

THIS WEEK

EDITORIALS

INTERDISCIPLINARITY It takes time and effort to avoid being glib about grand challenges **p.148**

POLICY Scientists must seize the moment in Zimbabwe **p.149**



ZOOLOGY Tracked turtles travel more than 4,000 kilometres **p.151**

Guard against a net loss

Moves to create a multi-speed Internet, by abolishing the principle of net neutrality that ensures equal treatment for all data traffic, could push science into the slow lane.

Two decades ago, *Nature* ran a news story warning scientists about what could happen to their computers when the new millennium rolled around (*Nature* 387, 109–110; 1997). Of course, the doomsayers and their concerns about aircraft dropping from the sky as digital clocks updated to 1 January 2000 were proved wrong, and “remember the millennium bug” became a popular way afterwards to argue for inaction in the face of any growing worry.

The phrase is being used again now — by supporters of a controversial move to alter how the United States governs Internet use. Dark predictions of a two-tier Internet made vulnerable to censorship, these advocates scoff, are massively overblown. Forget the millennium bug. Now, the ending of ‘net neutrality’ in the United States should trouble researchers: the potential for problems is real.

On 14 December, the US Federal Communications Commission (FCC) is expected to reverse its 2015 move to classify broadband providers as ‘common carriers’. For the first time, this would allow Internet service providers (ISPs) to block or slow certain types of content, and to charge users more for fast access to what those companies class as premium content. Supporters argue that this is a more efficient and profitable way to allocate squeezed bandwidth than the current net neutrality. Time-sensitive information, such as instant-video communications, can be put in a fast lane and allowed to overtake less urgent information, such as e-mail traffic.

Academic debate on the topic has been bitter. Some researchers who have studied the likely effects of such a change agree that the FCC and its supporters might have a theoretical case. Strict net neutrality can be shown, in economic models of Internet traffic, to be socially inefficient (M. Peitz and F. Schuett *Int. J. Ind. Organ.* 46, 16–62; 2016). And offering a fast lane could help some users. FCC chairman Ajit Pai used the example of telemedicine, which he said was being hindered. (Opponents counter that telemedicine could be offered in this way under existing rules; health-care groups including the American Academy of Paediatrics fear that large companies would then dominate.)

This fear of large companies and their pursuit of profit features in many of the predicted weaknesses of a less-neutral network. ISPs, for example, could be paid by tech firms to steer users towards their products.

How this shift might affect science and scientists is not clear — and this is probably one reason why the response to the debate from research organizations has been muted. A notable exception is the Public Library of Science, publisher of the PLOS journals. It has pointed out several times this year that giving ISPs the power to sort traffic on the basis of content, sender and receiver poses a threat to scholarly journals and research.

The changes could affect traffic that routes through the United States, which includes plenty from South America, Central America and the Caribbean. So, in theory, terabytes of data sent from telescope

arrays in Chile to physicists in Europe could be stuck in the digital slow lane as ISPs prioritize advertising-heavy social-media messages. Or universities and students, especially those in poorer countries, could face prohibitive access and download fees.

Many critics of the FCC’s move argue that it’s the principle of equal access to information that really counts — and that will be lost. Certainly, that’s one reason why other regions, including Europe and Canada, have fought hard to maintain and safeguard net neutrality. The European Commission, for example, enshrines in law a user’s right to be “free to access and distribute information and content, run applications and use services of their choice”. (This applies to Portugal — so, despite a widespread claim to the contrary, the nation does observe net neutrality.)

Science has made great strides in recent years to break open the walled gardens of many research fields and spread data and expertise around. The Internet — a scientific tool to begin with — has driven this revolution. As the implications of the US switch unfold, researchers and their representatives must prepare to protect this crucial progress. ■

“Universities and students could face prohibitive access and download fees.”

Safety faster

Bureaucratic drag dents Japan’s nuclear science.

When an earthquake struck the JRR-3 nuclear research reactor in Tokai, Japan, in March 2011, the damage was light. Researchers there expected they would be back at work in six months. Now, more than six and a half years later, hundreds of condensed-matter physicists, materials scientists and structural biologists still await the green light from the nuclear regulators. The tsunami triggered by the same earthquake caused meltdowns in three reactors up the coast at the Fukushima Daiichi plant, exposed hundreds of people to high levels of radiation and changed attitudes in Japan towards all nuclear reactors. Eight of the country’s eleven research reactors, including JRR-3, have been closed since.

The fear is justified. A government should never place research over the safety of its citizens. At the same time, a key role of all governments is to weigh many risks, including to jobs.

As Japan calculated when it poured millions of dollars into its research reactors, these support some of the nation’s most vibrant and internationally prominent research communities, composed of