

*All-pervasive, constantly watching, and invisible*

## Web 3.0 is Coming... Someday

In the quarter-century since its humble birth as a way to share experimental results between scientists, the World Wide Web has been a work that's constantly in progress. And what amazing progress it has been.

**Web 1.0** began with static pages, a few protocols, and simple graphics. That was enough to attract millions of ordinary users and to figure out what worked best online. **Web 2.0** took shape a decade later. Fueled by ever-more powerful scripts and programs and sped by broadband, this version brought interactive pages. Rather than just linking fixed sets of data, these let social media connect people.

Web 2.0 is now old news. As technology keeps evolving, people are now seriously thinking about the next step in the Web's development. But there are many different ideas about what **Web 3.0** be like. How it will exactly play out depends on many things, but we can already gather a sense of what it involves.

So, the first version of the Web was like a *library* – lots of information, but limited contacts and static data. The second was more like a *convention*. Media became available in more varieties than before, pages became responsive with rapidly-updated content, and interpersonal communications exploded. Will the next round just be more of the same?

Possibly, but it's important to note that this evolution is based on other technological developments. Just as the availability of **personal computers** permitted Web 1.0 to happen, **laptops** made Web 2.0 portable. **Smartphones** and **tablets** are now bringing the Web intimately into our lives everywhere all the time, and those connections will only get closer.

But that's not all. The signs are that a vast sea-change is subtly taking place under the surface of the Internet. Changes so vast that they cannot yet be clearly seen in their entirety. Perhaps some of the earliest dreams for the digital age will finally be realized.

For example, **linked data** will mean your medical history will become available to all your care providers, rendering the tedious filling out of personal medical histories for each new doctor a thing of the past.

Just don't expect the truly **paperless office** to arrive until we're certain that our digital technology won't ever fail. Yet, as more datasets and activities are shared, not only will fewer dead-tree backups be required, but new solutions will emerge for problems we never even recognized before.

Over time, our browsers might grow into smart digital assistants and the Web itself might take on three dimensions. Above all, we will find ourselves floating within an invisible sea of responsive data we can summon and manipulate at any moment anywhere.

But like everything on the Net, it's a mixed blessing. For if there's one thing the history of the Internet has already taught us is that any time a new tool or method is invented, someone, somewhere will instantly abuse or misuse it. And that won't stop.

### Directions to the future

Here are some of the most important trends that have so far been identified with Web 3.0:

#### Artificial Intelligence

**Robotics** is bringing artificially intelligent systems to work within the real world, as in self-driving cars. Yet AI is being deployed in non-physical environments right now, and learning all the time. **Siri**, real-time **language translation**, and navigation apps are just the start. Behind the screen, they're letting machines **study art** to find influences and even **showing them YouTube videos** to learn about our world.



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Software working invisibly in the background determines just what you see online. Facebook, for example, has just been sued for using **facial recognition software** to identify users in uploaded photos, in order to generate more tag suggestions for them.

Smart web-browsers may allow you to coordinate your own personal data with that available online to create **personalized digital assistants**, attentive software butlers or secretaries that can schedule events, select entertainment for you, make adjustments and issue reminders all on their own.

### **Mashups**

Aggregating and repackaging information is quite common even now on the Web. Likely it will become even more individualized. You may one day have a “**mashup**” homepage with just the news sources and apps you like, and the instant ability to change its configuration and functions to suit your whims.

### **3D Virtualization and the Media Web**

**Virtual reality** may be finally taking off, and if it truly takes the world by storm, perhaps it will remake the Web, too. Along with games and tours of famous places, **3D shopping malls** are already in the works. Searching for information could become a lot more “real” and engaging in a virtual environment. And who knows what brilliant new artforms can emerge freed from all physical limitations in cyberspace?

Perhaps 3D is just as gimmicky and as largely unnecessary an enhancement on the Web as in the movies. One alternative is a far more “**mediacentric**” **Web**, where searching is based on media content. Images and sounds would take the place of character strings.

### **Semantic Web**

As it stands today, if you look for a picture with a search engine, the results depend entirely on the words you enter. Images are not yet “seen” by computers; they scan for associated **keywords**. It would be a lot easier if they could read webpages the way humans do and connect information similarly.

The “**semantic Web**” – the Web of meaning – is what the inventor of the World Wide Web, Sir **Tim Berners-Lee means** by Web 3.0. His idea is to move to more natural search queries by having the machines read websites much like we do. This would enable smarter, far more flexible and accurate searches by allowing different sources of data to be compared.

The idea has not gotten much traction yet because to do this kind of thing with current abilities requires a massive rewriting of webpages and possibly a whole new set of protocols. Instead, it may be a lot easier and more practical in the long haul to give the computers enough smarts to do it themselves.

### **The Internet of Things**

This is what many people think of as Web 3.0: **billions of devices** hooked up to the Internet, all sharing data in the background. Advantages are as obvious as they are widespread, with energy-saving smart homes that residents can monitor and manage remotely or automatically, medical devices that constantly watch well-being, refrigerators that can keep track of grocery shopping lists, and so on.

What Web 3.0 will be is an **Internet of Everything** – people, machines, and ideas. This will be all around us, ubiquitous and invisible, altering how we work and relate in ways that cannot yet be foreseen.

Tiny, steady improvements in all these various areas may ultimately combine to create a new and very sci-fi, if not seemingly magical, kind of lifestyle. For none of these trends stands alone: their revolutionary potential will emerge from how they work together.

Artificial intelligence is essential to make everything else work well, but semantics will also be necessary to allow computers to understand, absorb, and transform our written culture. Not only that, but new classes of wired devices will extend the Internet throughout the entire physical world and beyond.

### **The Dark Side**

Such bright dreams are naturally shadowed by some horrific **nightmare scenarios**. Security is, of course, a major concern these days, but manufacturers rushing to install Internet-connected devices have put little thought into making their gizmos safe.

So there is a possibility that one day you could be spammed by your coffee-pot. Stalkers could follow you around, with access to your precise activities and location at every moment, or your pacemaker might be hacked to kill you if you don't pay ransom.

There are also big privacy issues. Might your medicine cabinet and fridge inform your doctor of your bad habits? What if your boss or insurer finds out? Many heavy questions need to be thought through. Lesser ones should be considered, too. Like, do we really *want* our toasters to be able to talk back to us?



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