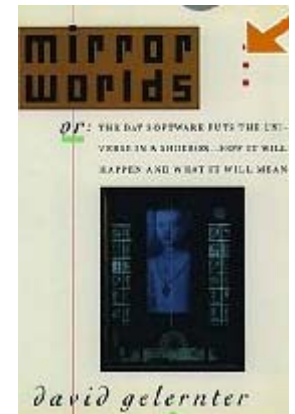

Google Maps API – Overview and Insights

Dr. Franz-Josef Behr



“Imagine looking at your computer screen and seeing reality – an image of your city, for instance, complete with moving traffic patterns, or a picture that sketches the state of an entire corporation at this second.... These will soon be available to anyone.”
David Gelernter, 1991: “Mirror Worlds”



Outline

- Google Maps API: History and overview
- Inside Google Maps API
- Community
- Mashups
- A step by step tutorial
- Summary

Google Maps API



History

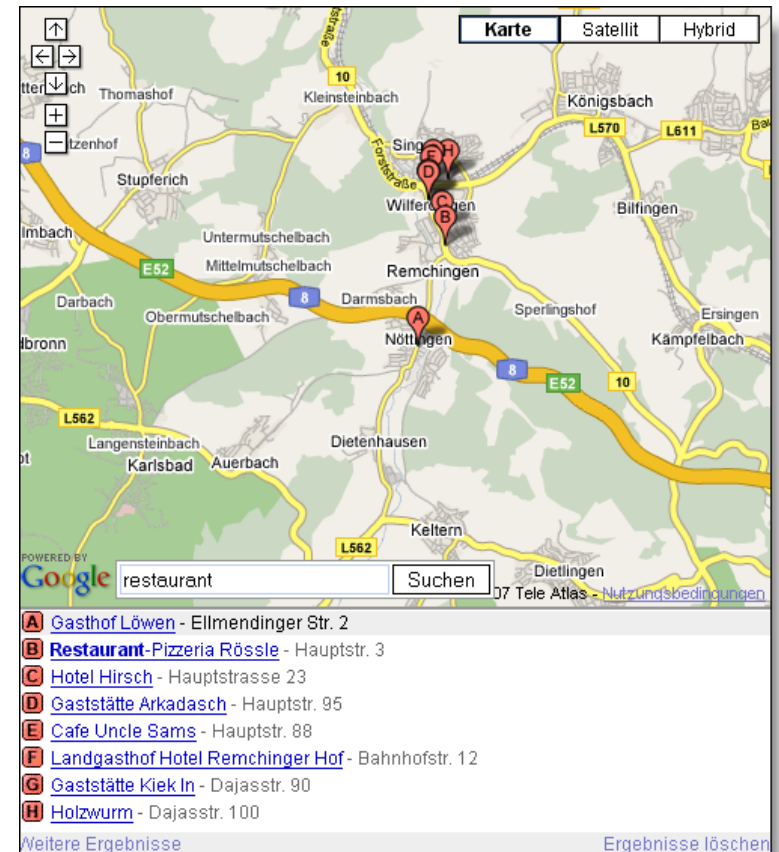
- Google Maps: Feb 7, 2005
 - [First re-engineering approach](#): Feb 9, 2005 (two days later!)
 - Jesse James Garrett's article "[Ajax: A New Approach to Web Applications](#)": Feb 18, 2005
 - [Maps API released](#): June 29, 2005
 - April 3, 2006, Google releases version 2 of the Mapping API
-
- Oct 23, 2008: Reverse geocoding added

Google Maps API – what's all about?

- no proprietary plug-in required
- using standard technologies (JavaScript, CSS, Ajax) in new and interesting ways
- Developers (and users) can now produce custom maps and embed them in our own web pages
- Google Maps became a JavaScript widget
- The service is free, but is not open source!

Google Maps API – what's all about?

- It's business.
- It's about earning money by advertisements.



<http://googlemapsapi.blogspot.com/2007/09/mashing-around-australia-add-local.html> [2007-09-25]

Terms of Service Summary

- Your service must be freely accessible to end users
- No intranet sites (except for development and testing)
- Must leave Google logo
- Google retains right to add advertising to map
- Details: <http://www.google.com/apis/maps/>

"By submitting User Submissions to the Service, you give Google a perpetual, irrevocable, worldwide, royalty-free, and non-exclusive license to reproduce, adapt, modify, translate, publish, publicly perform, publicly display, distribute, and create derivative works of the User Submission."

http://www.google.com/mapmaker/mapfiles/s/terms_mapmaker.html

Open Source?

- No, it's not open source – even if the source is visible
- JavaScript partially obfuscated

```
/* Copyright 2005-2007 Google. To use maps on your own site, visit http://www.google.com/apis/maps/. */ (function(){var lt=1;
"draggable";var Gl="dscr";var Hl="fid";var Ct="force mapsdt";var Dt="geViewable";var Il="groundOverlays";var Et="hotspot_x",K;
var Ll="screenOverlays",Rt="screenXY";var St="size",ld="snippet";var Ml="span";var Tt="streamingNextStart";var Ut="tileUrlBase
yd="color",Uq="cursor",vk="display",wk="filter",xk="fontFamily",lc="fontSize",yk="fontWeight",fc="height",Jc="left",Vq="lineH
Nq="GroundOverlay";var qk="GeoXml";function y(a,b,c,d,e,f){if(w.type==l&&f){a="<"+"a+" ";for(var g in f){a+=g+"='"+f[g]+' ' ";
function pb(a,b){var c=Fc(b).createTextNode(a);if(b){zb(b,c)}return c}
function Fc(a){if(!a){return document}else if(a.nodeType==9){return a}else{return a.ownerDocument||document}}
function Q(a){return G(a)+"px"}
function Sc(a){return a+"em"}
function O(a,b){rb(a);var c=a.style;c[Jc]=Q(b.x);c[bc]=Q(b.y)}
function Ee(a,b){a.style[Jc]=Q(b)}
function ga(a,b){var c=a.style;c[Tb]=Q(b.width);c[fc]=Q(b.height)}
function Mp(a){return new t(a.offsetWidth,a.offsetHeight)}
function Rb(a,b){a.style[Tb]=Q(b)}
function Yc(a,b){a.style[fc]=Q(b)}
function ym(a,b){if(b&&Fc(b)){return Fc(b).getElementById(a)}else{return document.getElementById(a)}}
function ma(a){a.style[vk]="none"}
function Ap(a){return a.style[vk]=="none"}
function Ja(a){a.style[vk]=""}
function Qa(a){a.style[zd]="hidden"}
function tb(a){a.style[zd]=""}
function Aq(a){a.style[zd]="visible"}
function rd(a){a.style[fd]="relative"}
function
```

Open Source? II

- For many people, the subtle distinction between "free but proprietary" and "free and open source" is lost.
- Google Maps is a prime example of this. While the power of Google Maps is quite impressive, it is at the end of the day a closed-source proprietary solution.
- Usage is governed by a license -- liberal, but not without restrictions.

Source: <http://www.foss4g2006.org/contributionDisplay.py?contribId=26&sessionId=61&confId=1>

Google Maps API – “Free” License

- Key Requirements:
 - You need an API key (based on a Google account)
 - Your service must be freely accessible to end users.
 - You may not alter or obscure the logos or attribution on the map.
- No Page View Limit
- 50,000 Geocode requests per day per API key (15000 per IP)
- No Ads are *currently* pushed by Google onto the Maps API sites.

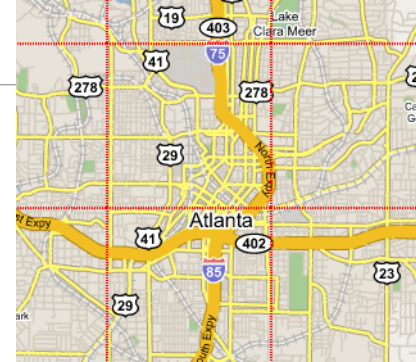
Google Maps API - Enterprise License

- Your Maps API site can run as a pay-to-access service
- Your Maps API site can run behind your firewall for internal business applications
- You get formal Service Level Agreements
- You get enhanced support from Google engineers

Inside Google Maps



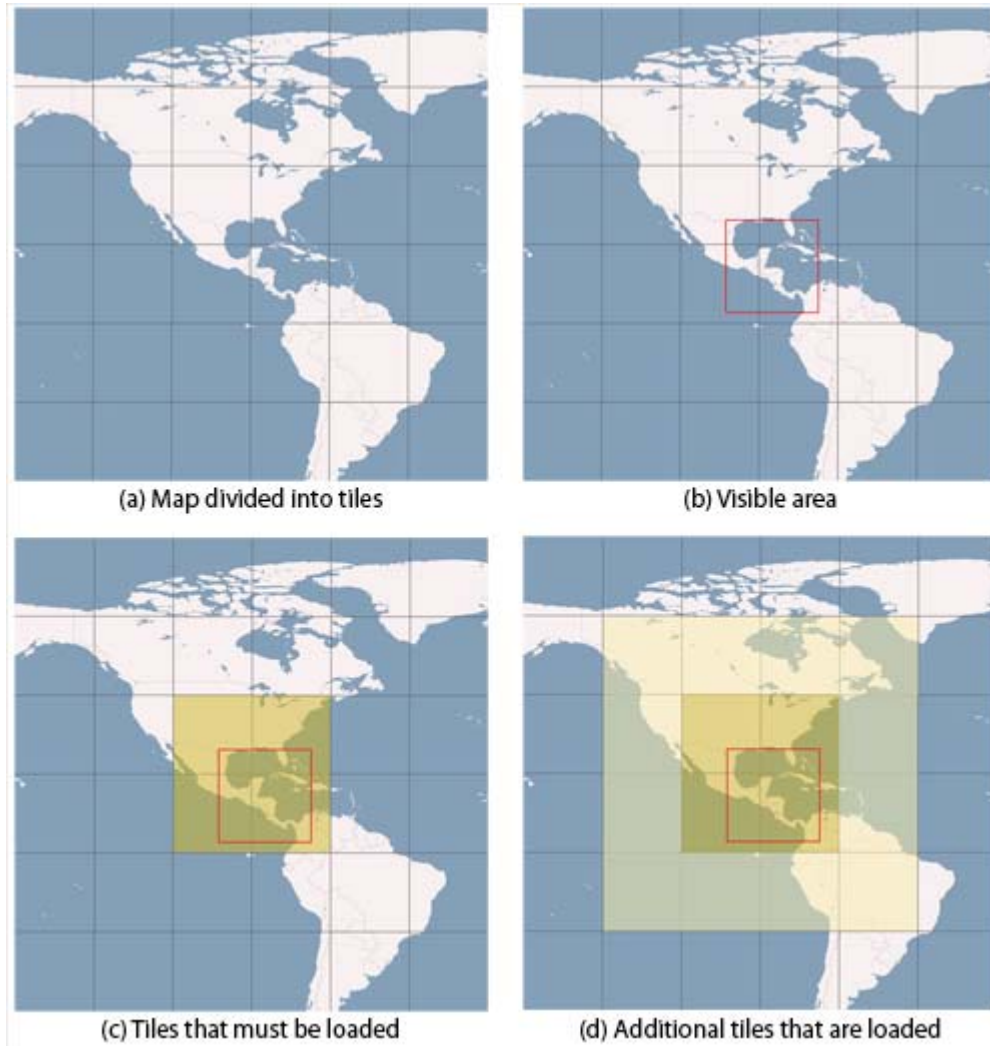
Key features



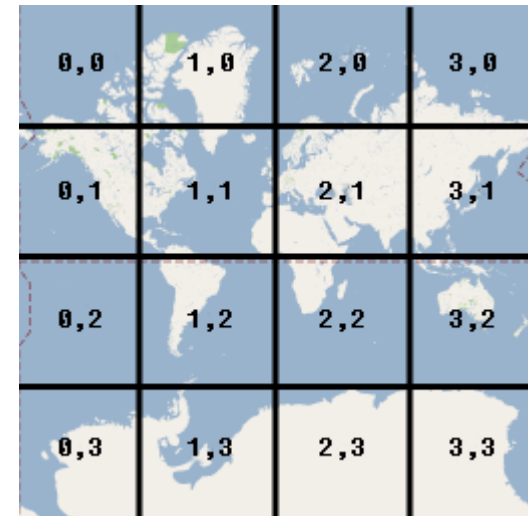
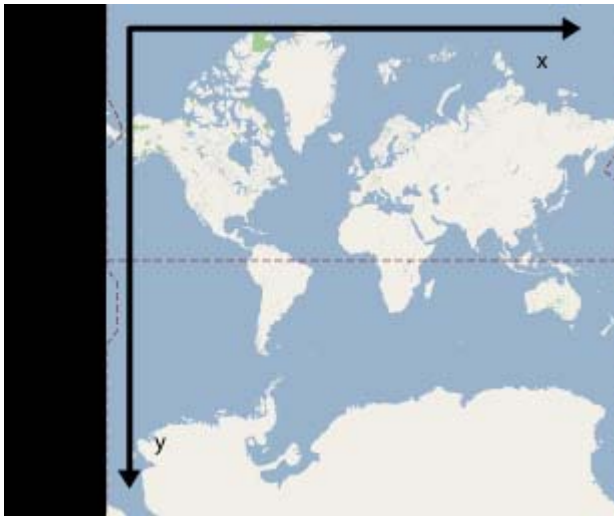
- The portrayal of geodata (the “big image”) is tiled (“tessellated”, “mosaicked”)
 - to download tiles as needed using a simple URL
`http://mt.google.com/mt?v=.1&x={x tile index}&{y tile index}=2&zoom={zoom level}`
- JavaScript is used
 - to handle the mouse events like Click, Drag, etc.
 - to dereference tiles that are out of view
- CSS is used for positioning
 - Both relative and absolute positioning

see: <http://www.davisworld.org/presentations/ryogm.ppt> [2007-09-25]

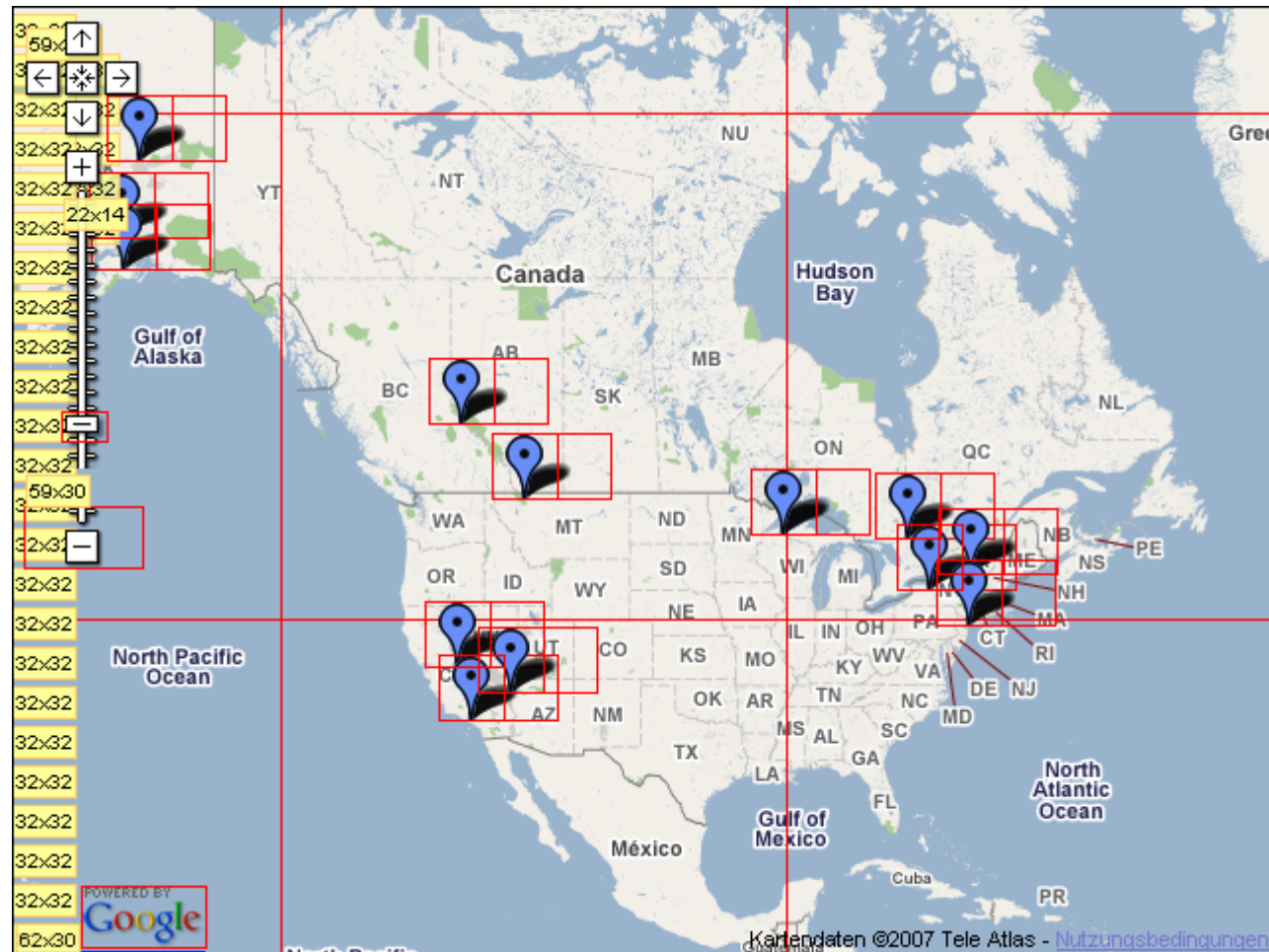
Remarks on tiling



Remarks on tiling: Numbering scheme



Remarks on tiling II

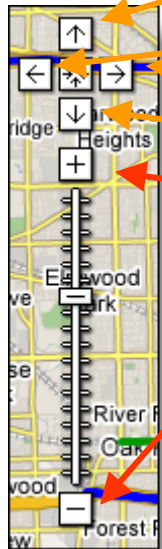


What's behind: <div> and elements

```
<div id="map_canvas" style="border: 1px solid black; width: 640px; height: 480px; float: left; position: relative; background-color: rgb(229, 227, 223);">
<div style="position: absolute; left: 0px; top: 0px; z-index: 0;">
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
</div>
...
</div>
```

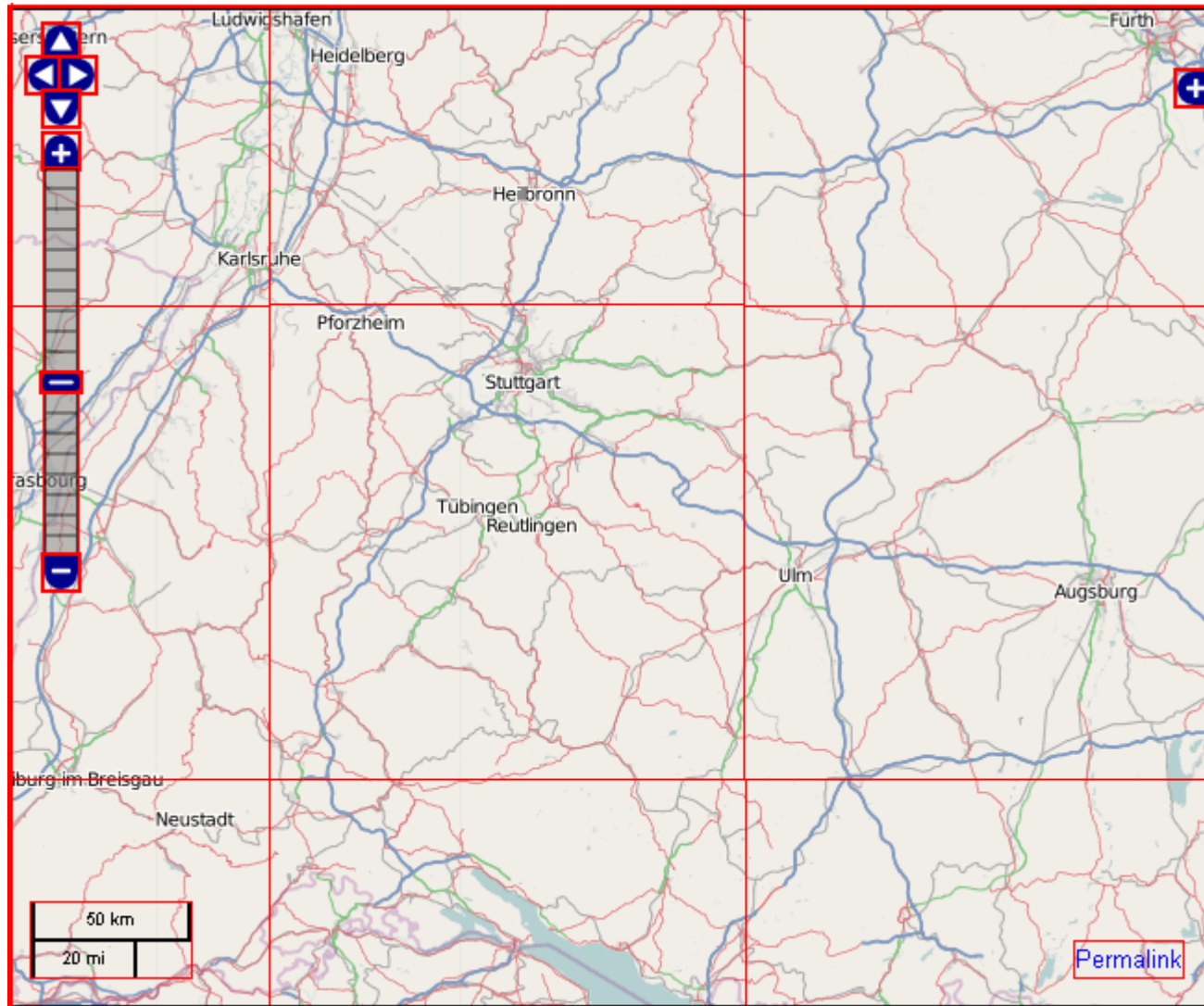
Further information: <http://econym.googlepages.com/howitworks.htm>

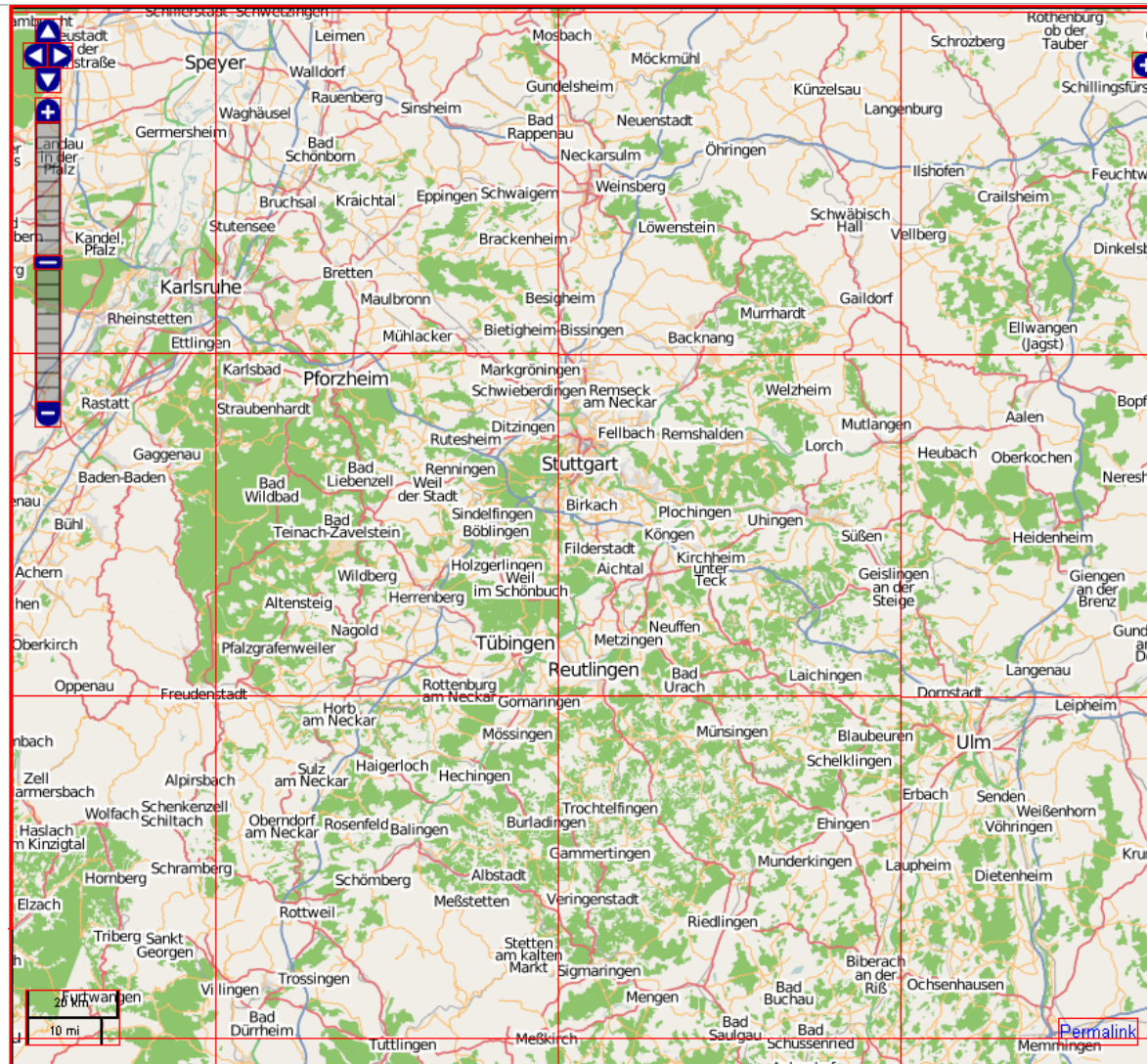
What's behind: <div> and elements



```
<div ...>
<div log="pan_up" title="Nach oben verschieben" style="position: absolute; left:
20px; top: 0px; width: 18px; height: 18px;"></div>
<div log="pan_lt" title="Nach links verschieben" style="position: absolute; left:
0px; top: 20px; width: 18px; height: 18px; "></div>
<div log="pan_rt" title="Nach rechts verschieben" style="position: absolute; left:
40px; top: 20px; width: 18px; height: 18px; "></div>
<div log="pan_down" title="Nach unten verschieben" style="position: absolute; left:
20px; top: 40px; width: 18px; height: 18px; "></div>
...
<div log="zi" title="Vergrößern" style="position: absolute; left: 20px; top: 65px;
width: 18px; height: 18px; "></div></div>
...
<div log="zo" title="Verkleinern" style="position: absolute; left: 20px; top: 11px;
width: 18px; height: 18px; "></div>
</div>
```

Tiling on other APIs (OpenLayers)





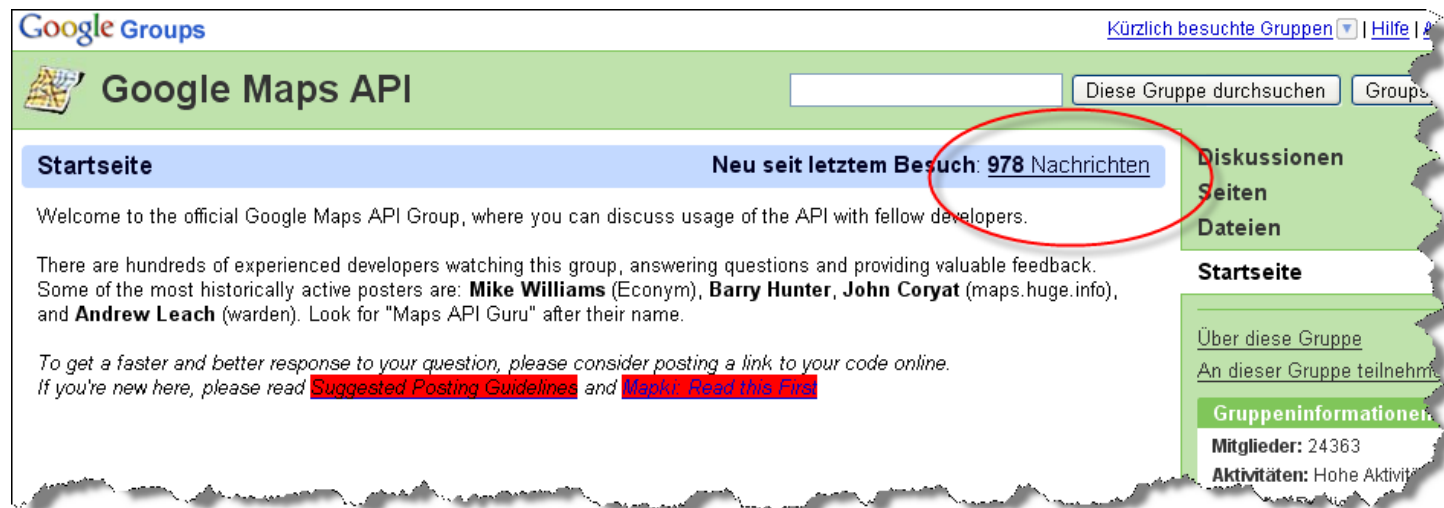
How many tiles are needed?

- At zoom level 20: over 1 trillion tiles to cover the Earth.

Zoom Level	# of Tiles	# Terrabytes
0	1	
1	4	
2	16	
3	64	
4	256	
5	1,024	
6	4,096	
7	16,384	
8	65,536	
9	262,144	
10	1,048,576	
11	4,194,304	
12	16,777,216	
13	67,108,864	
14	268,435,456	0.7
15	1,073,741,824	2.7
16	4,294,967,296	10.7
17	17,179,869,184	43
18	68,719,476,736	170
19	274,877,906,944	690
20	1,099,511,627,776	2750

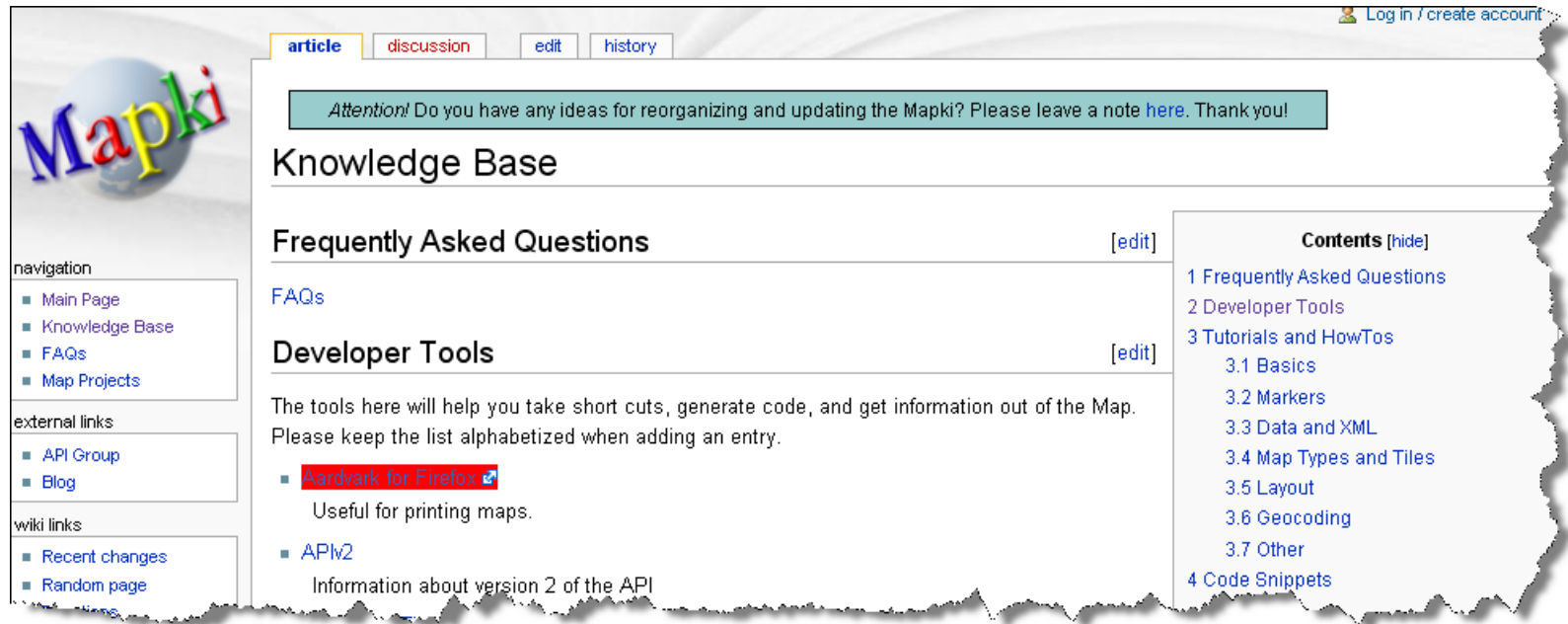
Active developer community I

- <http://groups.google.com/group/Google-Maps-API>
 - >34000 participants, ~4000 messages each month
 - Wiki pages ([API Feature Requests](#), [Known/Possible API Bugs](#))
 - Lots of people to answer questions



Active developer community II

- mapki, http://mapki.com/wiki/Main_Page
- Knowledge Base with Code Snippets
- FAQs, Map Projects
- Tons of existing code to learn from



Active developer community III

- GoogleMapsMania.blogspot.com



- Mike Williams's tutorial:
<http://econym.org.uk/gmap/>



GMaps Utility Library

- New open Source project for Google Maps API development, <http://code.google.com/p/gmaps-utility-library-dev/>, <http://code.google.com/p/gmaps-utility-library-dev/wiki/Libraries>
- Community Members and Google engineers can work hand-in-hand
 - ... to make the core Google Maps API even better
 - ... to keep the core Maps API fast and lean
- Easier for new developers to find all the great Maps API extensions that people have created (?)
- Stable release versions of the library
- Include only those components that you need

Summary: Benefits

- You don't have to buy expensive satellite and map data
 - Perhaps you will explore free sources of imagery and map data
 - You can, of course, serve up your own data as well
- You don't have to host big infrastructure
- You don't have to develop your own cross-browser AJAX mapping framework
 - Well, actually developers invest a lot of efforts and time. But you we can put something pretty respectable together in around 200 lines of JavaScript
 - But you can explore a couple of Open Source frameworks that are turn-key solutions (OpenLayers, MapBender, MapBuilder)

see: www.davisworld.org/presentations/ryogm.ppt [2007-09-25]



References

- <http://www.google.com/apis/maps/documentation/>
- <http://econym.googlepages.com/index.htm>
- http://mapki.com/wiki/Main_Page