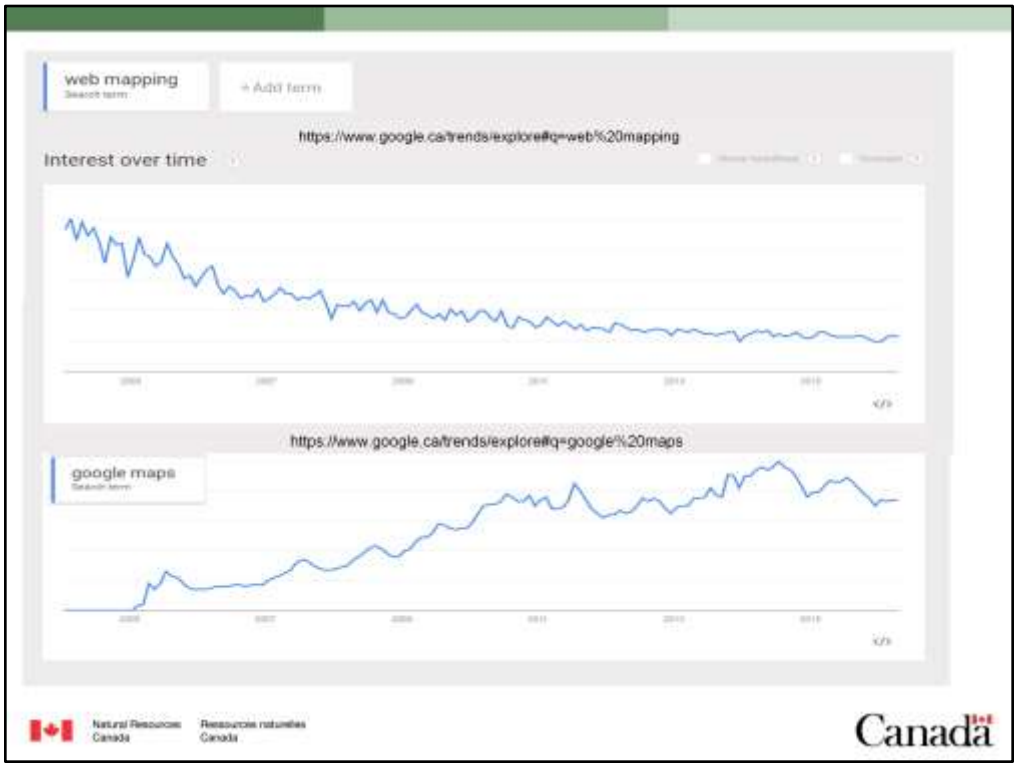
But Friedrich Hayek also understood something that neither the Web nor spatial communities did when their respective standards were developed. And that is the fact that spatial information is elemental to human knowledge: spatial information and Web information go together like chocolate and peanut butter!



Google alone perhaps has recognized and capitalized on this fact. I won't knock Google for having revolutionized the Web mapping industry, right out from under the feet of the SDI community.

But, for all the fantastic information one can get from Google maps, it will never, ever contain all the spatial information we need to be the best decision makers we can be. Nor will Google + Apple maps, nor Google + Apple + CartoDB +… you get the idea. There is no one source of information that contains, will contain nor can contain the information we need to make effective decisions.

We need a Web of Maps for that.

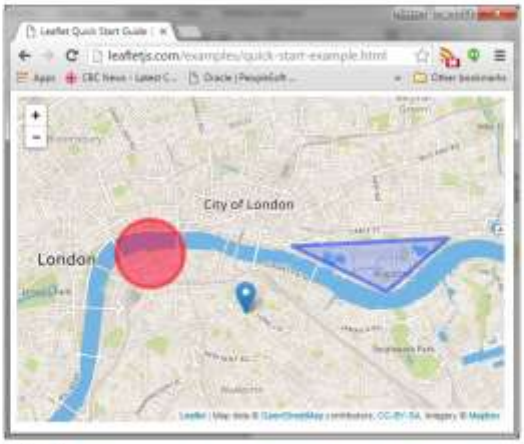


In the same period that Google Maps' relevance has increased, consumer interest in Web mapping has declined. So you can see that some Web maps are indeed relevant.

On the other hand, maybe this represents a good moment in history to *truly* standardize Web mapping: the patterns are established, the concepts are understood, everybody uses them, and the Web is stable.

Web mapping today

- Modern Web Map: Leaflet



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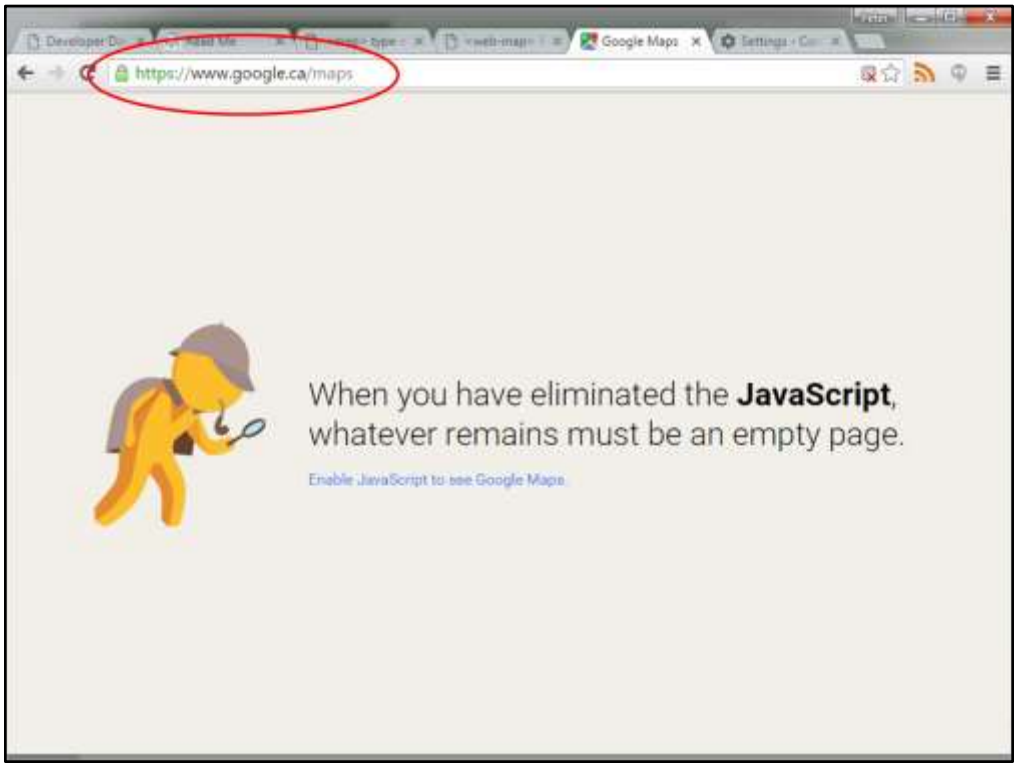
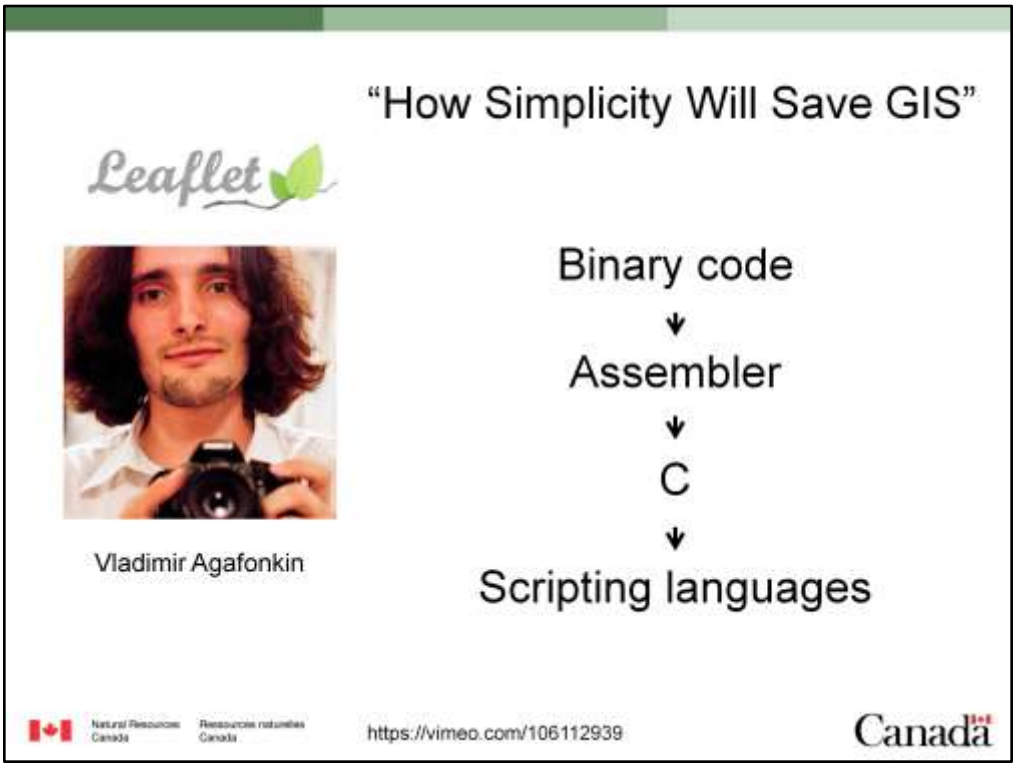
Leaflet is a Web-based JavaScript library for Web mapping. It makes web mapping simple, for a developer. In fact, one of the central goals of Leaflet is simplicity.

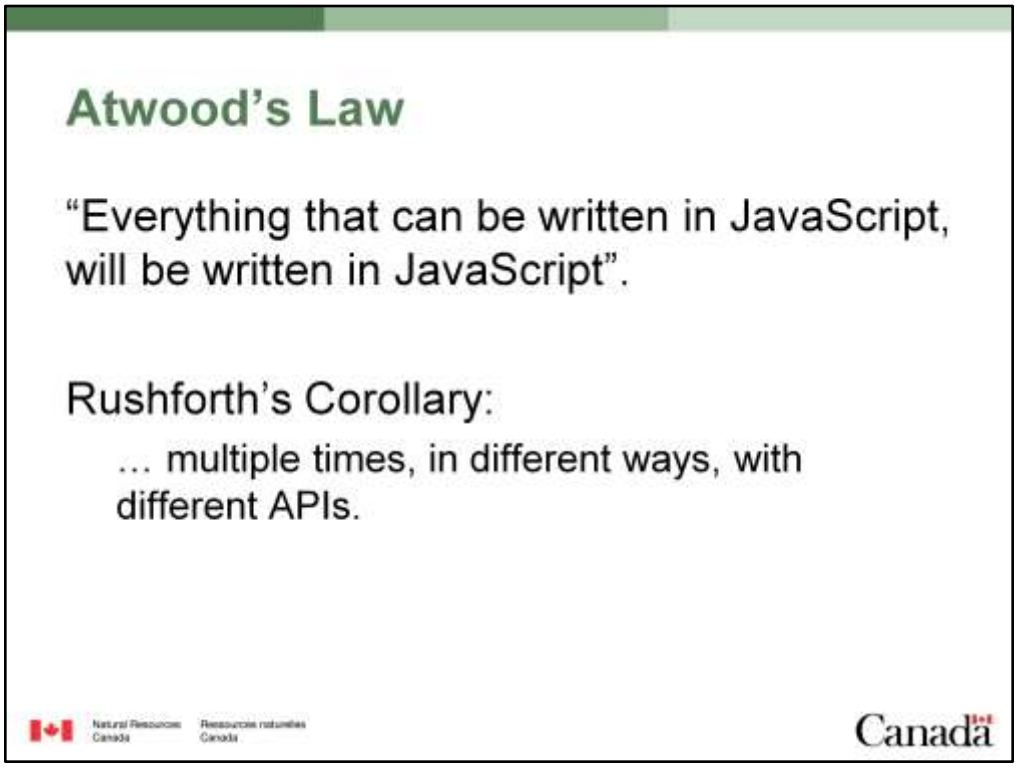


Complexity is where SOA-based SDIs failed to gather attention: they were based on standards that were directed at developers, and maybe they were even too complex for them. This is even where APIs, such as Google Maps, OpenStreetMap, CartoDB, Leaflet etc. fail: they too are directed exclusively at the developer, and even they are too complex.

All web mapping techniques today rely on JavaScript. In consequence, they leave the Web no richer for their existence: spatial information is centralized, invisible and ephemeral. More on that later.



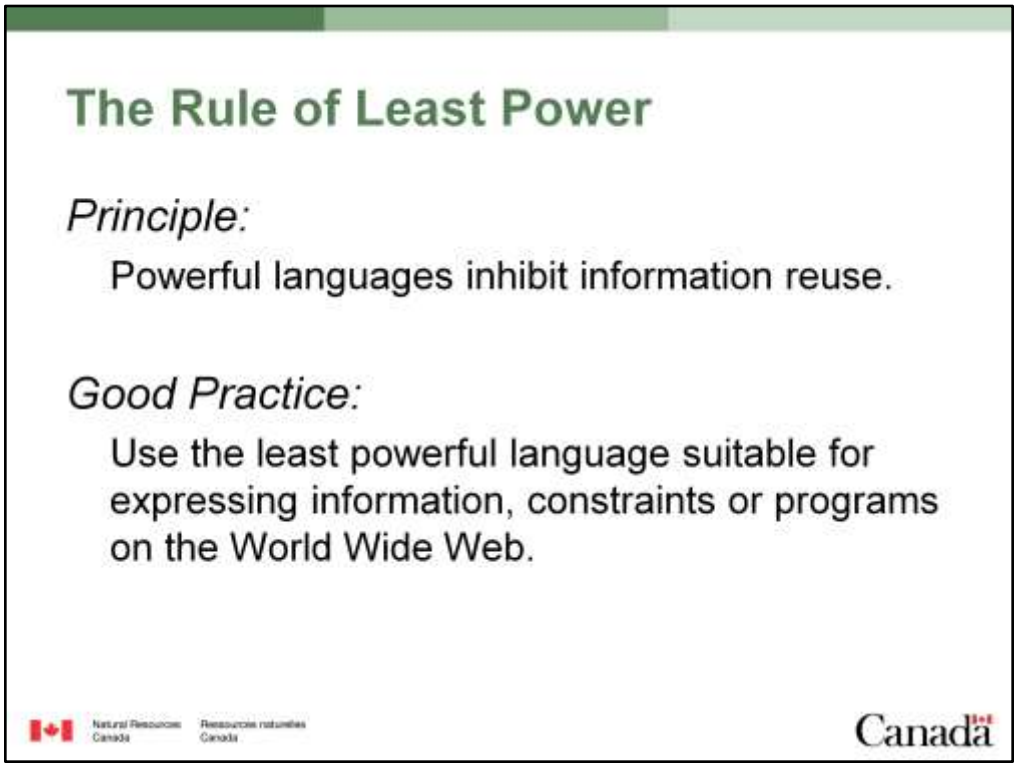
Vladimir Agafonkin is the original author and a principal contributor to Leaflet.js. In 2014, Vlad gave a talk at FOSS4G entitled "How Simplicity Will Save GIS". The talk is on vimeo, and I highly recommend you watch it. In it Vlad mentions the many virtues of simplicity, and these are clearly reflected in the Leaflet code base.
In one very interesting segment of that talk, he discusses how in the beginning, all programming was done in binary coding. Later, assemblers were invented, and coder productivity exploded. The same effects were encountered when C was invented, and once more with scripting languages, like Python, Ruby and JavaScript.



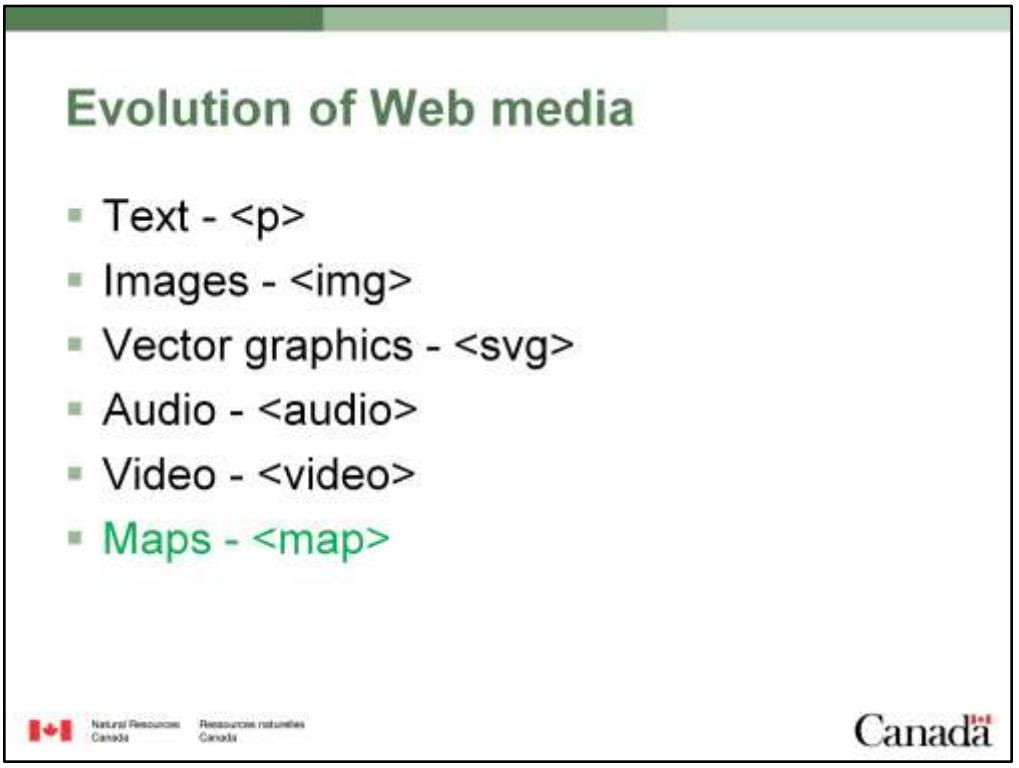
Which brings us to Atwood's Law. Jeff Atwood is one of the founders of StackOverflow, and a well-known and entertaining blogger. In the days of ascendant JavaScript, when XML was still fighting back, Atwood coined his law as a way of attesting to the effectiveness of Web programming, by trying to demonstrate a consequence to the Rule of Least Power, which if you don't know, was a principle elaborated by Tim Berners-Lee and the W3C. Unfortunately, I think Atwood mixed things up a bit, since the truth of his statement relies on the sophistication of JavaScript as a programming platform, not its simplicity. All the same, his point remains valid.

So, it's great that Web maps can be written in 100% JavaScript, and they have been.

Unfortunately, doing so bypasses many of the benefits of the simplicity of the Web, and compounds the problem of getting maps and spatial data into the hands of decision makers, for various reasons, one of which is what I'll call Rushforth's Corollary to Atwood's Law. The knock-on effects of Rushforth's Corollary are such that the barriers to developers and decision makers in using Web maps are increased by JS, not decreased.



HTML and CSS are declarative and simple. Use them where possible and suitable.

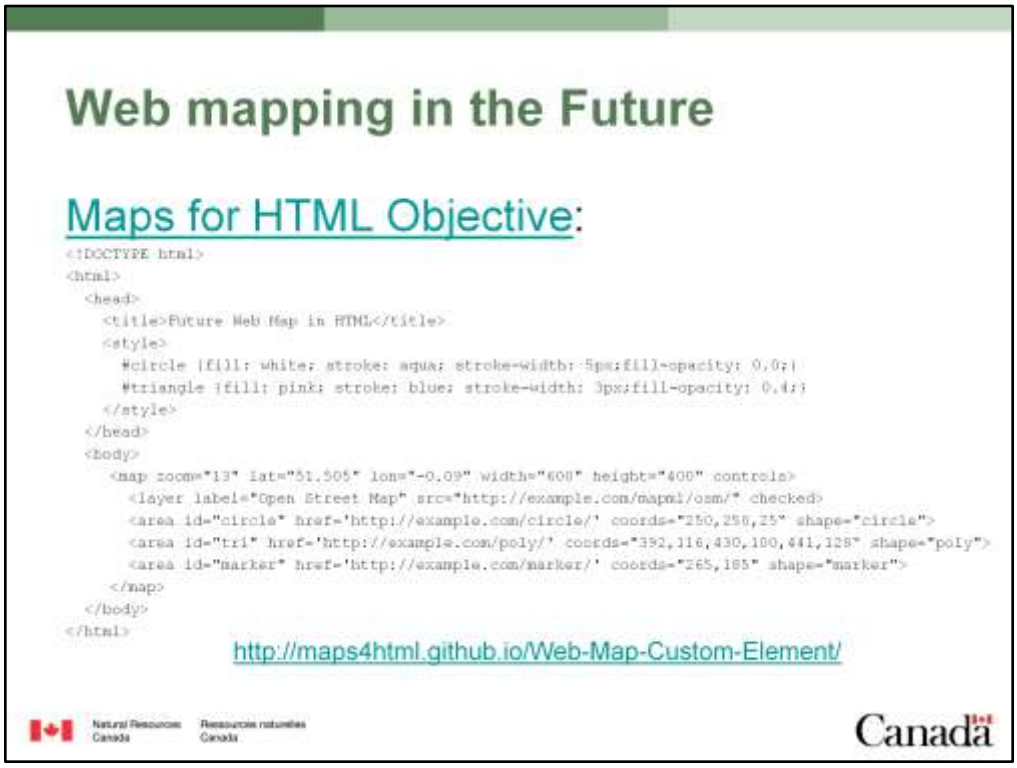


HTML is the least-powerful core of a set of *citizen*-oriented standards (HTML, CSS, JS) that progressively scales, making increasingly sophisticated applications possible.

HTML has evolved over the years to incorporate different media types, some of which were formerly accomplished by proprietary plugins and scripting languages. The next step in the evolution of the simplicity that will save GIS, thereby increasing the relevance of maps, is the addition of maps as a media type and element within the HTML vocabulary.

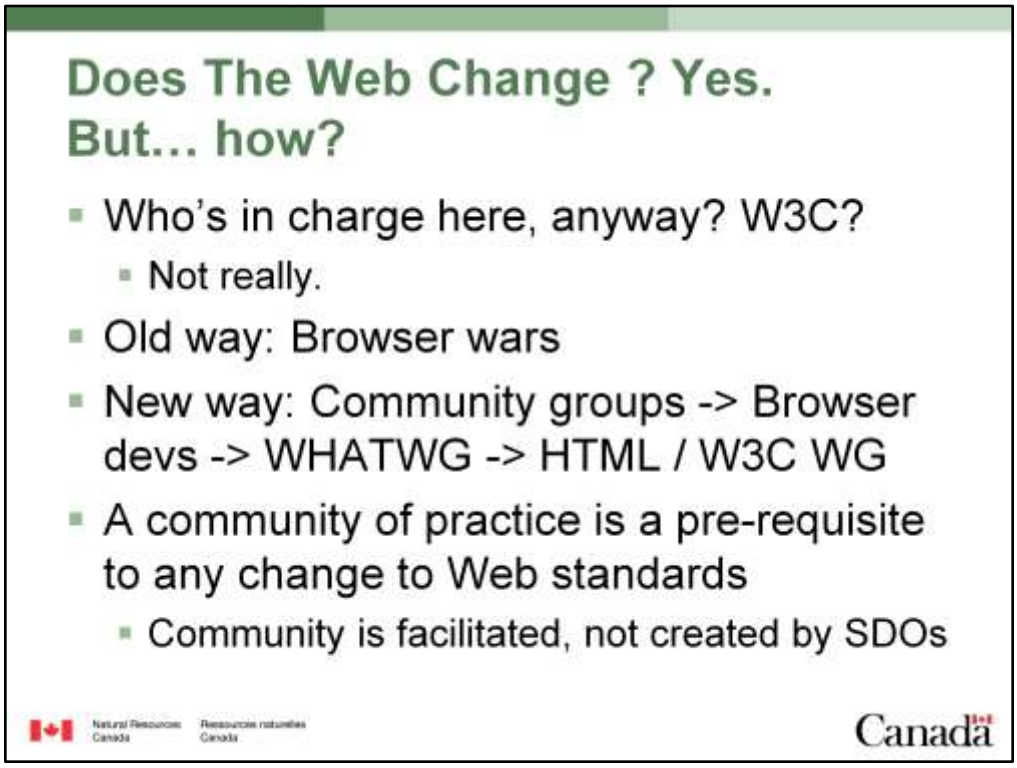
The reason a Web of Maps, and therefore Maps for HTML, is possible is because it uses the simple, successful genius of the Web invention: URLs, media types and the Uniform Interface.

One key architectural consideration that Tim Berners-Lee has written about when discussing the invention of the Web is called the 'Test of Independent Invention'. In that test, one asks: "in order for this system to succeed, do other systems that do the same thing have to die?". In the case of Maps for HTML, the answer should be an emphatic "No!", because through the magic of media types and the Uniform Interface, we are able to incorporate the technologies of Web mapping as they exist today, without waiting for them to die off. So we invite Google, Apple, ESRI, OpenStreetMap, MapBox, CartoDB, OpenLayers, Leaflet, OGC , W3C and the rest of the spatial and cartographic community to participate, because this is not a threat to their work: it is complementary, and the path forward.



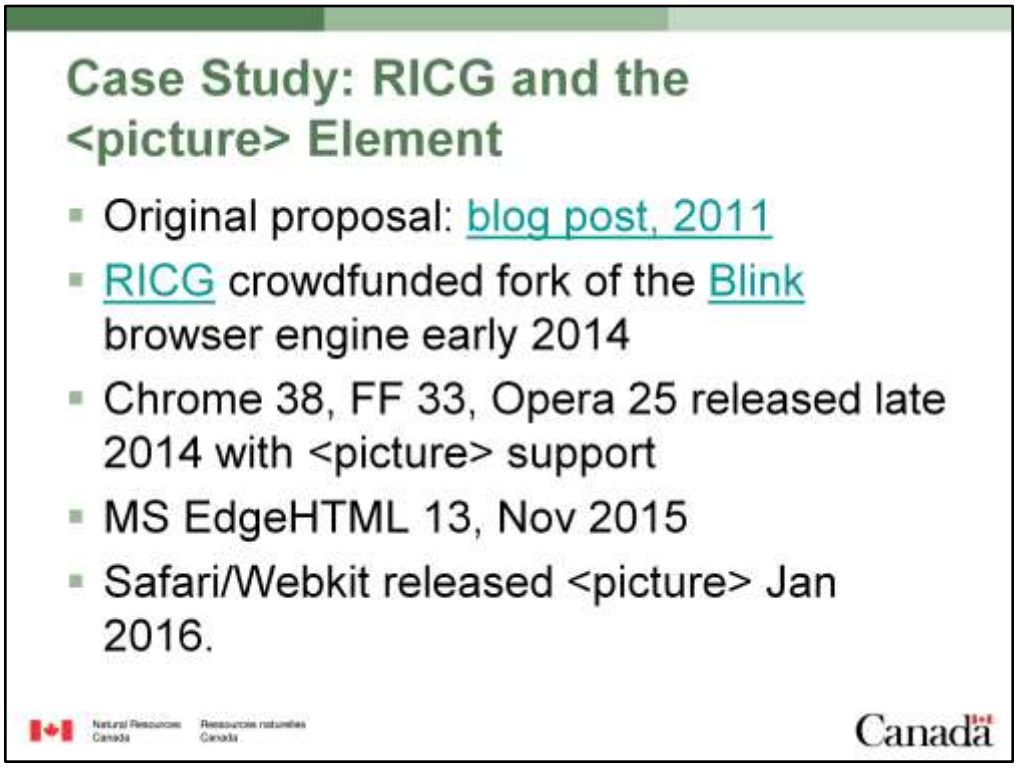
Over the past year, I've been working on a prototype implementation of this syntax as a Custom Element. Today that element, together with draft specifications for its behaviour are available on Github. I'll give you a quick demo of the element, but I invite you to play with it your self and possibly to create your own Web maps with it as an experiment. I am always looking for feedback about things that could work better. In the coming year I hope to solidify and release the code base as what I would like to be able to call "beta" level function.

http://maps4html.github.io/Web-Map-Custom-Element/

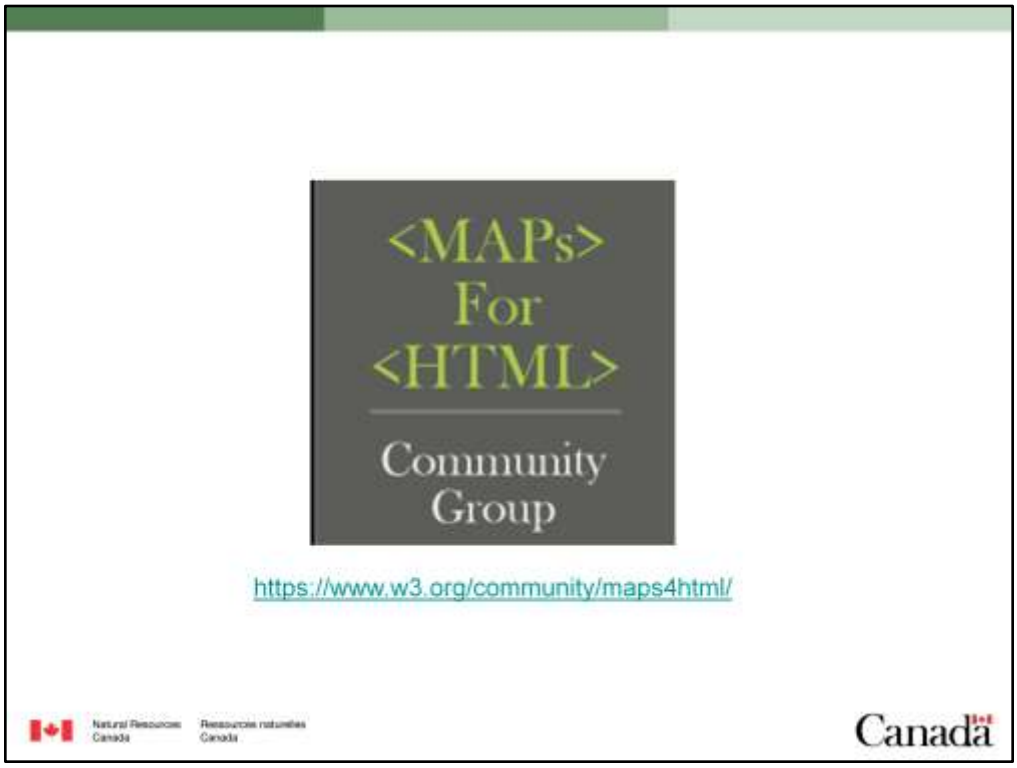


SDO = standards defining organization

If there's one thing that characterizes spatial data, it is community. So come on people, let's get together here!



The most recent and an excellent example of the evolution of HTML and the Web is the <picture> element / Responsive Images.



Let's do the same with maps on the Web. Maps For HTML is small, but GROWING!! Join us!

https://www.w3.org/community/maps4html/