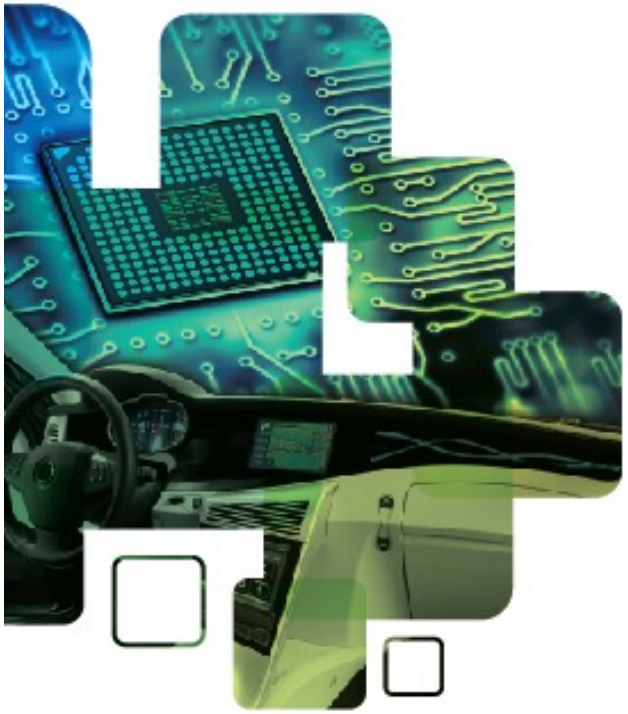

GENIVI®

AMM OPEN DAYS

LBS-Asian Requirements

22-Oct-15/11:00~12:30 | Intended Audience

Joohong Kim
Principle Engineer
ACCESS Company

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Agenda

- Introduction of Web Platform POC
- Navigation Requirements
- HTML5 Vector Navigation Project (details of vector map)
- The Future Plans

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Showcase at last night

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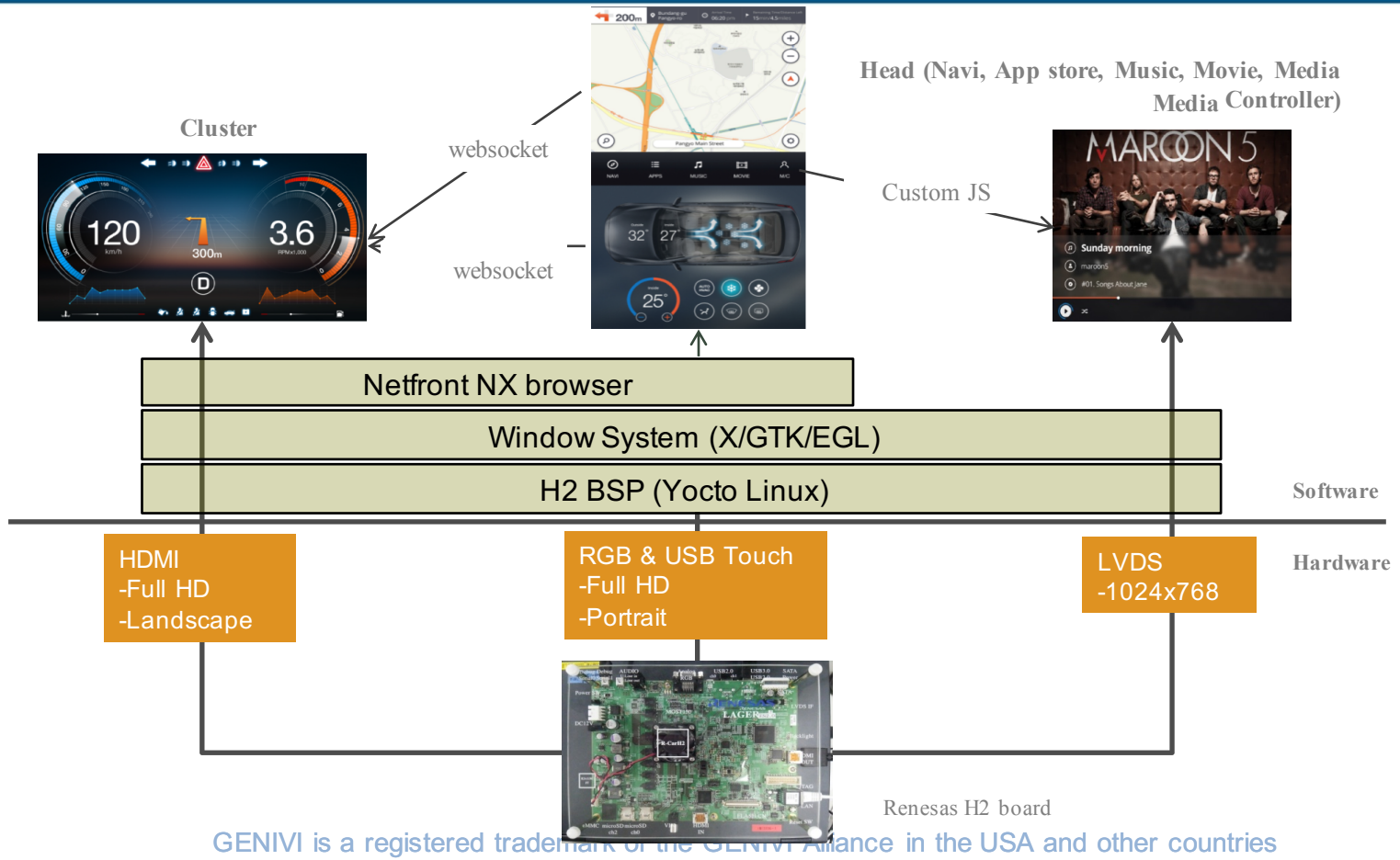
POC Architecture



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Limitations of POC

- Not GENIVI compatible (ACCESS NetFront NX - WebKit based)
- Image based navigation due to the performance issue of the vector navigation
- Media player is not suitable for browsers(CPU consumption)

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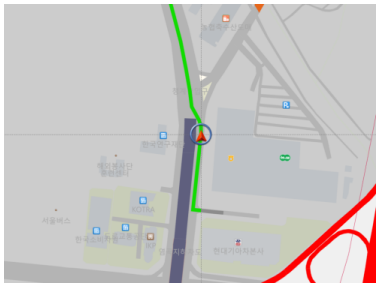
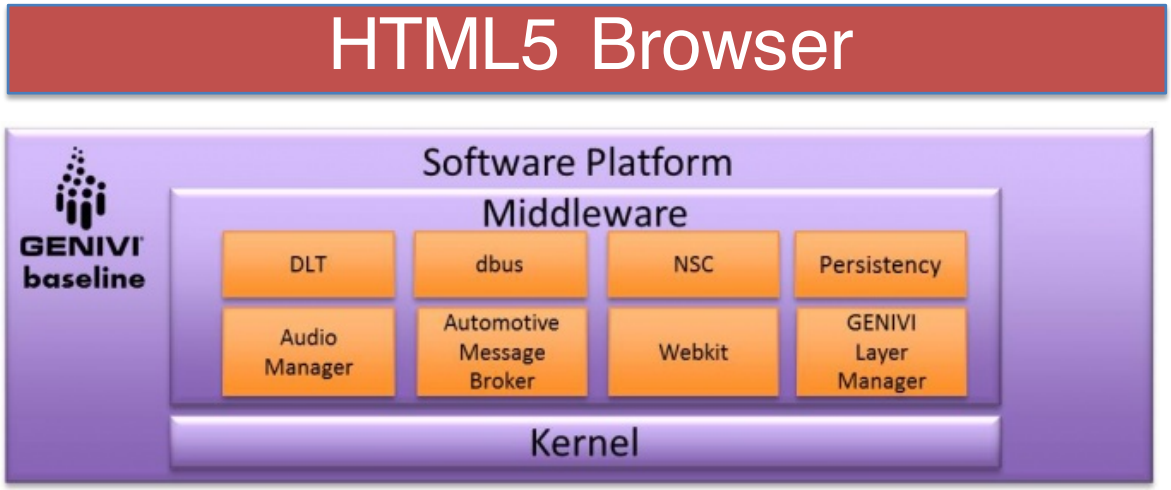
Next Step

Image



Vector



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Navigation Requirements: Geographical

- High density cities (Tokyo, Delhi, Seoul, Jakarta, Manila)
- Complex road structures (Overpass, tunnels)
- GPS Interference and narrow roads

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Navigation Requirements: Automakers

- Quickly response to the customers' high expectation
- Reduce the development cost and complexity
- Keep their customers with their own brand

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Navigation Requirements: Customers

- Competitive to mobile navigation (more data – crash barriers, crosswalk, guardrail, noise barriers, traffic lights, school zone, modeling)
- Avoid traffic jams with real-time traffic alerts and intelligent rerouting
- Social features (sharing the current location, location of the user's companies, social application POIs)

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HTML5 Vector Navigation: Goals

- Cost saving
  - Support Multiple Screen Resolutions
  - Platform Independent (Any OS can display)
  - Device Independent (Increasing number of devices)
- Cloud and BigData integrated navigation service
- Individualized services

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Screenshots

Map

Navigation

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Phases of HTML5 Vector Map Development

1. Map Data preparation: Define Web Vector Map Data format to reduce the size of the parcels
2. Implementing Map Display Engine
3. Map functions & service
4. Optimization

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Map Data: Size & Volume

- Data Size Analysis

Type	Parcel Min. Size	Parcel Max. Size	Number of Parcels	Total Size
Image Map	3 KB	5 KB	37,000,000	180 GB
Vector Map	1 KB	4 MB	37,216	2.5 GB

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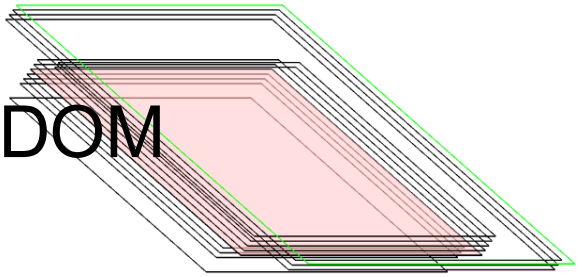
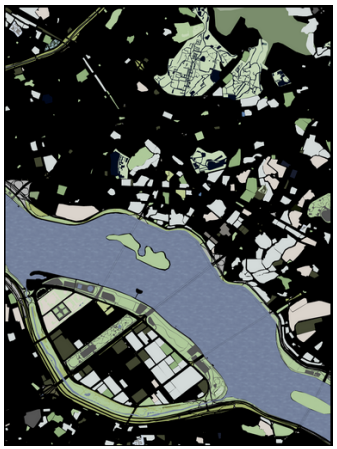
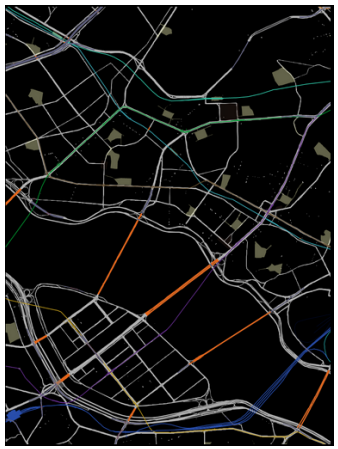
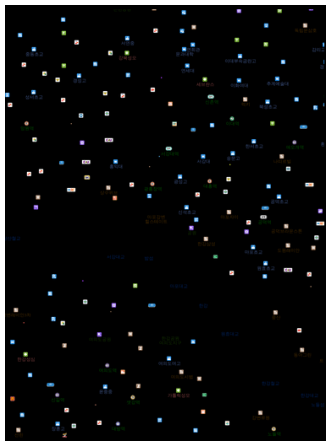
Display Engine

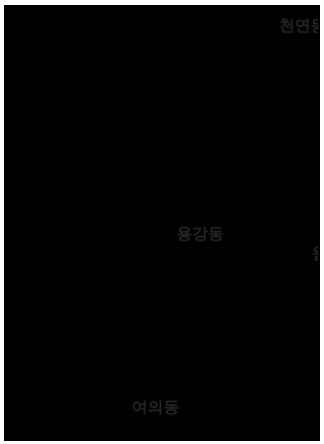
- Draw lines and rects with the map data on multiple canvas
- Compositing the multiple 2D contexts into DOM











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Map Functions: Zoom In/Out

- The changes in physical levels will request parcels.
- The changes in logical levels will redraw with the same parcels.
- Use CSS transform to animate the level change effect

Physical	Descriptions	Logical
Level 1	Political Boarders, Interstate Highways	Level 1
		Level 2
		Level 3
Level 2	Highways, trunk roads	Level 4
		Level 5
Level 3		Level 6
		Level 7
Level 4		Level 8
		Level 9
		Level 10

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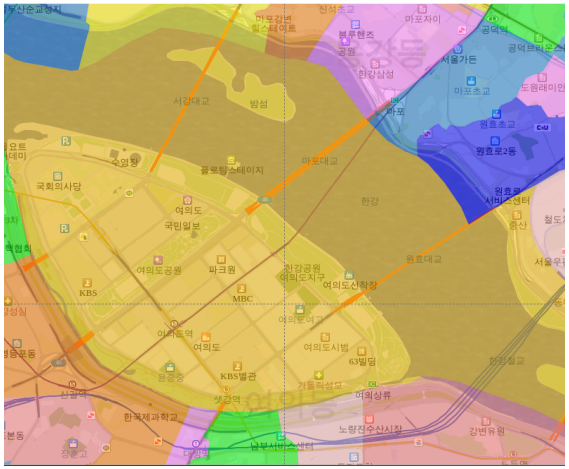
Map Functions: Services - Administrative Area

Map Service = Original Map Data + Additional Data

Map Service = Original Map Data + Change Attributes



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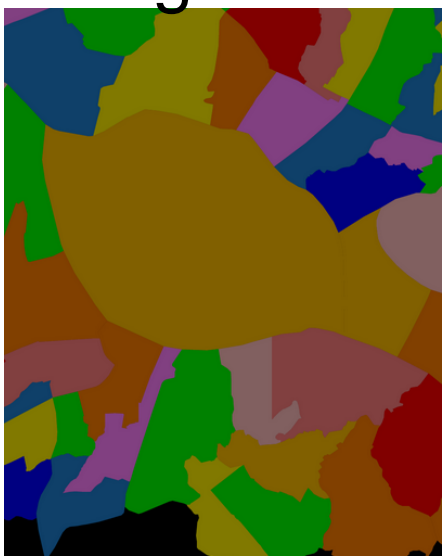

Ex) Theme, Highlight, Filter, etc

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Map and Navigation on Chrome Browser, PC

DEMO

21-Oct-15

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HTML5 Vector Navigation: Optimizing Browser

- Details of the Demo

	800*480 (Navi)	800*480(Map)	1024*768(Navi)	1024*768(Map)	1920*1080(Map)
Objects	6,000	8,000	7,000	10,000	13,000
Canvas API calls	100,000	150,000	140,000	170,000	190,000

- Optimizing Text related APIs (measureText, fillText)
- Optimizing lineTo()

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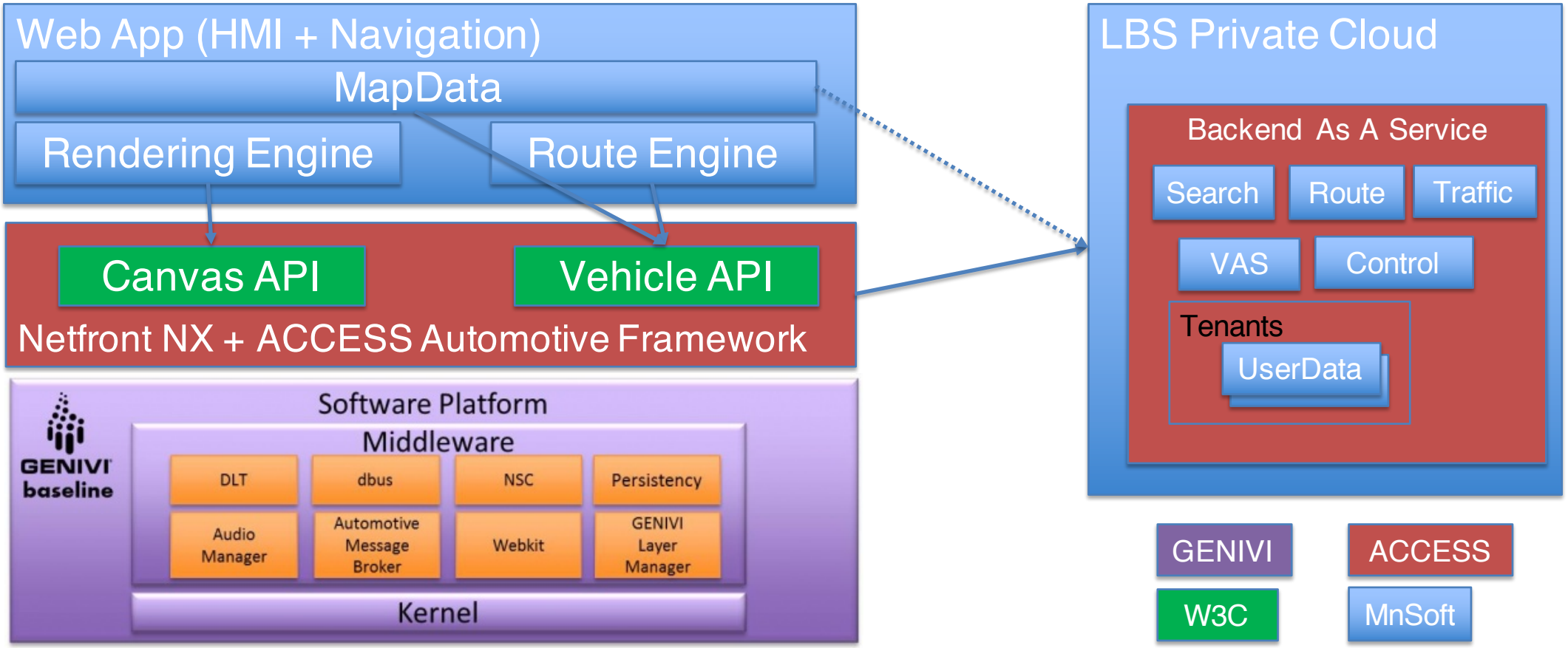
Work in progress: Architecture



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HTML5 Vector Navigation: Cairo vs SKIA

http://www.slideshare.net/SamsungOSG/duel-of-two-libraries-cairo-skia

- Cairo
  - C
  - Standard build system (autoconf/automake)
  - Drawing context is in cairo_t
  - Packages available for all major distributions
  - API/ABI Stable
  - Being considered as an ISO Standard
- Skia
  - C++
  - Custom build system(ninja)
  - Context is split
    - SkCanvas –drawing
    - SkPaint – style
  - Not Packaged
  - Not API/ABI Stable
  - Better performance

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Cairo vs SKIA: Performance

- Skia has better performance than Cairo for EGL+MSAA
  - 50% faster on average for basic drawing ops (both on PC and M0)
  - Slower than Cairo in certain cases

	EGL Performance results		
test case	Cairo	Skia	
vline	485	508	4.48%
hline	482	499	3.41%
line	292	510	42.79%
multi_line	430	646	33.46%
cubic	107	402	73.37%
quadratic	123	416	70.47%
curves	11	76	85.44%
circle	107	169	36.98%
rect	243	81	-201.03%
roundrect	109	232	53.11%
star(!)	201	169	-19.06%
mulshape	139	197	29.57%
animation	123	375	67.13%
fill	166	240	30.54%
bubbles	169	45	-274.75%
lin_grad	441	63	-601.84%
rad_grad	455	62	-631.12%
mask	433	876	50.53%
clip(!)	1689	23	-7336.62%
paint	364	6	-5811.96%
transform	8	2	-258.79%
text !	767	5	-15009.39%
text_glyphs !	708	41	-1614.53%

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HTML5 Vector Navigation: Next Step

- Associate Event handler with drawn object
- WebGL display engine

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Q&A

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Thank You

Credits goes to MnSoft Senior Engineer JinYoung Kwon

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