Central and Eastern European governments and cloud computing

Sparking economic growth, transparent governments and better service delivery

Contents

Introduction

Just 25 years after the fall of Communism, the Central and Eastern Europe (CEE) region has evolved into a key player in the global economy. The world-class mathematical and engineering talent in many of these countries has been a well-kept secret, but that is changing. Global IT organizations and investors are beginning to pursue entrepreneurs, programmers and software engineers throughout CEE. Even with the recent economic slowdown, CEE is still transcending its traditional manufacturing and service provider economic base to emerge as a technology hub.[1]

As its economies evolve, CEE governments find citizen expectations evolving too, on several fronts. Governments can no longer be satisfied with merely keeping pace technologically. CEE populations expect their governments to embrace policies and technologies that don't just support but also fuel **economic growth.** And while Communism is consigned to history, CEE governments still struggle with high rates of corruption. As a result, constituents demand more **open, transparent governments.** Meanwhile, in a world of social media, instant messaging, gaming, smart phones and online business, everyone is a global consumer and communicator. So why shouldn't CEE citizens expect **efficient, effective government** services that rival experiences in the international digital marketplace?

To stay competitive and address stakeholder requirements, CEE governments need to investigate options beyond traditional IT. Cloud computing now pervades both the global economy and our individual lives—think of Facebook, Twitter, web-based email, streaming video services, document hosting services and more. By moving critical IT systems to the cloud, governments gain far more than mere technical benefits. They can control IT costs, create new ways to access and harness data for both private and public sector use, improve stakeholder services, and spark operational and business model transformations.[2]

What is cloud computing?

Cloud computing is a pay-per-use consumption and delivery model that enables real-time delivery of configurable computing resources—for example, networks, servers, storage, applications and services. (See Figure 1.) Typically, these are highly scalable resources delivered over the Internet to multiple organizations, which pay only for what they use. The services themselves are in data centers where computational resources can be dynamically provisioned and shared to achieve significant economies of scale.

For additional details about both business and technical aspects of cloud computing, see ibm.com/cloud

Cloud computing—a pay-per-use consumption and delivery model

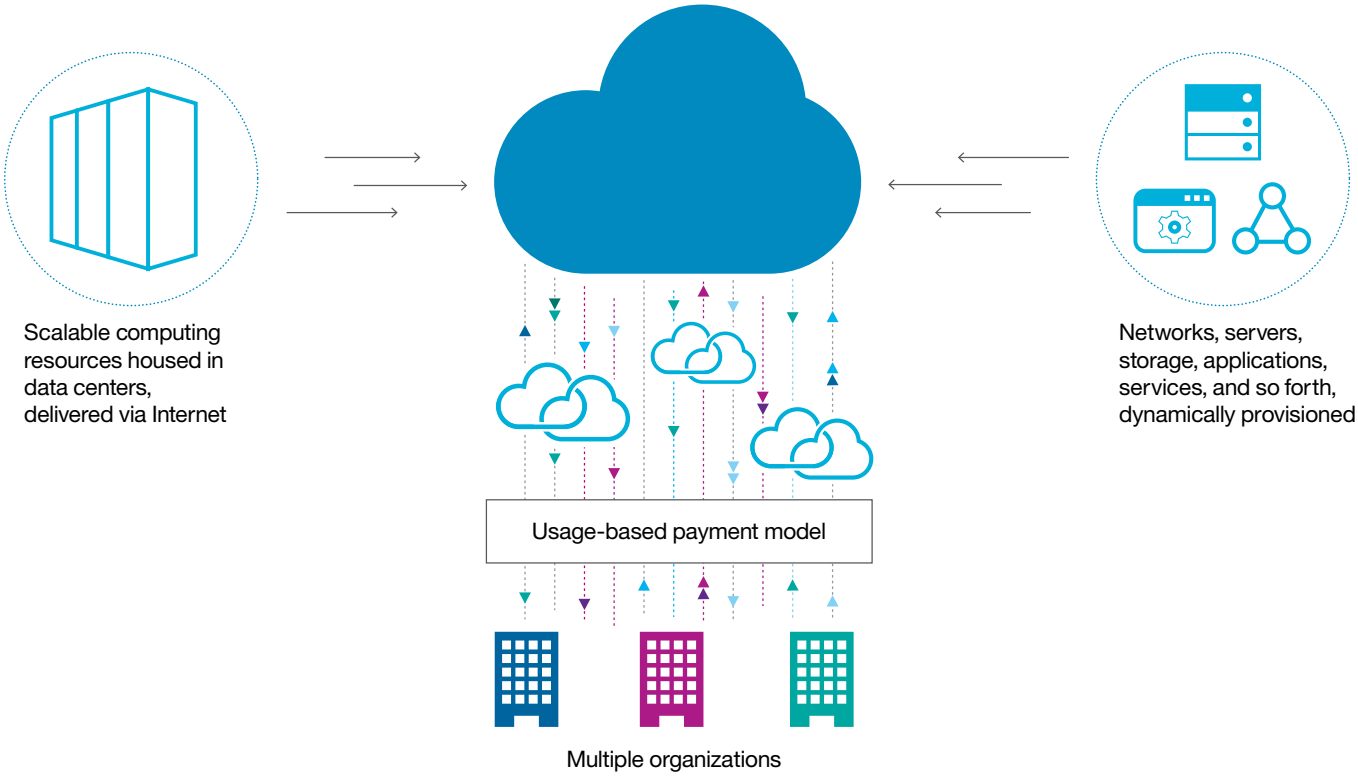


Figure 1. Cloud computing is a pay-per-use consumption and delivery model that enables real-time delivery of configurable computing resources.

In this paper, we will examine how cloud computing can:

- Help CEE governments develop a cost-effective, flexible infrastructure to better mobilize a youthful, innovative, educated population and spark economic development.
- Meet urgent citizen demands for transparency in government.
- Provide services that meet and exceed the ease, convenience and mobility delivered by the private sector.

Private and public cloud infrastructure spending in Central and Eastern Europe (CEE) is forecast to grow from $0.51 billion in 2015 to $0.97 billion in 2019.[3]

Cloud as a catalyst for economic growth

From 1988 to 1990, as the curtain fell on Communism in Poland, the country saw the creation of 2 million companies and 6 million jobs. A radical new law, the Act on Economic Activity, implemented by Poland's industry minister at the time, Mieczyslaw Wilczek, jump-started entrepreneurial efforts by removing regulations such as employment caps. The legislation launched a wave of innovation and gave any Pole the right to open a business.

Poland's economic success of the late 1980s illustrates that government policy can dramatically impact economic development, yet CEE countries have not enjoyed such growth recently. CEE presents a mixed economic picture,[4] in part due to a struggling Eurozone and geopolitical uncertainty. Slovakia and Poland managed to dodge the recession and have made research and innovation a key priority for their Structural Funds policy. (Note: Structural Funds are European Union-based financial tools that help lessen economic disparities between regions.) Economists expect to report CEE economic growth of 3.3 percent in 2015 but predict growth will fall slightly to 3.1 percent in 2016.[5]

The Global Competitiveness Report of the World Economic Forum[6] notes that the Czech Republic should explore ways to transition to a knowledge economy, that its technological readiness remains low and its businesses are less innovative than in other European Union economies. And the Knowledge Economy Index, which evaluates national environments relative to their effective use of knowledge for economic development,[7] ranks only one CEE country, Estonia, in the top 20. (Estonia ranks 19th.)

"Cloud can be the game changer in CEE. IBM's job is to take local clients on their cloud journey and help them unlock more value in their business and ultimately speed up the way to innovation. But to overcome barriers to enterprise cloud adaptation, we need to first demystify the security concerns, which remain the major inhibitor of further cloud adoption in this territory. At this stage, it is about educating the clients and building confidence, as I am convinced IBM is the right—no, the only solution for the enterprise."[8]

—David La Rose, General Manager, IBM CEE

CEE governments need new strategies to stimulate economic activity. Traditionally, they used technological disruption to do so, for example by providing government support and regulation of broadband capability and Global Positioning Systems (GPS). While EU integration and creating low-cost service locations have their place in CEE's development policies, CEE governments need to once again turn to technological disruption to truly jumpstart their economies.

Cloud provides numerous benefits such as speed, agility and scalability; security-rich, highly available services; improved efficiency; and cost optimization. The result is a rich platform for government innovation and collaboration. By helping to facilitate and synchronize the growth of business, talent and technology, cloud can help CEE governments create value and innovation.[9]

Benefiting from a shared collaborative environment

A collaborative cloud platform allows researchers in both academia and the for-profit sector to more quickly exchange and develop ideas, test results and discuss conclusions. Because these concepts are not developed in a vacuum, they tend to be more relevant to real world scenarios and enjoy higher rates of utilization. Cloud also facilitates forums and "crowdsourcing" to provide faster feedback on ideas and products. One survey of 572 business and technology executives showed that 62 percent of them adopted cloud with a focus on increased collaboration with external partners[10]—a strategy easily applicable to the public sector.

For example, Slovak Technical University in Bratislava, Slovakia, built a common cloud-based platform to enable better cooperation between universities, research centers and government companies. The goal is to increase not only the number of patented ideas, but also the percentage that is used in production.[11]

Creating innovative services and platforms on the cloud

With enhanced collaboration and more efficient workflows, cloud computing improves innovation. CEE governments can realize enhancements to their existing processes and services and fuel exciting new services with freshly available data. CEE governments can also create replicable cloud platforms for use by start-up companies, providing accessible, scalable business applications with a flexible pricing model. Cloud computing lowers the barrier to entry for new companies—there is no need for capital investment or IT, because the operating model is expense based.

By 2018, it is predicted that 60 percent of new applications will use cloud-enabled continuous delivery and cloud-native application architectures to enable faster business innovation and business agility.[12] Such technologies can be developed initially in the governmental sphere and then used to jump-start entrepreneurial ventures.

In one scenario, Estonia has created a unique e-Business Register that allows entrepreneurs to set up their business online using their national ID cards. (The system also accepts ID cards from other countries.) The e-Business Register lets company owners view annual reports, personal and commercial pledge data; monitor data processing and record amendments of companies in real time; send out detailed queries of other companies; and inquire about their possible tax debts or criminal activity.[13]

In South America, Chile's Ministry of Economy developed the "Start-up Chile" program, with the goal of enticing foreign entrepreneurs to invest in Chilean businesses and promoting Chile as Latin America's innovation and entrepreneurial hub. The website uses social networking tools like Facebook, Twitter and YouTube and features 1,910 complementary applications.[14]

Cities on the cloud: Creating intelligent new public services

CEE's populations are increasingly drawn to urban areas, and CEE cities need to provide convenient services and strong infrastructures—not simply to satisfy citizen demands, but also to attract new business and develop tourism. Often, cities run in "silos," with duplication in systems and processes and each department protective of its turf. By using cloud technology to create intelligent new public services, a city's citizens, visitors and businesses can reap the benefits of shared services, processes, data and disaster recovery capabilities. And, they gain these advantages without having to establish expensive data centers.

For example, IBM uses cloud technology to transform city operations through Intelligent Operations Centers. Utilized as a software-as-a-service, an IBM Intelligent Operations Center provides a dashboard that gives city leaders an overview of various dimensions of city management and data, including drill-down capability to associated agencies such as emergency management, public safety, social services and transportation. This enables a city to manage complicated ecosystems, better communicate with their populace and coordinate among departments.[15]

IBM has also awarded "smarter city" technology grants that help cities embrace cloud-based technologies. Success stories include Eindhoven, Netherlands, which reduced crime through a plan that encompassed citizen use of social media. Edmonton, Alberta, Canada, has analyzed accident data to improve road safety.[16]

Another success story involves Stuttgarter Straßenbahnen AG (SSB), a public transportation entity in Stuttgart, Germany, that serves more than 171 million passengers a year through a system of light rail and buses. (See Figure 2.) The city now has a greater metro area of 5.3 million, and SSB's data volumes are increasing by 10 percent each year. Existing systems were slowing access to corporate data, and online customer services were declining in quality. IBM worked with SSB to overhaul its infrastructure and improve customer response times through an infrastructure solution that includes an IBM cloud. SSB experienced marked improvements in application performance. In one scenario, wage-processing time dropped from six hours to six minutes.[17]

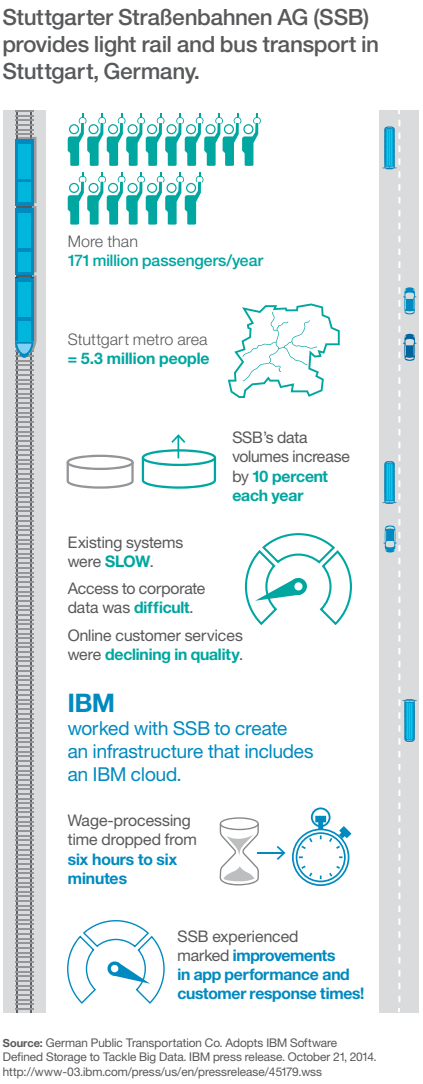


Figure 2. IBM worked with Stuttgarter Straßenbahnen AG (SSB) to overhaul its infrastructure and improve customer response times through an infrastructure solution that includes an IBM cloud.

Data: The new natural resource

Data is rapidly becoming a utility. Like electricity or heating, it is considered a part of the infrastructure, and where appropriate, should be equally accessible. Data provides insights that help governments and their citizens make more astute decisions, better optimize operations and even generate new revenue streams. The scalability and flexibility of a cloud infrastructure can simplify analyzing, accessing and sharing data.

Korea's Digital Budget and Accounting System (DBAS) provides a mechanism for its citizens and government employees to access and use financial data. This innovative tool manages and coordinates the end-to-end fiscal process, from budget formulation to accounting. DBAS consolidates fiscal processes of 51 central government agencies and links 55 external systems and local governments, public entities and subordinate organizations, providing a wide-ranging view of public finance.[18]

As well, some governments are investigating how to make their data accessible to private enterprises both large and small, with the hopes that technology entrepreneurs will use advanced analytics to develop new applications and services around the data.[19]

On the large company end of the spectrum, IBM has partnered with the UK government to support Big Data and cognitive computing research in that country. IBM's investment is US $300 million and includes IBM® Watson™ technology (IBM's cognitive computing platform) as well as 24 IBM onsite researchers. The goal is to ease the way for non-computer specialists and smaller, local businesses to gain new perspectives and insights from data.[20]

CEE governments should also note that open data initiatives are beneficial to academics and researchers, for whom uncovering researchable data has often been challenging. But recently, the UK government revised copyright laws to provide more non-commercial data access. The European Commission, which is promoting a pan-European outlook to data in hopes of stimulating more start-up tech ventures,[21] encourages this trend.

Creating revenue: Government as a cloud service provider

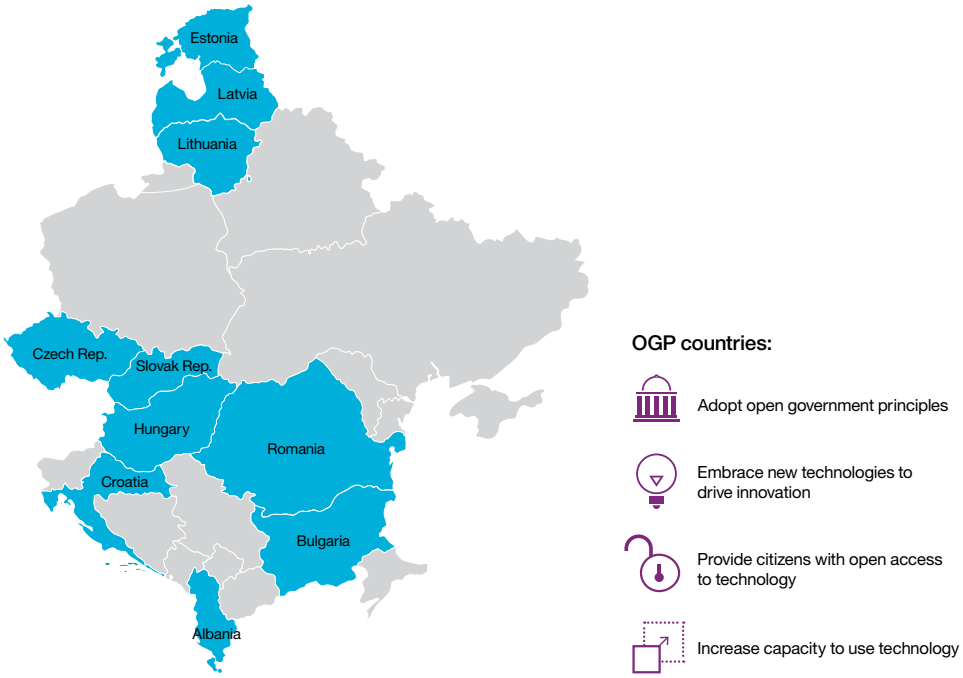
CEE governments can also investigate creating "regional clouds." In this scenario, one government agency provides computing and storage services to other agencies, sometimes also rolling out this offering to local businesses and generating revenue.[22] Regional clouds can dramatically alter how state and local governments obtain computing services—and enhance collaboration among local agencies. Such an effort serves to dramatically consolidate systems, reduce operating costs and create a new revenue stream for the provider entity.

Increasing transparency: Cloud as an enabler for open government

Unfortunately, corruption is a costly issue in the European Union. In its "EU Anti-Corruption Report," the European Commission estimates that corruption across its 28-member countries costs the EU economy €120bn a year—just slightly less than the EU's entire annual budget.[23] Recently, CEE governments played heavily in high profile cases of alleged corruption. The last several years have seen the forced resignation of the Czech Republic's prime minister, protests against unemployment and high utility prices in Bulgaria, and frequent protests against corruption in Romania.[24] In fact, the EU Anti-Corruption Report states that 95 percent of respondents in Lithuania and the Czech Republic view corruption as widespread in their countries, compared to 76 percent of all European respondents.[25]

The Open Government Partnership (OGP) was founded on September 20, 2011, as a global effort to improve the transparency, effectiveness, and accountability of governments. Albania, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania and the Slovak Republic have all joined the OGP. (See Figure 3.) OGP countries adopt open government principles, including "promoting transparency, empowering citizens, fighting corruption and harnessing new technologies to strengthen governance."[26]

A number of Eastern European countries (in blue) have joined the Open Government Partnership (OGP)



Source: Open Government Partnership. Accessed Nov. 16, 2015. http://www.opengovpartnership.org/about

Figure 3. The Open Government Partnership (OGP) was founded on Sept. 20, 2011, as a global effort to improve the transparency, effectiveness, and accountability of governments.

This environment and a still-vivid memory of communist rule fuel the demand for a more open, transparent government—one that enforces doctrines giving citizens the right to access governmental documents and proceedings to allow for effective public oversight.

While an open government requires supportive policies and principles, cloud computing serves as the technical foundation. Cloud provides an ideal platform for exchanging information and creating open data repositories and open services. It can also control access and enforce security mechanisms that grant access only to authorized users. As well, governments can create clouds based on open, compatible standards, avoiding vendor lock-in.

The quest for more open, transparent governments is not limited to CEE. The US has created data.gov to satisfy its citizens' need for information. The UK website data.gov.uk and the India website data.gov.in offer similar information portals.[27]

Open data also prompts wider benefits. National governments are part of a broader ecosystem that includes local governments, departments, ministries, nongovernmental organizations (NGO), and commercial businesses—an ecosystem in which shared information and collaboration create value and innovation.

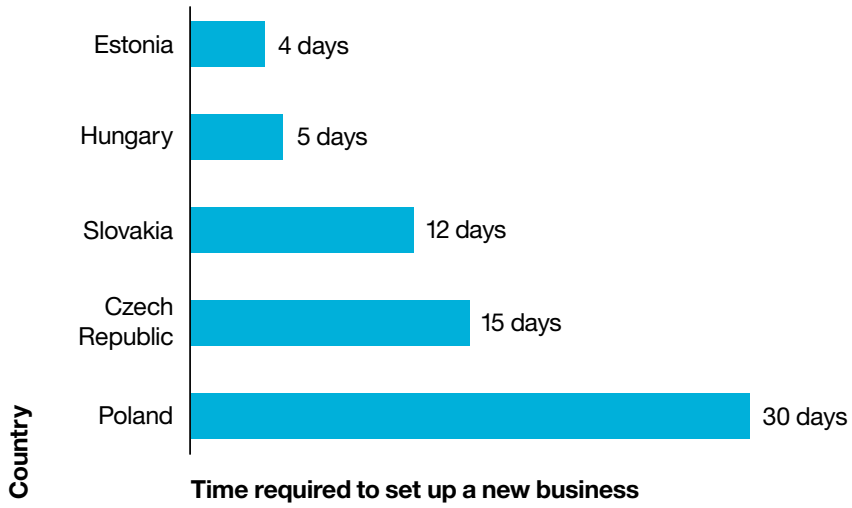
The Moroccan government has established a robust government portal as part of its effort to bring top-notch e-services to its citizens and create a more inclusive decision making process. Citizens can use the e-consultation platform to access and comment upon legislative texts. The government uses this platform as a means of fostering dialogue with its citizens, enriching its democratic governance processes.[28]

In perhaps the most ambitious case, the EU is deploying an EU Open Data core platform. PublicData.eu is a pan-European data portal, providing a single point of access to open, freely reusable datasets from local, regional and national public bodies across Europe.[29] Expected to become the world's largest open data project, this data portal will eclipse both the UK and US data portals, which encompass 15,000 and 111,000 sets of data, respectively. The portal will help both established companies and start-ups with creating new businesses and using advanced analytics to create new services. Academics and researchers will benefit from the trove of data as well.[30]

Exceeding citizen expectations: Providing effective and efficient service delivery

CEE governments must satisfy an increasingly sophisticated constituency with evolving, higher standards. Advances in social and mobile technology have conditioned citizens to expect comparable digital experiences from their governments. Just as they demand more from products and services in general, today's consumers also expect more from their government agencies, including simpler processes and more efficient interactions.[31]

CEE governments sometimes use multiple complex applications to complete even one defined service. E-government modalities can simplify service access, yet CEE governments are listed just twice (Latvia and Estonia) on the top 50 e-government countries, according to the United Nations 2014 E-Government Development Index.[32]



Source: Time required to start a business (days).
The World Bank. Accessed Dec. 14, 2015.
http://data.worldbank.org/indicator/IC.REG.DURS/countries?display=default

Figure 4. The process of setting up a new company is a crucial barometer measuring the ease of doing business and growth stimulation. CEE's performance in this metric varies considerably.

For example, the process of setting up a new company is a crucial barometer measuring the ease of doing business and growth stimulation. CEE's performance in this metric varies considerably, as shown in Figure 4.[33]

Another study cites a similar scenario, in which foreign companies interested in pursuing new construction initiatives in the Czech Republic indicated they were discouraged by excessive bureaucracy.[34]

The flexibility, scalability and cost-effectiveness of cloud can help governments provide more advanced digital services. Effective management of IT resources can extend thin budgets and even automate certain services. Sharing applications and data across the government ecosystem exploits economies of scale and opens up the potential for analytics. And, cloud can onboard new applications and users much more quickly than traditional IT.

Nepal has been using e-government initiatives to provide better services to its citizens. Projects include a government portal, national ID, e-education, infrastructure, enterprise architecture, groupware and more. The country's IT policy aims to transform Nepal into a knowledge society that harnesses e-governance to advance socioeconomic development and reduce poverty.[35]

Providing a common reduced-cost platform

A consistent benefit to cloud computing is its more efficient, pay-as-you-go operating expense model, as opposed to the more traditional capital expenditure model—a factor that helps CEE governments provide services to their populations more effectively by reducing cost. Cloud also helps governments consolidate multiple, fragmented data centers, with the improved quality, efficiencies and standardization that come from shared services.

Cloud utilizes virtualization and service management software, which automates the service delivery process and creates faster service delivery. This is one of the biggest cost-savings areas, with some organizations experiencing a 70-percent reduction in service delivery time.[36] Additionally, new data centers are often "green," meaning they consume less energy and better utilize existing hardware. All in all, cloud offers more effective resource management and a flexible pricing model.

In one scenario, the Albanian government's adoption of technology was increasing rapidly. But the result was applications running on a myriad of platforms, with no economies of scale. The government adopted a private cloud environment to make the most of its technological and human resources, with excellent results. Users of government applications received vastly improved services that are faster and more reliable, increasing productivity by 70 percent.[37]

As well, New Zealand has committed to making government services accessible in an online environment, with all new services offered online by 2017. New Zealand is keenly aware of the need to protect personal information and build public trust in online services. To that end, it is establishing system architectures that include security and privacy principles.[38]

Scalability to manage fluctuating workloads

Government services often experience cyclical periods of intense demand—for example, when income taxes or other revenue-collecting activities occur. Another critical scenario involves elections. In 2014, the results of Poland's general election were delayed because the national election commission servers fell victim to hackers and repeatedly crashed.[39] Cloud computing provides the agility and scalability to handle peak—and even unpredictable—periods, and also the ability to implement stringent security measures.

A lawyer's perspective: Can the CEE public sector benefit from cloud?

by Maciej Gawroński, Bird & Bird Maciej Gawroński sp.k., Warsaw, Poland

In September 2012, the European Commission adopted a strategy for Unleashing the Potential of Cloud Computing in Europe. (See http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0529:FIN:EN:PDF). The advantages of cloud, such as reduced IT expenditures and enhanced service development, exist regardless of whether a single awarding entity orders cloud computing services for the whole or part of the public administration, or an awarding entity orders cloud computing services for its own purposes.

According to the European Commission and numerous studies, the public sector could benefit immensely from cloud computing. These advantages could include, among other things, savings in taxpayer spending and promoting good standards in back-office processing and e-government services among public authorities, which are often not able to develop efficient solutions by themselves. Moreover, standardization—in relation to graphical user interfaces, application programming interfaces, file formats and so forth—saves users and providers valuable time, effort and energy. And, of course, cloud computing provides and fosters standardization.

In CEE, many see cloud computing as an opportunity to resolve at least some of the issues preventing their public sectors from accelerating toward an e-government and information society.

What are the legal or quasi-legal constraints hindering cloud?

Procurement—time of proceedings and value of an award

Cloud computing offers a dynamic, scalable, pay-per-use service. However, if you must undergo the end-to-end public procurement process in order to increase or decrease your use of a particular cloud service, you obviously are not able to profit from those advantages. To deal with this issue, we propose relying on a redefined right of option. Right of option is an existing instrument of public procurement law. However, it was initially considered an instrument for supplementing or reducing a major procurement. Now, for the purpose of procuring cloud services, right of option should cover most of the potential scope of services. As long as an awarding authority moves within the limits of an option (for example, adding or reducing virtual servers), no new procedures are required.

Data protection

All regulated sectors, and in particular the public sector, are sensitive to the requirements of data protection law. On top of this, there is a general concern as to whether cloud computing complies with EU data protection requirements. These concerns, as related to data processing in the European Economic Area (EEA), arise mainly from a limited understanding of data protection principles and the patchwork of EU data protection laws.

Data transfer to the US

Following the European Court of Justice decision in *Schrems* (C-362/14), invalidating European Commission decision 2000/520/WE on the Safe Harbour Framework, it was no longer possible to rely on Safe Harbour as a legal basis for data transfer to the United States. This decision definitely impacted cloud service providers and companies that use cloud services, which had to find alternative ways to transfer data to the United States. The solution that most organizations reached for was the European Commission-approved model clauses and Binding Corporate Rules (BCR), for transfers of personal data within the same corporate group. As this paper went to publication in February 2016, EU and US officials reached consensus on a new solution: the EU-US Privacy Shield. This program is intended to replace the Safe Harbour Framework and strengthen US commitments to protect the data of European citizens. It will also ultimately provide for right of challenge of the US authorities' access to EU citizens' data, although exact details are evolving.

The issues surrounding data protection compliance can be overcome by relying on expert advice—cloud computing can be data protection compliant.

Budgeting

One challenge the public sector faces in adopting cloud is the nature of a budgeting process that requires you to predict the total demand or expenditures for a fiscal year. In certain cases of joint procurement, this may narrow the margin for profiting from dynamic allocation and the pay-per-use benefits of cloud.

Terms and conditions

Different Central European data protection authorities have developed certain guidelines, such as the Polish Inspector General for Personal Data Protection's (GIODO) *Dekalog Chmuroluba* (*The Ten Commandments of a Cloudophil*) published in 2013. (See http://www.giodo.gov.pl/plik/id_p/4308/j/pl/ - in Polish), or the guidelines issued by the Czech Data Protection Office in August 2013. (See https://www.uoou.cz/VismoOnline_ActionScripts/File.ashx?id_org=200144&id_dokumenty=6582 - in Czech.)

Recently the European Commission adopted a proposal for a directive on certain aspects concerning contracts for the supply of digital content, which also applies to cloud computing services. The proposal and all related policy documents are available at http://ec.europa.eu/justice/contract/digital-contract-rules/index_en.htm. The Commission is also working on defining fair contractual terms.

Guidelines and use cases

The public sector is usually concerned not only about the final outcome, but equally about responsibility, liability and, therefore, procedures. Understandably, decision makers look for simple, measurable criteria, which could justify their decisions.

Security—general issues

There are general concerns regarding data protection read as information security. Questions are being raised as to how to make cloud computing services more secure and compliant with data protection law requirements. The International Organization for Standardization (ISO) recently developed a cloud-specific standard for information security – ISO 27018. We hope that the ISO 27018 standard will fully address the concerns regarding data protection compliance by cloud computing offerings. (See https://www.iso.org/obp/ui/#iso:std:iso-iec:27018:ed-1:v1:en.)

Security—intelligence

Apart from general information security aspects, there are concerns relating to potential enforced access to information stored in a cloud by a public entity. As long as the enforcement agency is from the same country as the public entity using the cloud, there should not be any particular concern. The situation differs when a foreign agency may enforce access to information stored in a cloud by a public sector entity of another country. A case in point, Edward Snowden's revelations weakened much trust in US-controlled trust providers and eventually led to the invalidation of Safe Harbour and the creation of the EU-US Privacy Shield, which we discussed above in the section "Data transfer to the US."

Summary

The advantages that awarding entities could achieve by purchasing cloud computing services far outweigh the disadvantages. Although there is a risk that ordering the cloud computing services could be a difficult process, currently the legal provisions do not exclude the possibility of purchasing them. Tackling the concerns of the awarding entities is extremely important, as well as conducting a public dialogue between awarding entities, authorities and legal/technical specialists. Much still remains to be done, however at the end **there is a real chance for seeing public administration in the cloud, and especially that cloud computing could be compliant with data protection rules and security principles**.

Governance considerations: Critical yet often overlooked

Cloud governance encompasses the decision-making processes, criteria and policies involved in the planning, architecture, acquisition, deployment, operation and management of cloud computing capabilities. Effective governance is a critical factor in managing a successful cloud delivery, yet companies often overlook this key area when undertaking cloud implementation projects.

This area is complex, so we have highlighted three areas that both attract the most questions and carry the most potential for improvement, including:

- Organizational structure
- Service management
- Decision-making model

Organizational structure

When cloud is implemented, inevitably new roles are introduced and certain existing roles grow less important or perhaps even become obsolete. This can require a change of direction,

organizational behavior and culture. For many CEE governments, this is one of the biggest challenges, because changing culture and behavior requires focus, patience and time. For example, organizations need to analyze and define evolving roles and organizational alignments, and map out a transformation approach. The benefits of cloud, as we've outlined in this paper, are well worth the effort.

Service management

Cloud's impact on service management is significant. For example, principles and strategies for service offerings and an overall portfolio must be developed and introduced. The service offerings must be described clearly, so consumers understand both what they buy and also the cost and charging model.

Current assessments of IT processes often focus on operations (such as incident, problem, change and configuration management). Service catalogs and service level agreements (SLAs) are also in place. As IT service delivery increasingly evolves to a hybrid model, this focus continues with new complexities—mainly because some sourcing will be external, with fewer control mechanisms. Here is where a pragmatic view helps. The aim is to secure effective solutioning. For instance, when solutioning incidents, the goal is to maintain a level of control so all incidents are handled within SLAs.

Consumption reporting also deserves focus, but often organizations are reluctant, because perhaps internal customers do not compensate with "real" money. This may be true, but consumption behavior will be easier to steer and manage if you are able to show figures on how much each unit, group or person consumes and relate the chargebacks.

Decision-making model

Decision making is a difficult process for many organizations. It takes time, and the results are often based more on opinions than facts. A decision-making model helps an organization make the "right" decisions at the right time—and to make decisions based more on facts and less on emotions.

The model helps determine:

- **Roles.** Who is responsible for decisions and how are those decisions made?
- **Requirements.** What criteria (functional and non-functional) should the solution meet?
- **Decision criteria.** What factors are used to evaluate and test the requirements?
- **Must haves.** What should the proposed solution provide?

The secret is to carefully select and define all criteria to avoid any ambiguity.

While these topics are not unique to the cloud strategies of CEE government organizations, they are critical nonetheless. For more details, we suggest you read these two IBM white papers:

- Preparing for the hidden impact of cloud solutions: How cloud affects IT governance, organization and services at http://bit.ly/Rv5naf
- Designing your Cloud Decision Framework: A consistent, structured approach to selecting cloud services at http://ibm.co/19WbrT7

The path forward: Recommendations

We've discussed how CEE governments can enjoy tremendous benefits through moving key applications to the cloud: an enhanced economy; a more open, transparent government; and efficient, effective cloud services for their citizens. But once you decide to explore cloud technology, figuring out what's next can be overwhelming. Here are some initial thoughts.

Describe your goals from a business metrics perspective, not from an IT perspective.
What are the end results you want your country and its citizens to realize? What services do you anticipate will deliver the most valuable benefits to residents, departments and businesses? Can you integrate common operations such as finance, procurement or human resources across your government functions? How will you facilitate consumption of the prospective cloud services?

Adopt a "cloud first" approach.
At a high level, a "cloud first" policy directs government agencies to take full advantage of the considerable benefits of cloud computing. This approach helps you to educate stakeholders and develop strategies that drive a "cloud first" mindset when procuring services.

Establish security policies, guidelines and governance.
CEE governments can achieve greater transparency on the cloud. But simultaneously, the EU demands stringent data security and privacy standards from its governments—creating a complex regulatory environment. Depending on your country, you will need to address applicable requirements for data residency and data sharing in your cloud strategy.[40] For more information on these evolving developments, refer to page 11, "A lawyer's perspective: Can the CEE public sector benefit from cloud?"

Beware single vendor lock-in.
With many existing and emerging technologies, you will want to remain adaptive. Embracing open standards and a flexible Enterprise Architecture will help you avoid getting locked into a single vendor. Define your version of a "cloud first" strategy and agree with other groups on a decision model that will help while debating a cloud delivery model for a particular workload.

Analyze the characteristics of the services you want to migrate to cloud.
Understand your workloads—certain services are better suited to cloud than others. Performing workload analysis (like IBM Workload Transformation Analysis for Cloud) demonstrates that workloads have different requirements, such as security and privacy, performance and availability. The workload analysis clarifies which workloads should be moved onto which type of cloud (private, public or hybrid) and the benefits of doing so. Such an analysis will help you build a cloud migration roadmap specifying when and how workloads should be migrated, and the associated migration costs.

Determine your government's role—is it a cloud provider, cloud consumer or service integrator?
If you are hosting other agencies, organizations and local governments, you are effectively becoming their cloud service provider. You will want to implement a common security and digital branding model across the services as you integrate other organizations.[41]

Look globally to assess what you can learn from other governments and their experiences.
We've given you some examples of how governments within and beyond CEE are utilizing cloud computing. Explore other scenarios as well, and evaluate how these lessons learned apply

to your objectives. Since government use of cloud is relatively early in its lifecycle, especially in Europe, you will see a variety of approaches.

Organize a broad community of committed stakeholders. Who is potentially impacted or could help your cloud initiative succeed? Which stakeholders should you engage? Think citizens, government departments, end users, IT staff, entrepreneurs, NGOs, key influencers and local technology companies. A government cloud initiative should not solely be the domain of the IT department, even if this role is essential. Build a broad community that is invested in the project's success.

Engage with knowledgeable practitioners to help with this process.
Working with EU Structural Funds, change management and service transformation can be complex. Time to value and risk reduction can improve dramatically when you find the right specialists with the right experience.

Start!
CEE governments have a unique and timely opportunity to harness the power of cloud. It's no longer a question of if, but how and when. You should aim for a balance between getting your strategy right and getting started. You can still refine your strategy even as you start a modest project that can be delivered quickly. What is a service that you can quickly set up in just days to experiment, learn and play? Can you apply some A/B testing principles to your project, by which you quickly deploy, learn and adapt as you go based on end user experience? You may start by looking at subsets of basic office automation, email, web hosting and payment systems. Other options include human resources and enterprise resource planning, finance, emergency management systems, public safety applications and many others.[42]

For more information, please reference our series of three white papers: *Your roadmap to cloud adoption*.

Part One: Creating a cloud computing strategy at http://ibm.co/TXqLpE

Part Two: Defining your cloud ecosystem at http://ibm.co/WiOqm7

Part Three: Establishing a relationship with your cloud service provider at http://ibm.co/1k3alTy

Why IBM Cloud Professional Services?

A solid strategy for cloud computing is critical to helping you deliver innovative IT services that can create new business value, and IBM Cloud Professional Services can help. Our structured approach combined with rigorous methodologies, time-tested tools and extensive experience can deliver the insights you need to simplify the workload analysis process, make more strategic decisions and optimize your cloud investments.

In fact, overall IBM was positioned as a leader in the IDC MarketScape: Worldwide Cloud Professional Services, 2014 Vendor Analysis. According to IDC's 2014 *Global Cloud Professional Services Buyer Perception Survey*, clients highlighted IBM as strongest in providing industry insights and competence, creating a more effective business and optimizing ratio of onshore/offshore efforts on a project.[43] And Synergy Research has ranked IBM as the #1 hybrid cloud provider for the enterprise.[44]

At IBM Cloud Professional Services, we take a collaborative approach. We weave together business insight, advanced research and technology to help give you a distinct advantage in today's rapidly changing environment. Our integrated perspective on cloud consulting, design and implementation can turn strategies into action. With expertise in 17 industries and global capabilities that span 170 countries, we help clients around the world benefit from new opportunities available on the cloud.

For more information

To learn more about how IBM can help you with workload analysis, please contact your IBM representative, or visit: **ibm.com**/cloud-computing/us/en/learn/consulting

You can also follow us on Twitter at www.twitter.com/ibmcloud and on our blog at www.thoughtsoncloud.com

To learn more about IBM Cloud Professional Services, please contact your IBM representative or visit the following website: **ibm.com**/cloud computing

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Produced in the United States of America
February 2016

WUW12379-USEN-00