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'Land is so yesterday': e-residents and 'digital embassies' could replace country borders

The most advanced digital society in the world is a former Soviet Republic on the edge of the Baltic Sea.

When Estonia gained independence from Russia in 1991, it quickly realised that it needed to find something to set itself apart from its neighbours. Norway had oil, Finland mobile phones, Sweden design. But as Taavi Kotka, the Estonian government's chief information officer, asks, what do you think of when you think of places like Lithuania or Slovenia? Nothing, he says, and so to become distinct, Estonia has embarked on massive technological innovation.

What Estonia has achieved makes the Northern Californians look like laggards: despite only half of the country having a phone line in 1991, by 1997, 97 per cent of Estonian schools were online. In 2000, cabinet meetings went paperless. By 2002, the government had built a free Wi-Fi network that covered most of the populated areas. By 2007, it had introduced e-voting, and by 2012 huge amounts of fibre-optic cabling were being laid – promising ultra-high-speed data connections – and 94 per cent of the country's tax returns were being made online, taking users an average of five minutes to fill in the parts that hadn't been automatically completed by the link between the tax office and local banks. Now, every task that can be done with a digital service, is.

The frost-eaten potholes in front of the shopping mall are deceptive – this is a society that is putting itself above such atoms-based matters. Today, almost all government services are managed online. Citizens, armed with a chip-and-pin identity card, can run their affairs from a laptop or phone, anywhere there is connectivity. And the Estonian government wants to offer you the chance to do the same thing.

From summer 2015, you can go to the nearest Estonian embassy and apply for e-residency.

Ahead of Brexit, statistics reveal that almost 1,000 Brits have now applied to be e-residents of Estonia. Applications from the UK are being made twice as frequently as before the referendum, following an initial surge from three to 51 applications per week. More than half of all applications from the UK, 534, have arrived since the vote, while 231 arrived in the same period beforehand. Based on current trends, it is likely the 1,000th British application for e-residency will arrive this week, as Article 50 is due to be triggered.

Since April 1 2015, you can apply online and complete your application at an Estonian embassy. All you need is your passport or photo ID.

When filling in the form online, you'll need your name and identifying information, a scanned passport photo, a scanned copy of government-issued identity documentation, a minimum of one paragraph describing your interest and motivations behind applying for e-residency, and payment of the state fee in the amount of €100 via Visa or Mastercard.

Then comes the background check, when your documents are sent to Estonia. This helps the police and border guard board with risk management and the background check. You may also be asked if you have any previous links with the country.

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After about four weeks or so, you'll receive an email to let you know whether your application was successful. If it's a yes, you can go and pick up your identity card from one of 38 embassies.

You want to open a business, say; once you have your card, you can go online from wherever you are on the planet, log on to the government portal with your card and PIN, and use it to form your Estonian company, then register with an Estonian bank and start trading. Because the Estonian tax office is digitally linked to Estonian banks, filing your taxes is radically simple. So too is any bureaucracy involved in keeping the company going. After all, these are Estonian digital services we're talking about: it's across the web, secured with your ID card.

And that's the opportunity, because Estonia is working on linking its tax office with its counterparts in other regions of the world. The Estonians want to offer the option for, say, UK citizens to run their UK companies through the Estonian system, which would in turn, in the background, with no extra work for the user, make sure that the UK tax office receives all the money it is legally due. A UK-based entrepreneur, they hope, will decide to open her business in Estonia, use an Estonian bank and pay for some Estonian services, even if the company was only going to be trading in the UK, because she would find Estonia's national infrastructure far easier to deal with than the UK's. In other words, a nation is now competing with its neighbours on the basis of the quality of its user interface. Just as you might switch your bank to one with a better mobile app, the Estonians hope you'll switch your business to a country with an infrastructure that is easier to use.

Texto adaptado para la realización del segundo ejercicio de la fase de oposición del proceso selectivo para ingreso en el Cuerpo Superior de Sistemas y Tecnologías de la Información de la Administración del Estado.

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Software Crisis 2.0

The increasing demand for software is fueled by the increasing capability of software to perform tasks that were previously accomplished through some form of hardware. This is evident in developments such as software defined networking, software defined infrastructure, software defined data centers, right through to the concept of the software-defined enterprise, which has enough intelligence to automate all decision-making and business processes.

This is also evident in the move beyond Internet of Things (IoT) to Systems of Systems where the sensors and sources of data, such as household-appliances, are fully integrated into web-enabled systems capable of utilizing machine learning techniques to offer real-time data analytics on the morass of acquired raw data, with the ultimate goal of enabling societal benefits for citizens through the provision of useful and precisely customized information. In this era of 'Big Data', Software is becoming the unifier for value creation, even for companies that sell physical products. The reason why software is preferred over hardware is due to its ability to be changed anytime.

It is clear that a massive increase in the volume and quality of software being produced is required to address the emerging initiatives named above and many other innovations. This creates what Fitzgerald describes as a Software Crisis 2.0 bottleneck. The initial software crisis, first identified in 1968, was referred to the basic problems of time, cost and quality. Over the decades, several initiatives have sought to address this crisis, e.g., the waterfall life-cycle, the structured approach, software product lines, software patterns, agile methods, model-driven development.

However, none has succeeded in delivering an order of magnitude increase in software development productivity. Rather as the well-known and often cited Standish report suggests, software project failures are quite often the norm. However, it is true to say that model-driven development, software product lines, and agile methods, amongst others, are delivering significant improvements, with widespread industry acceptance, having passed the stage of being exclusively research topics.

This needs to be examined in the context of advances in other ICT areas – hardware advances, for example. In the hardware domain, the well-known Moore's Law in relation to integrated circuits is paralleled by other exponential improvements in data transmission and storage capacity, as exemplified by Butters' Law and Kryder's Law respectively. In the areas of parallel processing and multicore computing, however hardware advances require significant additional technical expertise at the software level in order to be leveraged successfully.

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