

## A Prototype of SVG Map of Land and Building Tax Objects in Indonesia

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## Outline of the Presentation

- Introduction
- Background
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  - Digital Terrain Model (DTM)
  - Tidal flood Simulation
  - Internet GIS
  - Scalable Vector Graphics (SVG)
- Data processing
- Web visualization of simulated flood
- Conclusion and Recommendation

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## Introduction

- Map is a representation of (part) of earth surface using certain map projection & coordinate systems .
- Map may includes topographic map (base map) and thematic map.
- Thematic map contains specific themes such as transportation, population, PBB map, etc.

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## Introduction

- Most of them are in conventional paper-based map.
- Only few people have access to the map.
- Internet offers chance to publish the map and reach wider audience.
- Current web map/internet GIS still having some barriers to be implemented.

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## Introduction

- New standard in web graphic, namely scalable vector graphic (SVG) provide opportunity to develop low cost internet GIS.
- It is based on XML, which is expected to be the backbone of the feature web.
- This study try to explore and proof the usability of SVG to be used in developing LBT map in web form.

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## Background

- The Directorate of Land & Building Taxes (PBB), has already created digital maps of most of the big cities in Indonesia.
- The aim was to build a GIS of LBT objects, and later to increase tax revenue.
- The availability of extensive spatial and attribute data in the SIG-PBB & SISMIOP were invaluable assets for the improvement of public services.

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## Background

- Currently, tax payers have no access to the systems, and they rely on the invoice letter from the directorate to know how much LBT tax they have to pay.
- The idea was to put the SIG-PBB on the internet, which enable the tax payers know in advance the amount of money to be paid to the government.

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## Internet GIS

- GIS is a systems which integrates spatial and attribute aspects of geo-spatial phenomena, and able to perform the following tasks: data input, manipulation/analysis, and presentation of results.
- Internet GIS defined as special GIS tool that uses internet as a means to access and transmit remote data, conduct analysis and present GIS results [Kraak, 2003].
- Some terms with similar meaning and sometimes interchangeable : online GIS, web GIS, online mapping, web map, web cartography and networked GIS.

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## Advantages of internet GIS

- Access to spatial information from all over the world, virtually to anyone who have internet access.
- There is already a standard interface that is understood by many people.
- Low cost investment from the user perspective.

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## Low Growth of Internet GIS

- Lack of spatial data in digital format.
- Although some maps are already in digital, but still not in GIS-ready format.
- Lack of skilled staff to maintain internet GIS.
- Financial obstacles to invest for such expensive internet GIS software from well known vendor with proprietary format.

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## Strategy to Overcome the Situation

- Raise awareness of decision makers about the importance of having spatial data accessible from the internet [example: Clinton's presidential order to make federal data publicly available on the internet].
- Promote the use of internet GIS as part of e-Government initiative
- Convert more maps into digital and GIS-ready format.
- Promote the use of an alternative and low cost format that enable internet GIS/web map

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## Web graphic

### Web graphic today

#### Standardized raster format

- Fixed resolution (poor quality or large size)
- Original content ('information') is lost
- Low interactivity (only 'clickable map')
- No searching/indexing of information

#### Non-standard industry format (proprietary)

Source: Kobben, 2003

### Web graphic of the future

#### Vector graphic, resolution independent

#### 'Content' of information saved

#### Customisable for viewing environment

#### XML-based

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## Vector formats on the Web

Format	Visualization module	use	Level of interactivity	Internal format
SVF	plugin	out-dated	1	Binary
DWF	plugin/applet	rare	2	Binary
Flash	plugin	frequent	3	Binary
PDF	plugin	frequent	1	binary/ascii
SVG	browser/plugin	rare (now)	4	Ascii
PGML	*	*	3	Ascii
WebCGM	browser/plugin	rare	2	Binary
HGML	*	*	1	Ascii
DrawML	*	*	0	binary
VML	browser	rare <sup>3)</sup>	1	ascii
Java2D <sup>4)</sup>	applet	rare (new)	4	binary
ActiveX <sup>4)</sup>	browser	frequent <sup>2)</sup>	4	binary

\*) format specified but not implemented  
 3) only MSIE 4.0+  
 4) not a Graphics format, but graphics library for programmers

\*) 0: simple display  
 1: zoom, layers, links on objects  
 2: external scripts accessing graphics  
 3: animation  
 4: full control on objects and animations

Source: Neumann & Winter, 2001

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## Scalable Vector Graphics (SVG)

- SVG development started at the end of 1998, pioneered by a working group of W3C. First application of SVG format was in September 2001, and since then the W3C recommends it as a standard for graphic format on the web.
- An XML based language used to describe 2D graphic vector
- eXtensible Markup Language (XML) is based on SGML and is designated by W3C as the backbone of the future web [Kobben, 2003].

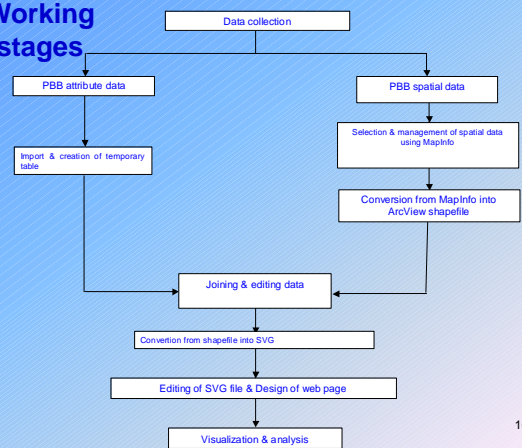
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## Scalable Vector Graphics (SVG)

- Offers advantages among many, previously released, graphic standard for web application:
  - Graphic quality
  - Interactivity
  - Scalability
  - Animated and dynamics map

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## Working stages



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## Important components of web pages

Page	File	Remark
District map	District_map.svg	Contain main map
	District_place.svg	Space for information
	District_legend.svg	Legend of the district map
	District_map.js and n-district_inisialisas.js	JavaScript code to present animation & information
Sub-district map	Subdistricts.svg	Contain main map
	Subdistrict_place.svg	Space for information
	Subdistrict_legend.svg	Legend of the sub-district map
	District_back.svg	Hyperlink to get back to district map
	Subdistrict_inf.js interaktif.js	JavaScript code to present animation & information
Village map	Village_map.svg	Contain main map
	Arrows.svg	Space for information
	Village_legend.svg	Legend of the village map
	Subdistrict_back.svg	Hyperlink to get back to sub-district map
	Inisialisas.js and block_boundary_map.js	JavaScript code to present animation & information

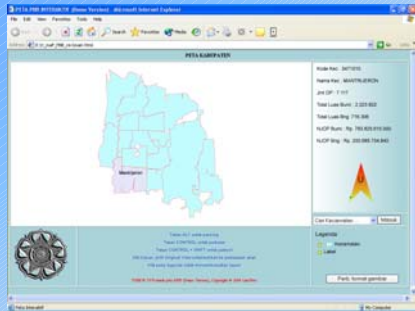
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## Important components of web pages

Page	File	Remark
Block map	Map.svg	Block map
	Head.svg	Title, denoted the block number
	Overview.svg	Overview map
	Query.html	HTML file when a query operation is requested.
	Tb.xml	XML file contain attribute data
	Svgside.svg	Space for information about building objects, located under the right side of main map
	Svgdowns.svg	Space for information about land/parcel objects, located under the main map
	Legend.svg	Contain symbol of 5 themes in block map
	Back.svg	Hyperlink to get back to sub-district map
	JavaScript files (.js)	JavaScript code to present animation & information
	Navigation buttons	Buttons for zooming, panning, interactive distance measurement, and coordinate reading
	Text input	Scale reading
	NOP list	Short cut for zooming in based on NOP

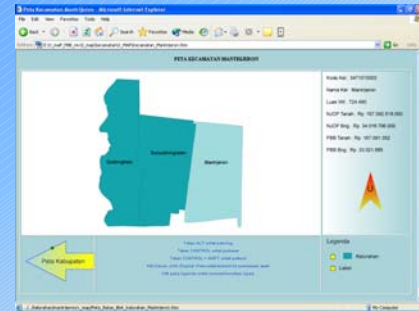
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## Level of maps



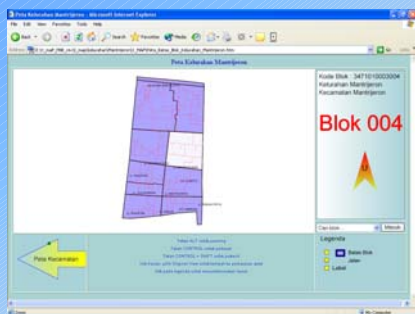
19

## Level of maps



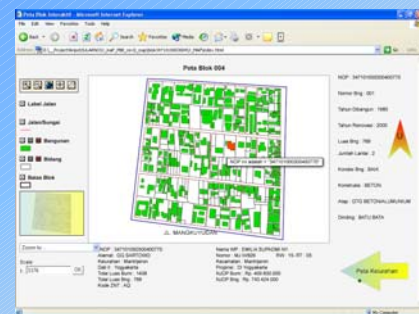
20

## Level of maps



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## Level of maps



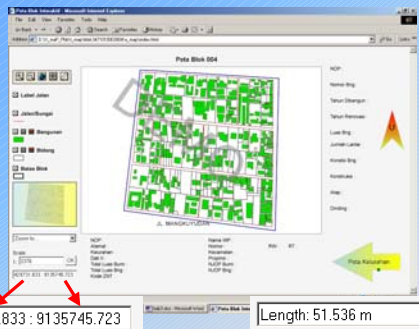
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## Data retrieval



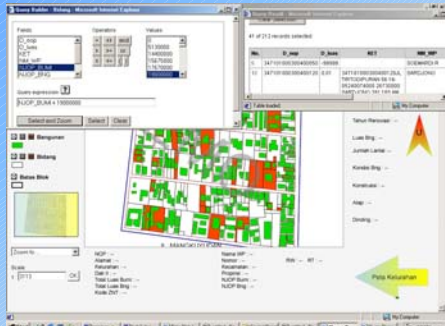
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## Online measurement

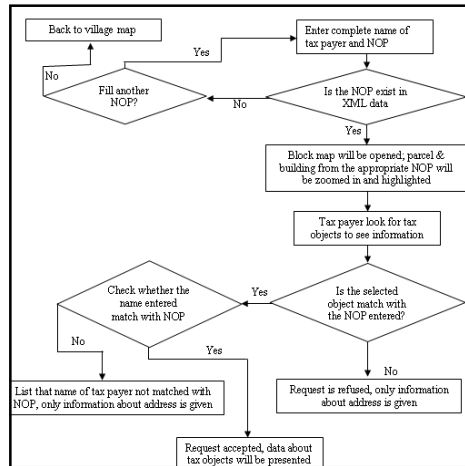


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## Querying the Database



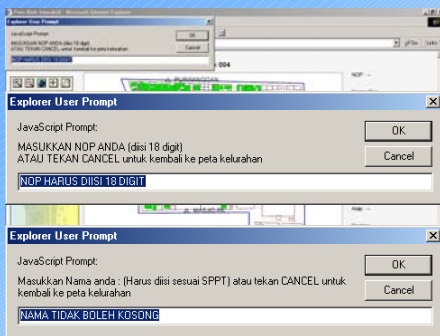
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## Access Procedure

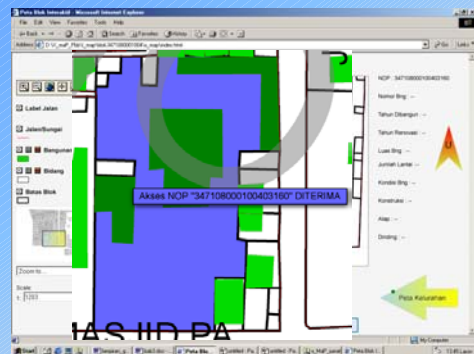
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## Access Authorization



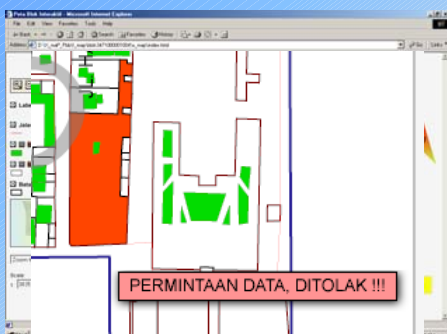
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## Access Accepted



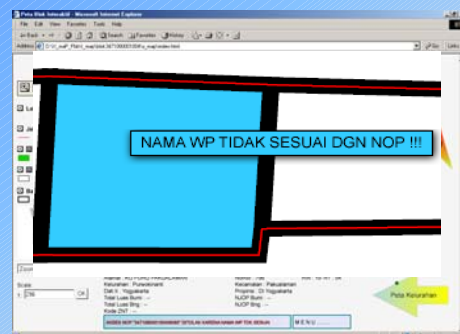
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## Access Refused



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## Access Refused



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## Conclusion

- This paper investigates the possibility of publishing land and building tax objects, and its associated information, on the internet.
- The result was a prototype of SVG map which has successfully been generated from the land and building tax objects map.
- At this current state, the system is still separated with the original database which is in Oracle 8i. An attempt is being done in connecting the SVG map with the database.

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## Conclusion

- Interactivity is one important aspect which can attract tax payers to use the systems. This aspect can be achieved, and the users have full interaction with it.
- To prevent unauthorized users trying to explore others' information, a password mechanism have been implemented. Only the tax payer him/herself who could see his/her tax objects' information.
- The information of the tax objects, such as tax payer's name & address, selling value of tax objects, etc., can be easily attached to and accessed from the map.

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## Conclusion

- The SVG map can, virtually, be used to publish any maps that belong to "public domain" such as RTRW, RDTRK, RTBL, Potensi Daerah with low cost investment.
- The SVG map is platform independent, it can be viewed using internet browser, such as MS Internet Explorer (with free Adobe SVG viewer plug-in) and Croczilla (without plug-in).
- In the near future, it is expected that MSIE can be used to view SVG map without browser.

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**Terima Kasih**

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## Internet GIS

- The development of internet GIS open up new perspective that spatial data can be shared to users who do not have access to GIS software
- Internet GIS shows an interesting application, if it could be integrated as part of e-government.
- Currently there is no a web-based tax information systems, especially with spatial data attached to it.
- On the other hand, public demands on transparency seem to increasing.

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