

The  
Text 2.0 Framework

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# What is Text 2.0?

- text that knows that it's being read
- interacts with the reader in *real time*
- to support its understanding

extraordinary small person, who stood there examining me with great seriousness. Here you may see the best portrait that, later, I was able to make of him. But my drawing is certainly very much less charming than its model.

That, however, is not my fault. The grown-ups discouraged me in my painter's career when I was six years old, and I never learnt to draw anything, except boats from the outside and boats from inside. Now I stared at this sudden apparition with my eyes fixed starting out of my head in astonishment. Remember, I had crashed in the desert a thousand miles from any inhabited region. And yet my little man seemed neither to be straying uncertainly among the sands, nor to be fainting from fatigue or hunger or thirst or fear. Nothing about him gave any suggestion of a child lost in the middle of the desert, a thousand miles from any human habitation. When at last I was able to speak, I said to him, "But--what are you doing here?"

The Big Bang is a cosmological model of the initial conditions and subsequent development of the universe. It is supported by the most comprehensive and accurate explanations from current scientific evidence and observation.<sup>[1][2]</sup> As used by cosmologists, the term *Big Bang* generally refers to the idea that the universe has expanded from a primordial hot and dense initial condition at some finite time in the past, and continues to expand to this day.

Georges Lemaitre proposed what became known as the Big Bang theory of the origin of the Universe, which he called his "hypothesis of the primeval atom". The framework for the model relies on Albert Einstein's general relativity and on simplifying assumptions (such as homogeneity and isotropy of space). The governing equations had been formulated by Alexander Friedmann. Edwin Hubble discovered in 1929 that the distances to far away galaxies were generally proportional to their redshifts, as suggested by Lemaitre in 1927. This observation was taken to indicate that all very distant galaxies and clusters have an apparent velocity directly away from our vantage point: the farther away, the higher the apparent velocity.<sup>[3]</sup> If the distance between galaxy clusters is increasing today, everything must have been closer together in the past. This idea has been considered in detail back in time to extreme densities and temperatures,<sup>[4][5][6]</sup> and large particle accelerators have been built to experiment on and test such conditions, resulting in significant confirmation of the theory, but these accelerators have limited capabilities to probe the such high energy regimes. Without any evidence associated with the earliest instant of the expansion, the Big Bang theory cannot and does not provide any explanation for such an initial condition; rather, it describes and explains the general evolution of the universe since that instant. The observed abundances of the light elements throughout the cosmos closely match the calculated predictions for the formation of those elements from nuclear processes in the rapidly expanding and cooling first minutes of the universe, as logically and quantitatively detailed according to Big Bang nucleosynthesis.

Fred Hoyle is credited with coining the term *Big Bang* during a 1949 radio broadcast, as a derisive reference to a theory he did not accept.<sup>[7]</sup> Hoyle later helped considerably in the effort to figure out the nuclear pathway for building certain heavier elements from lighter ones. After the discovery of the cosmic microwave background radiation in 1964, and especially after its spectrum (i.e., the amount of radiation measured in each wavelength) sketched out a blackbody curve, most scientists were fairly convinced by the evidence that some Big Bang scenario must have occurred.

The Big Bang theory developed from observations of the structure of the universe and from theoretical considerations. In 1912 Vesto Slipher measured the first Doppler shift of a "spiral nebula" (spiral nebula

in the inside or the outside, history, arithmetic, and gave up what might have had been disheartening and my Drawing Book by themselves, this time, was to advise me directors, whether from the inside instead to geography, history, and at the age of six, I gave up my career as a painter. I had been drawing Number One and my Drawing

The Big Bang is a **cosmological\*** model development of the **universe**. It is supported by the most comprehensive and accurate explanations from current **scientific evidence**.

\* Physical cosmology, as a branch of astronomy, is the study of the large-scale questions about its formation and evolution.

# Why another framework?

- GUI applications in C / C# / Java ... :-)
- proper (,realistic‘) layout of text difficult
- even simple changes can be hard if application is hardwired
- isn't there a way to separate **structure** from **layout** from **logic**, even for gaze responsive applications?

# Yes. It's called *HTML*!

- est. standards:  
HTML, CSS, JS!
- 20 yrs. exp. in text
- mio. of developers
- perfect for *rich*  
documents
- let's make it *gaze*!



*Css Zen Garden*  
the beauty of css design.

A demonstration of what can be accomplished visually through CSS-based design. Select any style sheet from the list to load it into this page.

[DOWNLOAD THE SAMPLE HTML FILE AND CSS FILE](#)

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" >
<head>
<meta http-equiv="content-type" content="text/html; charset=iso-8859-1" />
<meta name="author" content="Dave Shea" />
<meta name="keywords" content="design, css, cascading, style, sheets, xhtml, graphic design, w3c, web standards, visual, display" />
<meta name="description" content="A demonstration of what can be accomplished visually through CSS-based design." />
<meta name="robots" content="all" />
<title>css Zen Garden: The Beauty in CSS Design</title>

<!-- to correct the unsightly Flash of Unstyled Content. http://www.bluerobot.com/web/css/fouc.asp -->
<script type="text/javascript"></script>

<style type="text/css" title="currentStyle" media="screen">
@import "Z11/Z11.css";
</style>
<link rel="Shortcut Icon" type="image/x-icon" href="http://www.csszengarden.com/favicon.ico" />
<link rel="alternate" type="application/rss+xml" title="RSS" href="http://www.csszengarden.com/zengarden.xml" />
</head>
<body id="css-zen-garden">

<div id="container">
<div id="intro">
<div id="pageHeader">
<h1><span>css Zen Garden</span></h1>
<h2><span>The Beauty of <acronym title="Cascading Style Sheets">CSS</acronym> Design</span></h2>
</div>
```

# The Browser Plugin

- best option for flexibility
- not bound to any specific browser (sort of)
- we benefit from their advancements
- clear separation of gaze logic from rest of rendering and layout
- but also a number of problems (we'll discuss them later)

# Intuitive integration of gaze into the browser

- stick to t. known
  - use tags similar to mouse evts.
  - use JavaScript f. global things
- be high level

## Tag / Event based

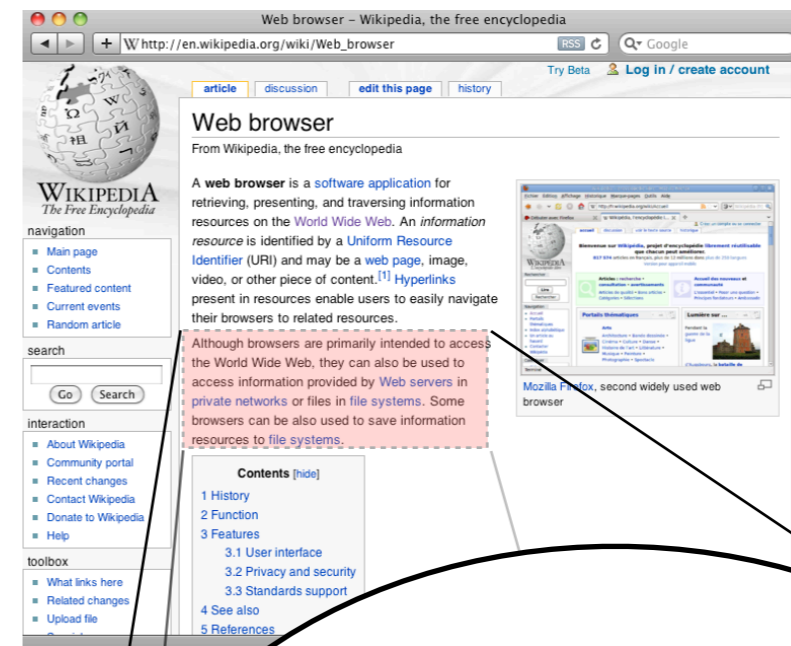
```
"It is true that on that you can't have come from very far away ..."<br>  
And he sank into a reverie, which lasted a long time. Then, taking my sheep  
out of <span onRead="eventHandler.playAudio('papercrumple.wav');">his pocket</span>,  
the contemplation of his treasure.<br> You can imagine how my curiosity was aroused by  
"My little man, where do you come from? What is this 'where I live,' of which you speak?"
```

## Java-Script based

```
// Set up connector  
connector.logging = "INFO";  
connector.sessionPath = "sessions/book fair sessions/"  
connector.trackingDevice = "eyetrackingdevice:trackingserver";  
connector.trackingURL = "discover://youngest";  
connector.connect();  
  
// Add listener and extensions  
connector.extensions.addListener("speech", speechCallback);  
connector.addListener("fixation", fixationListener);
```

# Understanding gaze markup

- HTML tags correspond to screen areas
- tag attributes make areas active
- on{Fixation, Gaze-Over, GazeOut, Perusal, Read}



**Begin**

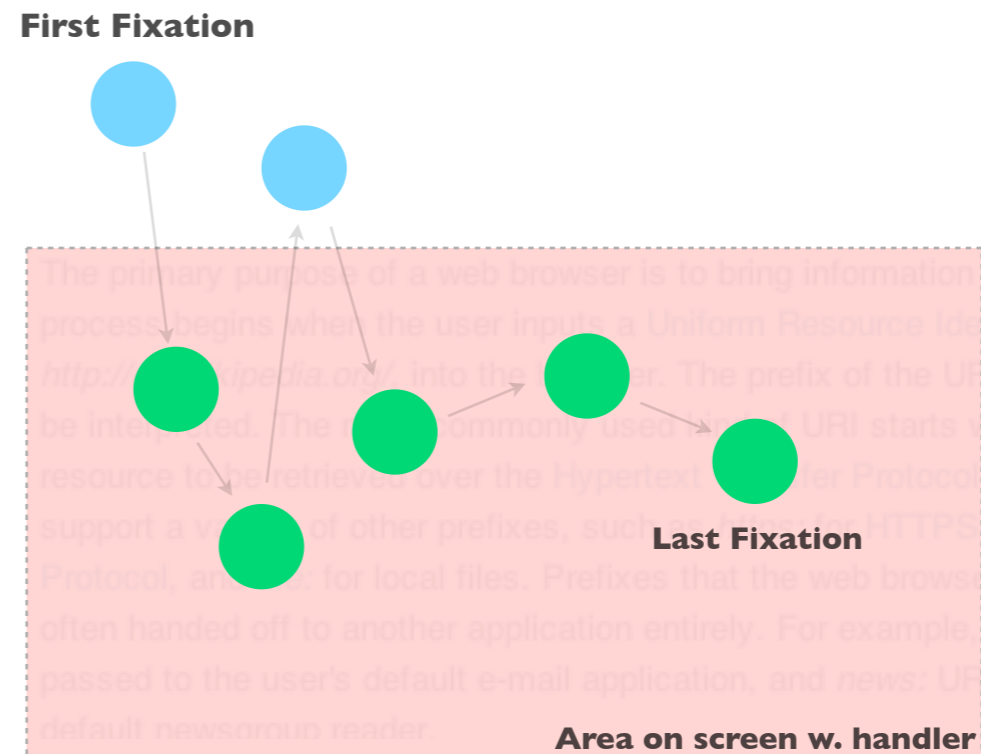
```
<p>Although browsers are primarily intended to access information provided by Web browser in private networks or files in file systems. Some browsers can be also used to save information to file systems.</p>
```

**Attribute of tag ,a'**

**End**

# onFixation

- uses filtered data and computes fixations
- executed every time a fixation occurs inside tagged area

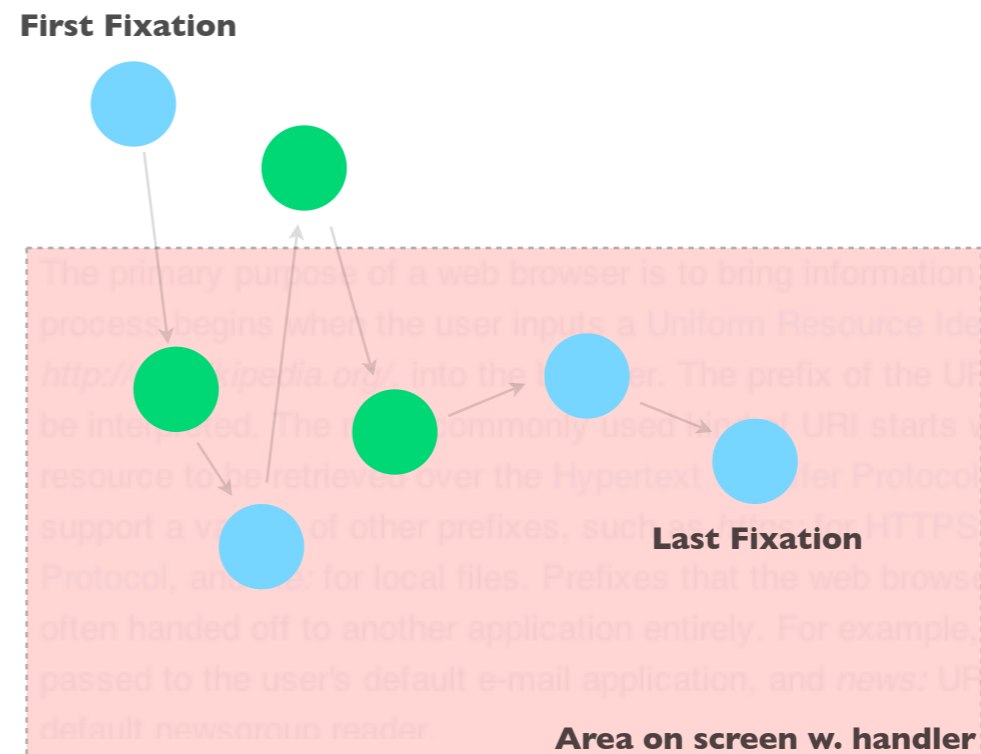


● = ignored fixation

● = relevant fixation

# onGazeOver / onGazeOut

- works like onFixation
- but executed only once respectively

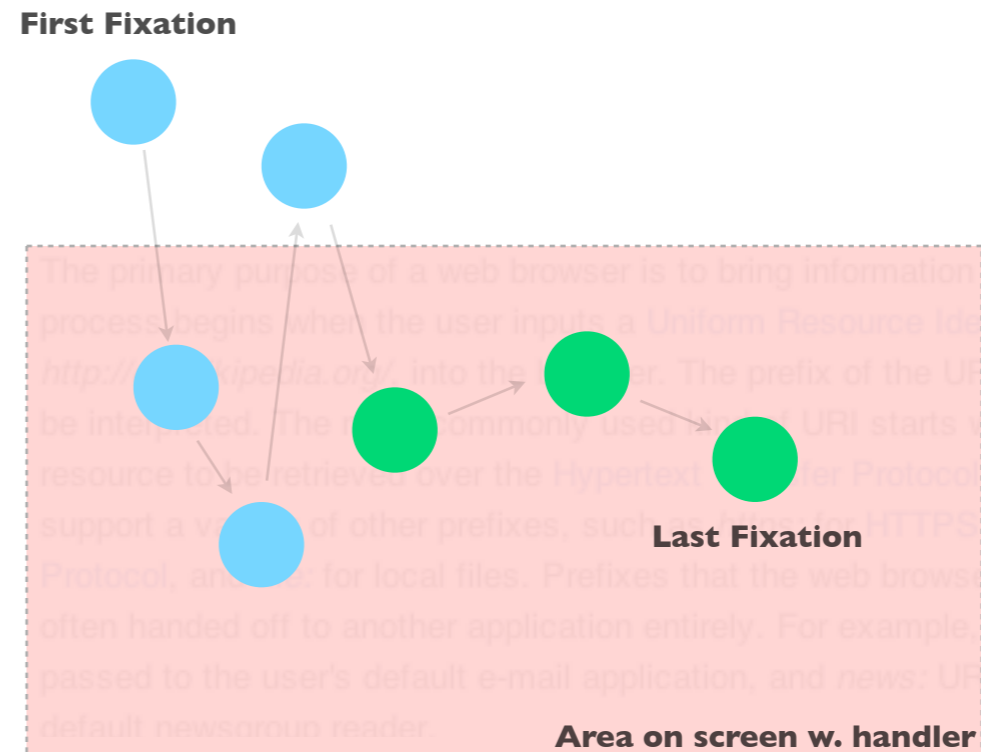


● = ignored fixation

● = relevant fixation

# onPerusal / onRead

- not triggered upon single fixations but on *reading behavior*
- onPerusal (skimming / reading / ...)
- onRead (reading only; currently same as onPerusal)



# JavaScript Gaze API

- required for glue code
- applications can tweak setup (e.g., enable logging, tracking device, ...)
- register global (application wide) listeners
- register „high performance“ extensions (i.e., computationally intensive algorithms) and add-ons like speech IO, ...

# Other Features

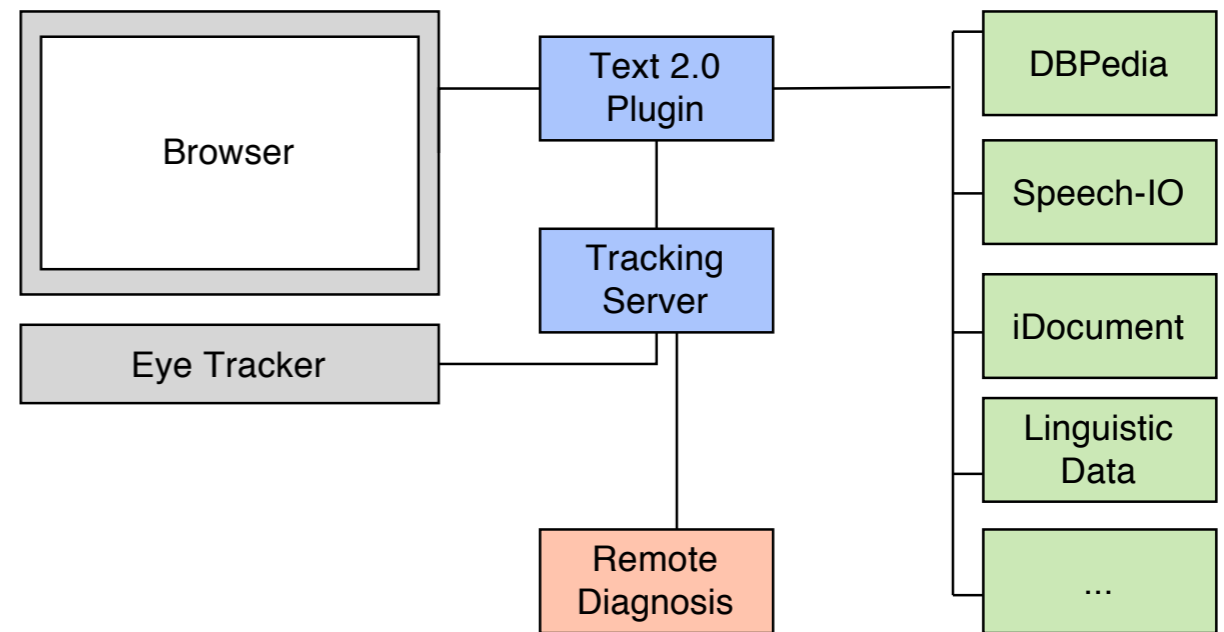
- session recording & replay
- *write once!*  
(evaluation code also works in realtime)
- online monitoring & diagnosis

The screenshot displays the EyeTracker software interface. At the top, two columns of text, labeled 'A' and 'B', are shown. Column 'A' contains a paragraph of text with several words highlighted in cyan. Column 'B' contains a similar paragraph with more extensive cyan highlighting and small red circles above it. Below the text, a 'Visual Tracking Data' window shows a dark area with two green circles and a red rectangle. To the right of this window is a bar chart with two bars, one green and one cyan, with values 77 and 74 below them, and 3.2 and 3.3 below the bars. Below these windows is a 'Pupil Size History' window showing a line graph with a red line and a yellow line, with values 5.0, 2.4, and 5.0 on the y-axis. At the bottom, an 'Overview' window displays system information:

Parameter	Value
Tracking Device Name	x120
Tracking Device Type	TRACKER
Tracking Device Location	discover://
Device Tracking Since	03.12.2009
Event Rate [events / second]	121
Recording Status (1200 Events)	On
Gaze Position [normalized]	Gaze position
Head Position [normalized]	Head position
Head Distance [mm]	Head distance
Pupil Size [mm]	Pupil size history
Local Recalibration & Verification	Perform recalibration
Overall Quality	Ok

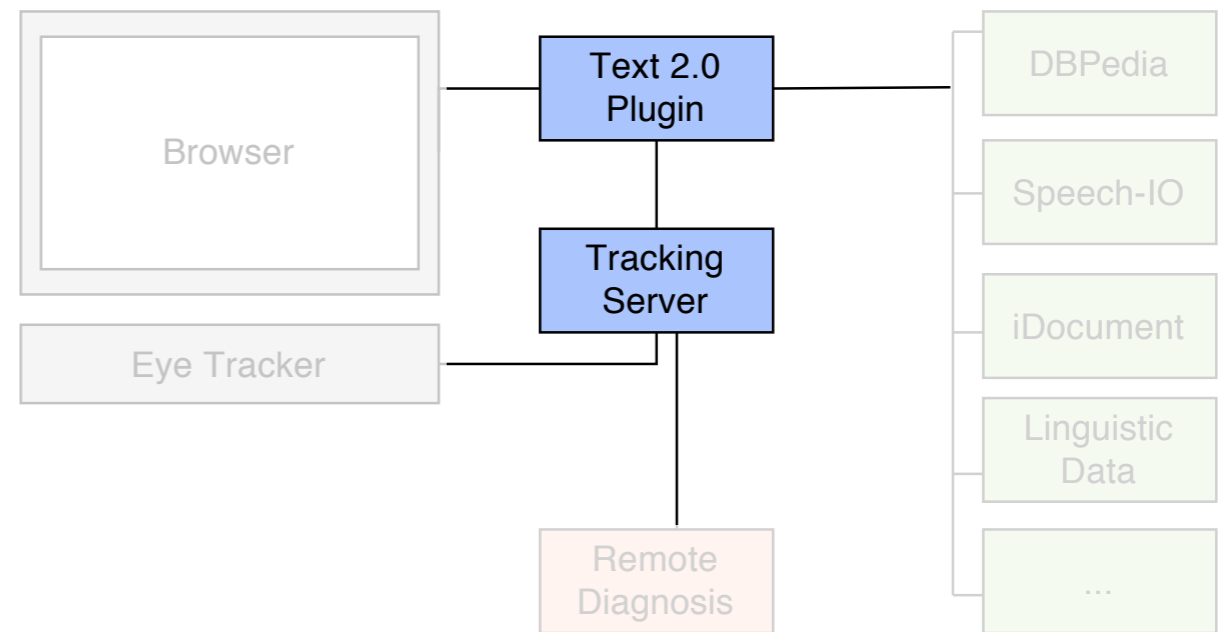
# The Tracking Server feeds the Plugin

- remote server provides gaze to browser plugin
- not in client because of restrictions (loading drivers, startup speed)



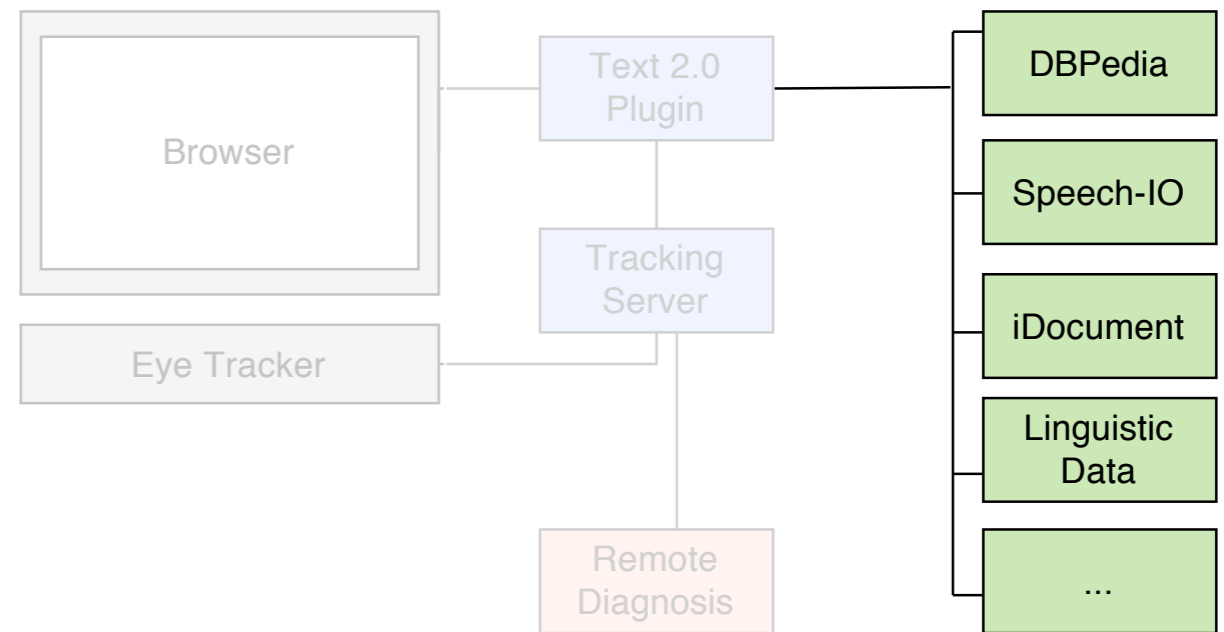
# The Tracking Server feeds the Plugin

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# Background Services

- provide services that can't be included directly because of size and startup speed
- discovered automatically



# Problems of Integration

- Browsers do not provide ...
  - ... word positions
  - ... a fast geometry API for plugins
- we need to do some *,magic'*
  - pseudo-renderer
  - updating elements in background

# Experiences

- some of our applications were created by high-school and university students; almost no special background required
- in fact, every web IDE supports writing gaze responsive applications now
- we benefit directly from browser advancement (e.g., WebKit CSS transforms - 3D support for free)

# Status & Outlook

- works with Safari (Chrome and Firefox should work as well, but need some tweaks)
- slow for very large web pages
- improvements in plugin/browser API would help us a lot

# Thank You!

For more information, please visit

[www.text20.net](http://www.text20.net)

You can direct questions also to

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