'The Grid' Could Soon Make the Internet Obsolete

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The Internet could soon be made obsolete. The scientists who pioneered it have now built a lightning-fast replacement capable of downloading entire feature films within seconds.

At speeds about 10,000 times faster than a typical broadband connection, “the grid” will be able to send the entire *Rolling Stones* back catalogue from Britain to Japan in less than two seconds.

The latest spin-off from Cern, the particle physics center that created the web, the grid could also provide the kind of power needed to transmit holographic images; allow instant online gaming with hundreds of thousands of players; and offer high-definition video telephony for the price of a local call.

David Britton, professor of physics at Glasgow University and a leading figure in the grid project, believes grid technologies could “revolutionize” society. “With this kind of computing power, future generations will have the ability to collaborate and communicate in ways older people like me cannot even imagine,” he said.

The power of the grid will become apparent this summer after what scientists at Cern have termed their “red button” day - the switching-on of the Large Hadron Collider (LHC), the new particle accelerator built to probe the origin of the universe. The grid will be activated at the same time to capture the data it generates.

Cern, based near Geneva, started the grid computing project seven years ago when researchers realized the LHC would generate annual data equivalent to 56m CDs - enough to make a stack 40 miles high.

This meant that scientists at Cern - where Sir Tim Berners-Lee invented the web in 1989 - would no longer be able to use his creation for fear of causing a global collapse.

This is because the Internet has evolved by linking together a hotchpotch of cables and routing equipment, much of which was originally designed for telephone calls and therefore lacks the capacity for high-speed data transmission.

By contrast, the grid has been built with dedicated fiber optic cables and modern routing centers, meaning there are no outdated components to slow the deluge of data. The 55,000 servers already installed are expected to rise to 200,000 within the next two years.

Professor Tony Doyle, technical director of the grid project, said: “We need so much processing power, there would even be an issue about getting enough electricity to run the computers if they were all at Cern. The only answer was a new network powerful enough to send the data instantly to research centres in other countries.”

That network, in effect a parallel Internet, is now built, using fibre optic cables that run from Cern to 11 centers in the United States, Canada, the Far East, Europe and around the world.

One terminates at the Rutherford Appleton laboratory at Harwell in Oxfordshire.

From each centre, further connections radiate out to a host of other research institutions using existing high-speed academic networks.

It means Britain alone has 8,000 servers on the grid system – so that any student or academic will theoretically be able to hook up to the grid rather than the internet from this autumn.

Ian Bird, project leader for Cern's high-speed computing project, said grid technology could make the internet so fast that people would stop using desktop computers to store information and entrust it all to the internet.

"It will lead to what's known as cloud computing, where people keep all their information online and access it from anywhere," he said.

Computers on the grid can also transmit data at lightning speed. This will allow researchers facing heavy processing tasks to call on the assistance of thousands of other computers around the world. The aim is to eliminate the dreaded "frozen screen" experienced by internet users who ask their machine to handle too much information.

The real goal of the grid is, however, to work with the LHC in tracking down nature's most elusive particle, the Higgs boson. Predicted in theory but never yet found, the Higgs is supposed to be what gives matter mass.

The LHC has been designed to hunt out this particle - but even at optimum performance it will generate only a few thousand of the particles a year. Analyzing the mountain of data will be such a large task that it will keep even the grid's huge capacity busy for years to come.

Although the grid itself is unlikely to be directly available to domestic internet users, many telecoms providers and businesses are already introducing its pioneering technologies. One of the most potent is so-called dynamic switching, which creates a dedicated channel for internet users trying to download large volumes of data such as films. In theory this would give a standard desktop computer the ability to download a movie in five seconds rather than the current three hours or so.

Additionally, the grid is being made available to dozens of other academic researchers including astronomers and molecular biologists.

It has already been used to help design new drugs against malaria, the mosquito-borne disease that kills 1m people worldwide each year. Researchers used the grid to analyze 140m compounds - a task that would have taken a standard internet-linked PC 420 years.

"Projects like the grid will bring huge changes in business and society as well as science," Doyle said.

"Holographic video conferencing is not that far away. Online gaming could evolve to include many thousands of people, and social networking could become the main way we communicate.

"The history of the internet shows you cannot predict its real impacts but we know they will be huge."