e-Estonia guide
the most advanced digital society in the world

— Wired

Estonians are pathfinders, who have built an efficient, secure, and transparent ecosystem that saves time and money.

e-Estonia invites you to join us on a digital journey.
Estonia is an innovative nation in Northern Europe known for its digital ambitions. Thanks to smart e-solutions created here, it takes only a few hours to start a company and minutes to declare taxes. The nation is in the top countries in Europe in terms of start-ups per capita and ranks first as one of the most start-up friendly countries in Europe according to Index Venture 2021.

However - there’s a lot more to discover! From 2022, Tallinn, the capital city of Estonia is designated as UNESCO City of Music due to the music being our historical heritage. Meanwhile, forests covering about half of Estonian territory, we still act as a digital society, having almost 90% broadband coverage in Estonian households.

Discover what our innovative country has to offer!

SITUATED: on the Gulf of Finland
POPULATION: 1.3 million
OFFICIAL LANGUAGE: Estonian
TOTAL AREA: 45,339 sq. km
CAPITAL CITY: Tallinn
CURRENCY: Euro (€)
GOVERNMENT: Parliamentary democracy
MEMBERSHIP: EU, NATO, OECD, WTO, Digital Nations

Estonia’s digital success for this decade

Digital government in Estonia is entering its third decade, but we are not about to slow down. Our focus continues to lie in using digital technology, services and culture to help make Estonia the best-run country in the world.

Estonia has ambitious goals for the upcoming years. There are three challenges that frame our priorities for the next decade:

Users’ ever-growing expectations. Estonians expect their government services to match the user experience and innovation of the best tech companies and startups — easy-to-use, personalised, invisible, mobile. Our approach to developing user-centric services needs to grow out of agility and strong product management. Through proactive and life event-based services we will reach out to people when the government can help in lieu of waiting for them to come to us.

Uncertainty. The coming decades will require governments to operate in conditions of increased uncertainty and unexpected crisis, as evidenced by the Covid crisis and Russia’s war against Ukraine. Digital government can contribute to societal resilience with speed, allowing new public services to be deployed in days and weeks instead of months and years; precision, targeting interventions and support where they are most needed and foresight, using data to discover and address changes before they turn into a crisis. And cyberspace is itself a growing source of uncertainty, with bad actors seeking to take advantage of our dependence on digital tools. Estonia will continue to make cyber security a whole-of-society endeavour, necessitating significant public and private investment.

Delivering value. Estonia is a small country: what we lack in size, we need to make up for in ingenuity. Government can’t do this alone but must work as a platform for private and third-sector parties, leveraging data and automation to improve education, healthcare, social inclusion while preparing us for challenges such as the green transition and an ageing society.

As we look toward the next decade of digital government, we will shepherd our main asset: our users’ trust and confidence, which in turn contributes to near universal adoption of digital services and infrastructure.

Since digital knows no borders, the tenor of our international engagement is shifting, from evangelisation to collaboration. We can only deliver these results in a broader context of shared solutions, open markets and collaborative standard setting.

I look forward to working with you!

Luukas Kristjan Ilves
Estonia’s Government Chief Information Officer
Our credo: We constantly seek and develop new digital solutions that allow things to get done faster, better, and cheaper.

We have built a digital government and society from scratch, and so can you. Today, Estonia has shared its e-governance journey with more than 100 governments that follow our example and employ the competence of our experts and tech companies.

If you want to see how a truly successful digital society works close-hand, do come to Estonia — or start by checking out e-estonia.com. Our private companies, experts as well as government officials are happy to share our digital know-how and solutions to make the world more efficient and simply a better place.

This is how a successful digital society was built in Estonia, and it’s the way we intend to continue. Right now we are working, for example, on making public services work invisibly aka proactively in the background for a seamless user experience. We have a wide programme for AI adoption going on — we see the future in AI-powered government. We will be restarting and rebuilding several digital systems, architecture and infrastructure to prevent them becoming a legacy in the next years.

Here are some indicators that show how IT-solutions have improved everyday life in Estonia.

**Financial indicators:**
- 98% of companies are established online
- 99% of banking transactions are online
- 98% of tax declarations are filed online — it takes only 3 minutes!
- Over 93400 e-residents

**Healthcare:**
- 99% of patients have countrywide accessible digital records
- 99% of prescriptions are digital
- 2.3 million queries by doctors and 2.3 million queries by patients every month

**Savings and efficiency:**
- At least 2% of state GDP is saved due to collective use of digital signatures
- 1000+ years of working time saved annually thanks to data exchange
- Time to establish a business reduced from 5 days to 3 hours

**e-Government indicators:**
- 98% of Estonians have a national ID-card
- 46.7% of Estonian voters from 109 countries used i-Voting during the last European Parliament election

e-Estonia is an incredible success story that grew out of a partnership between a forward-thinking government, a pro-active IT sector, and a switched-on, tech-savvy population. Being a pathfinder in public sector e-services meant that nothing was prepared for us — we had to cut our own trail to discover how to provide services in a form that did not yet exist, and which could be available to everyone 24/7.

We have built a digital society — and so can you.
In 2022, Estonian e-resident set a world record at London Tech Week in establishing a company online in just 15 minutes.

When Estonia started building our information society over two decades ago, there was no digital data being collected about our citizens. The general population did not have the internet or even devices with which to use it. It took great courage to invest in IT solutions and take the information technology route. Here are some of our best e-solutions that have led to Estonia becoming one of the world’s most developed digital societies.

**Principles of Estonian e-governance:**

- **Decentralisation** — There’s no central database and every stakeholder, whether a government department, ministry, or business, gets to choose its own system.
- **Interoperability** — All system elements exchange data securely and work smoothly together.
- **Integrity** — Data exchanges, M2M communications, data at rest, and log files are, thanks to KSI blockchain technology, independent and fully accountable.
- **Open platform** — Any institution may use the infrastructure and it works as an open source.

- **No legacy** — Continuous legal change and organic improvement of the technology and legislation.
- **Once-only** — Data is collected only once by an institution, eliminating duplicated data and bureaucracy.
- **Transparency** — Citizens have the right to see their personal information and check how it is used by the government via log files.

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**X-Road data exchange platform:**
- 99% of public services online with 24/7 access.
- 2.7B+ queries annually via X-Road.

**Cyber security:**
- Locked Shields is the world’s largest and most advanced international technical live-fire cyber defence exercise — it takes place annually in Estonia concurrent with the CYCON conference.
- Estonian government started live tests with KSI Blockchain technology in 2008. Today, KSI Blockchain service is available globally.
- Estonia is the home to the NATO Cooperative Cyber Defence Centre of Excellence and European IT agency.
- Estonia is an elected member of the UN Security Council, active from 2020.
- Estonian Ministry of Defence established CR14 (Cyber Range 14) in 2021 to offer cybersecurity-related research, training and development for domestic and international; private and public sector partners.

**Public safety:**
- e-Police system available in police cars unites over 15 databases, including those of Schengen and Interpol.
- Estonia was the first country in the EU to legalise testing self-driving vehicles on public roads.

**Education:**
- First in Europe in the OECD PISA tests.
- Two times more students in ICT-related courses on the average than in other developed countries.
- 100% of Estonian schools use e-solutions.

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**INTERNET FREEDOM**

#2 Freedom House 2021
the journey of e-Estonia

Population Register
The state’s database for holding basic information about each person living in Estonia.

X-Road
The backbone of e-Estonia. Invisible yet crucial, it allows the nation’s public and private sector e-Service databases to link up and function in harmony.

ID-card
Estonia has by far the most highly-developed national ID card system in the world. Much more than a legal photo ID, the mandatory national card also provides digital access to all of Estonia’s secure e-services.

ID bus ticket
On buses and trams, a passenger may dial a telephone number to buy a ticket or a monthly pass. Because the ticket is tied to the passenger’s state-issued ID code, any ticket controller who checks the passenger’s ID card will instantly see that a ticket has been purchased.

Estonian Education Information System
A state database that brings together all information related to education in Estonia.

m-Parking
Mobile Parking is a convenient system that can be used in privately-owned and public parking facilities in Estonia, allowing drivers to pay for parking using their mobile phones.

eSchool
One of the most widely used web applications for schools in Estonia, it provides an easy way for parents, teachers, and children to collaborate and organise all needed information for teaching and learning.

Digital signature
Since 2002, every Estonian resident has been able to provide a digital signature. Today, this is done via ID-card, Mobile-ID, or Smart-ID, for safe identification and use of e-services.

e-Land Registry
A one-of-a-kind web application that contains information on all property ownership and rights for properties and land parcels.

i-Voting
A unique solution that simply and conveniently helps engage people in the governance process. In 2005, Estonia became the first country in the world to hold nationwide elections using this method.
KSI blockchain
A blockchain technology designed in Estonia and used since 2012 to make sure networks, systems, and data, such as national health, judicial, legislative, security, and commercial code systems, are free of compromise, all while retaining 100% data privacy.

e-Health system
A nationwide system integrating data from Estonia’s healthcare providers to create a common record every patient can access online.

Smart Grid
A digitally enabled electrical grid that gathers, distributes, and acts upon information regarding the behaviour of all participants (suppliers and consumers) in order to improve the efficiency, importance, reliability, economics, and sustainability of electricity services.

X-Road Europe
Estonia was the first in the world to interconnect decentralized components of state- and public sector databases at the national level.

e-Receipt
A portal that enables end users to manage their receipts, as well as documents related to those, such as letters of guarantee and product manuals, in a single, convenient web environment.

Mobile-ID
Allows people to use a mobile phone as a form of secure digital ID. Like the ID-card, it can be used to access secure e-services and digitally sign documents but has the added advantage of not requiring a card reader.

e-Prescription
A centralised paperless system for issuing and handling medical prescriptions. Almost all medicine is prescribed digitally and all a patient needs to do is present an ID-card to the pharmacist, who will issue the prescribed medicine according to the health system. Estonian e-prescription is also valid in Finland, Croatia and Portugal.

EV quick-charging network
The charging infrastructure project created an Estonian network of quick chargers. Quick chargers for electric cars blanket Estonia today and ensure freedom of movement for drivers of electric cars.

e-Residency
A transnational digital identity for which anyone in the world may apply allows the user to run a trusted location-independent EU business online with all the tools needed to conduct business globally.

e-Police system
Involves two main tools: a mobile workstation installed in each patrol car, and a positioning system that shows headquarters every officer’s location and status.

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Proactive family benefits
When a child is born, a population entry activates all of the following services, and the family gets all the benefits they are entitled to automatically.

Remote verification for notaries
Remote authentication enables the conduct of notarial acts using Veriff’s online identity verification platform. There is no requirement to be in the same space physically when buying and selling real-estate.

World’s first autonomous hydrogen vehicle
The driverless hydrogen shuttle Liisu, developed by Auve Tech and researchers from University of Tartu, is aimed at enhancing last-mile transportation.

NIIS X-road consortium
Nordic Institute for Interoperability Solutions (NIIS) ensures the development and strategic management of X-Road and other e-governance solutions.

Government AI strategy
Creating the legal and strategic framework for accelerating AI development, a detailed strategic plan is made for promoting implementation of AI solutions in public and private sector.

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Bürokratt
Bürokratt will, in the future, allow a person to get everything they need from one device and through a virtual assistant in one communication session. Bürokratt is thus an interoperable network of public and private sector AI solutions, which from the user’s point of view, act as a single channel for public services and information.

World’s first data embassy
Assuring our digital continuity, Estonia is the first country in the cloud. Our critical databases and services are backed up in a high-security data centre in Luxembourg.
building blocks of e-Estonia

e-Estonia’s success relies on an open-minded citizenry, who are eager to use e-solutions, and a strong infrastructure that has made it possible to build a safe and user-friendly e-services ecosystem.

e-Governance

Thanks to a safe, convenient, and flexible digital ecosystem, Estonia has reached an unprecedented level of transparency in governance and built broad trust in its digital society. For example, our government uses e-Cabinet to pass laws, while citizens use i-Voting to have their say. As a result of digital signatures, Estonia annually saves 2% of GDP and has become a hassle-free environment for business and entrepreneurship. Estonia is probably the only country in the world where 99% of public services are available online 24/7.

Thanks to a digital identity issued to every Estonian and e-Resident of Estonia, the country is years ahead of countries still trying to work out how to authenticate people without physical contact. In Estonia, every person can provide digital signatures using their ID-card, Mobile-ID, or Smart-ID, so they can safely identify themselves and use e-services. Digital signatures have been used in Estonia since 2002, over 800 million signatures have been provided since then — this is more than in the rest of the European Union.

Interoperability services

The 21st-century keywords, citizen-centred state, and service-oriented information system, require information systems to function as an integrated whole to support citizens and organisations. To do that, organisations and information systems, such as the Population Register or State Portal, must be interoperable and able to work together so that data is requested from the citizen once. Estonia’s solution for maintaining a modern state is the data exchange layer X-Road, which saves Estonians thousands of years of working time every year.

Healthcare

Estonia’s healthcare system has been revolutionised by innovative e-solutions. Patients and doctors, not to mention hospitals and the government, benefit from convenient access and savings that e-services deliver. Each person in Estonia has an online e-Health Record and can use e-Prescription to get medicine without paper prescriptions. The electronic ID-card system and blockchain technology are used to ensure health data integrity and mitigate internal threats to data.

Security and safety

Being a digital society means exposure to cyber threats. With solid investments in cybersecurity infrastructure, Estonia has developed extensive expertise in this area, becoming one of the most recognised and valued international cybersecurity experts. After our experience with cyberattacks in 2007, scalable KSI blockchain technology was developed in Estonia. Besides securing its own e-services with blockchain, such as e-Law and e-Court, Estonia also became host to the NATO Cooperative Cyber Defence Centre of Excellence and the European IT agency, and established CR14 in order to put the 10-year cyber range experience into a good use and start offering cybersecurity-related training, research and development throughout all sectors both domestically and internationally. Also in regular use, e-Police, Alarm Centre, and e-Ambulance Fast Reaction keep Estonian streets safe.

Estonia is the first in the world to offer 99% of public services online 24/7
Thanks to the location-based aspect of many of our public services, Estonia has been able to increase the well-being and safety of its citizens. In 2000, Estonia made headlines by pioneering a system that can instantly pinpoint the location of any GSM mobile phone used to make an emergency call. Today, Estonia continues its commitment to innovation and new technologies by offering the opportunity to use Estonia as a test bed for self-driving technologies and intelligent transportation systems.

Modern e-solutions make setting up and running a business in Estonia quick and easy. Estonian solutions like digital signatures, electronic tax filing, the e-Business Register, and the availability of public records online have pared down bureaucracy to a bare minimum and facilitated an environment where business is easy, yet also secured with blockchain technology. It’s a simple fact: Where business is easy, business will grow. That’s why Estonia is among the countries hosting the highest concentration of start-ups per capita.

The goal of the educational digital revolution in Estonia is to implement modern digital technology, such as e-School or the Estonian Educational Information System, more efficiently and effectively in learning and teaching, and to improve the digital skills of the entire nation. For example, our goal includes ensuring that every student receives the knowledge and skills to access the modern digital infrastructure for future use. Estonia’s success in the digital revolution is reflected in the fact that twice as many students pursue IT-careers in Estonia versus the average in other OECD countries.

40% of ICT Master’s students in Estonia are female - the highest share in Europe
ongoing projects and an ambitious future

Successful countries must be ready to experiment. Building e-Estonia, one of the most advanced e-societies in the world, has involved continuous experimentation and learning from mistakes. Estonia sees the natural next step in the evolution of the e-state as moving basic services into a fully digital mode: for citizens, things can be done automatically and, in a sense, invisibly.

In order to remain an innovative, effective, and successful Northern European country that leads by example, we need to continue executing our vision of becoming a safe e-state with automatic e-services available 24/7.

In this regard, Estonian Ministry of Economic Affairs and Communications has put together a Digital Agenda 2030, which includes a vision and an action plan concerning the development of the Estonian economy, state and society with the help of digital technology in the next decade. The goal is to increase the satisfaction with digital public services, make high-speed, trustworthy and affordable Internet available to all, and make sure that the cyberspace is safe and reliable.

In doing so, Estonia is the first country to offer e-Residency – a government-issued digital identity available to anyone in the world interested in running a global EU company fully online.

No attention has been paid to the environmental compatibility of solutions and climate change when developing digital government in Estonia. The environmental footprint of the use of digital solutions is constantly increasing in Estonia and elsewhere in the world. But now that environmental monitoring has become more efficient thanks to digital solutions, Estonia has decided to analyse ways to reduce the actual environmental impact of the digital government and become a pioneer as a green, environmentally friendly country with digital government.

The Data Embassy is an extension in the cloud of the Estonian government, which means the state owns server resources outside its territorial boundaries. This is an innovative concept for handling state information, since states usually store their information within their physical boundaries. Data Embassy resources are under Estonian state control, secured against cyberattacks or crisis situations with KSI blockchain technology, and are capable not only providing data backups, but also operating the most critical services.

Our data embassy is located in Luxembourg under a Tier 4 level of security – the highest level for data facilities. In this collaboration, Luxembourg and Estonia are pathfinders in creating a unique and innovative way to ensure digital continuity in the world.

e-Residency is building a new digital nation for citizens of the world where no-one is held back from their entrepreneurial potential because of where they choose to work or reside. This has enormous potential for unlocking global growth by democratising access to entrepreneurship and e-commerce. We believe that countries will one day compete for e-residents based on the quality of their public e-services and their business environment.

The Estonian government has decided to make sure all public services involve as little repetitive bureaucracy as possible. It means that as much government services as possible could be conducted either in a single online contact with an official or completely automatically. As a truly digital society, Estonia has already made an innovative leap by launching proactive family and parental benefits. This means that parents of a newborn no longer need to apply for benefits but receive a proactive proposal from the government for the benefits they are entitled to, which they simply have to confirm. However, in the current situation, public services are generally provided at the initiative of users. The goal of the Digital Agenda 2030 is to make public services into a single seamless service based on citizens’ life or business events. What’s more, in order to take it onto a whole another level, where possible, the state should reach you via notifications when you need them.

Estonia’s future solution for healthcare is data-driven health. Firstly, thanks to a data-driven approach, including genome-based analysis (Estonian Biobank already has over 200 000 donors), people will become more aware of the factors influencing their health, enabling them to take control over their well-being. Secondly, patients will be able to augment their healthcare journey using a variety of apps and devices, which are certified by the state and can also be reimbursed. Finally, Estonia is also taking steps to become a test bed for innovative healthcare technology, including medical AI.
Piloting on-demand transport in countryside regions is a response to challenge traditional means of transport and offer an alternative to personal cars. Delivery robots and autonomous couriers have already arrived and are roaming the streets of Estonia. Similarly, electric scooters have become popular among Estonians, while bicycle infrastructure, intelligent city space and car free zones are being enthusiastically tested to improve urban areas for its residents.

As businesses and citizens become more mobile, the need for truly international e-services becomes all the more pressing to remove the red tape involved in the cross-border movement of people and companies. Estonia has begun this work with a public sector data exchange facility, established between Finland and Estonia in 2017. Estonia was first in the world to test and use blockchain technology on national level. Estonia was first in the world to interconnect decentralised components of state and public sector databases at a national level.

The Real Time Economy (RTE) is an environment where financial and administrative transactions connecting citizens, business and public-sector entities are in structured standardized digital form. These transactions are increasingly generated automatically and completed in real time without store and forward processes. For example, solutions like real-time payments, e-ID services, real-time e-invoicing, and e-Receipts, can hugely benefit the digital single market through direct cost savings. In Estonia many actions i.e. electronic authentication and digital signing already act as building blocks of the real-time economy. Continuing with the development of standardised data exchange solutions (using XBRL GL, GS1, and other global standards as well as innovative technologies like blockchain and AI), and merging these projects and initiatives as links of real-time economy, will make it possible to develop RTE ecosystem.

Digital competence is one of the eight main competences included in Estonian national curricula, which is of equal importance to entrepreneurial, social and civic competences. Creating a digitally competent and technologically savvy new generation in Estonia has been a decades-long effort. IT education received an even bigger boost with the ProgeTiger programme, which guaranteed every Estonian student from kindergarten to vocational school access to high-quality IT education. Although, there is no magic formula for comprehensive online learning programme, constant development of ICT skills through teacher training and integration in the national curricula, equips the youth with modern 21st century skills.
IT sector

IT plays a central role in Estonian life because people trust IT solutions. Essential e-solutions in Estonia that enable the digital society to function smoothly were all built by local Estonian companies. Our IT sector has over 20 years of expertise and experience in automating public and private sector services. Today, virtually all state-related operations can be done online 24/7 — prescriptions are issued digitally and only a tiny fraction of individual tax declarations are filed on paper.

To date, Estonia has shared its e-governance journey with over 60 governments and exported its solutions to over 130 countries around the world. The Estonian IT sector and ambitious start-up community dare to create innovative e-services that change the world — from Skype to e-Residency.

The Estonian ICT cluster is the main force behind cooperation and development in the Estonian IT sector. It forms a collaborative platform for enterprises which combines competences and provides access to a dynamic network of companies. For example, most public and private e-solutions in Estonia have been made using ICT cluster partners. Through the ICT cluster, Estonian IT companies can cooperate in order to find partners and develop new solutions, create new products, and improve their competitive ability on international markets.

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Visit the gateway to Estonian digital society

The Briefing Centre presents the e-Estonia concept and acts as a coordinator for B2B, and B2G relations. We host presidents, ministers and highlevel global decision-makers from public and private sectors, investors, international media and connect them to Estonian companies. The Estonian government has also assigned the e-Estonia Briefing Centre with the role of coordinating the international image and narrative of e-Estonia. We share news about the digital society and its latest developments.

REGULAR VISITS:
→ a comprehensive and exclusive overview of the underlying mechanisms of e-Estonia by our inspirational speakers
→ 1-2 meetings with Estonian IT companies and/or public sector experts

CUSTOM-MADE VISITS:
→ consultation on programme agenda and custom-made business-programme with public and private sector experts
→ meetings and discussions with Estonian ICT companies for partnership ideas and best practice

5500+ DELEGATIONS
80,000+ VISITORS
130+ COUNTRIES
8,000 SUBSCRIBERS
70,500+ SOCIAL MEDIA FOLLOWERS

We inspire our guests with the e-Estonia success story, its developments, benefits and challenges as well as ongoing projects and the future of e-Estonia.

We consult on and arrange custom-made B2B and B2G programmes, featuring Estonian public and private sector experts, which can boost innovation and international cooperation opportunities.

Custom-made programmes last between half a day to three days; send an e-mail to business.e-estonia@eas.ee for your personal agenda and quote.

Examples of successful custom–made programmes:

828
→ Sparkassen Consulting that consults the Sparkassen Banking group in Germany met with SK ID Solutions, Cybernetica, Tuum, Salv, Bankish, Guardtime, Depowise, and Cybexer Technologies.

→ Tony Blair Institute’s meeting with Ministry of Economic Affairs and Communications, Cybernetica, Health Founders, Cybexer Technologies, and ITL.

→ Google EMEA’s meeting with Ministry of Economic Affairs and Communications, Helmes, Auve Tech, e-Residency, Startup Estonia, and HK Unicorn Squad.

82G
→ Federal Tax Authority (UAE) meeting with the Estonian Tax Board and company Nortal.

→ Queretaro’s State Government (Mexico) meeting with Estonian company Roksnet which led to the implementation of the X-Road data exchange platform.

→ Malta’s Ministry for Foreign and European Affairs meeting with Estonian governmental agencies and companies, e.g. Cybernetica, SK ID Solutions, CybExer, Proud Engineers.

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