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Foreword

The Next Connected World: Secure and Unobtrusive

Being connected *anytime, anywhere and on any device* becomes a reality. The future belongs to the technologies able to effectively connect people and objects. The convergence of these technologies is generating a societal transformation.

In this edition, we try to highlight the impact of the IoT (Internet of Things) technologies and pervasive connectedness on security and our ambient. A few examples about the *connected home* concept will disclose the complexity and transformational force of these new technologies. Being at the core of this massive process with our software development competencies, we thought to depict Java's role in the development of IoT field.

In addition, our traditional market report section reveals fresh data about Cluj-Napoca, the heart of Transylvania. With consideration for his overall contribution to making Romanian ICT industry present on the international arena, our special talks section features an interview with ARIES President.

Enjoy reading and let 2015 unfold!

Codespring team.

Market Report

Cluj-Napoca: Growth Pole of Romania's ICT Industry

With more than 300 IT companies established in the city and about 10,000 active software engineers, Cluj-Napoca is in 2015 the 1st IT export hub of Romania, delivering 78% of the Romanian IT exports. The brain muscles are being prepared by the 11 universities that lie in the historical academic center of Cluj, while the innovative power grows in the wombs of more than 200 research units and laboratories. This hidden treasure of South-Eastern Europe investment map is standing apart by its multiculturalist and multilingual community.

What are the behind-the-scenes facts and figures that propel Cluj-Napoca as a growth pole of Romania's ICT industry? What are the main characteristics of this new breed of software engineers? What has Cluj-Napoca to offer for the next decade? – The answer to these questions will be delivered in the present article.

2015–2020: Back to the European Neighborhood: Romania and the South-Eastern Block

One of the best things about Romania is that it is literally a border country: both geographically as a limit of the European Union and culturally as a cross-road between Occident and Orient. It has been largely analyzed how Romanians can successfully align to Latin cultures, Anglo-Saxon cultures, Slavic cultures or Asian cultures. For outsourcing and international ICT activities, this aspect pondered a heavy weight in the decision of finding the right location for implementing future development and service centers.

As an incentive, the Government in Romania has strategically supported initiatives and investments in the ICT sector, maintaining the zero income tax strategy for software engineers and promoting operational development programs. Similar measures may be found in the neighboring countries like Bulgaria, Ukraine, and Hungary.

The shift of contracting resources from Asian locations (such as India, Singapore, Malaysia, Philippines and other) to Central, Eastern and South-Eastern European locations has been sensed in Romania about 5 years ago. The physical proximity, the cultural vicinities and the educational similarities were able to meet the expectations of Western European and North-American business and technical teams, against the voluminous resources that former colonies could offer.

According to the **2014 A.T. Kerney GSLI** *“Central Europe offers mature industry and skilled players at about 50% arbitrage compared to Western Europe; deeper arbitrage opportunities are available in South-East Europe, but with a more immature industry and regulatory landscape.”*

	2014 A.T. Kerney GSLI ranking	Δ	Financial attractiveness	People skills availability	Business environment	Language group
Bulgaria	9 th	+8	2.99	0.97	1.66	Slavic
Poland	11 th	+13	2.28	1.39	1.87	Slavic
Romania	18 th	+7	2.74	1.15	1.56	Italic
Russia	21 st	-10	2.02	1.88	1.49	Slavic
Hungary	31 st	0	2.34	1.24	1.69	Uralic
Czech Republic	33 rd	+2	2.05	1.27	1.94	Slavic
Slovakia	35 th	+5	2.39	1.03	1.77	Slavic
Ukraine	41 st	-3	2.76	1.23	1.04	Slavic

	South-Eastern European countries
	Central European countries
	Eastern European countries

The same study reveals the following aspects: *“Another recent EU member, Romania (18th) offers a sound regulatory environment. The country's size offers a robust pipeline of talent from its network of universities. Transylvania is home to a large German-speaking population. French and Italian speakers are relatively easy to find due to Romania's cultural and*

linguistic affinity to Latin countries. The Romanian Government is actively courting the sector: companies that are acting in the sector are able to deduct the payroll tax for their employees, making for a more attractive financial environment.”

In 2014, the Romanian ICT contribution to the Gross Domestic Product (GDP) was about 5.2%, recording a net 15.3% year-on-year growth. The ICT sector turnover structure in 2014 was recalibrated as follows: 70.3% generated by hardware companies, 14.8% generated by software providers and 14.9% by IT Services providers.

COUNTRY RANKINGS

Deloitte's CEE Technology Top 50 2014:	4 th place
2012 Jones Lang LaSelle Top 10 Outsourcing Destinations Globally:	9 th place
A.T.Kearney Global Services Location Index 2014:	18 th place
2014 Tholons Top 100 Outsourcing Destinations:	40 th place
Fitch Sovereign Rating 2014:	BBB-, stable
Moody's Credit Rating 2014:	Baa3, stable
Standard & Poor's Foreign Rating:	BBB-

Comparing Romania's ICT evolution to the countries competing to attract ICT investors and to grow on the international ICT market in the next decade, we can resume that the location is appealing due to its diverse ICT centers and the versatility of skilled work force.

Cluj-Napoca 2015 - 2020: Striving for Innovation and Technical Excellence

Contender of the country's capital (Bucharest), the picturesque city of Cluj-Napoca, the heart of Transylvania, is ranked 2nd in size and economic activity in 2014 / 2015, but grabs the pole position for IT exports: 78% of the total Romanian IT export is originated in Cluj-Napoca. The declared intentions of the local community to emerge as an innovation and technical excellence location have their foundations on four pillars: information technology, research and development, academic environment and multiculturalism.

- **Information Technology Center:** Cluj-Napoca distinguishes as an information technology center through its more than 300 IT companies, out of which about 200 companies deal with software development. The active software engineers on the market have been estimated at about 10,000 persons and new forces join yearly with an average of 1,000 ICT graduates. The organizational power of the IT community in Cluj has taken the form of ClujIT cluster, recently labeled with Bronze Cluster Management Excellence by the ESCA – The European Secretariat for Cluster Analysis, member of the European Cluster Excellence Initiatives.



- **Research and Development Center:** Cluj-Napoca counts in 2015 more than 200 public and private research units and laboratories. The R&D (research and development) activities are a priority of the local IT and Sciences community. As a manifestation of this strategy we mention two impactful projects: Cluj Innovation City - the leading innovation project of 240 hectares that will host innovative start-ups, research units and academic units; and, CREIC (Centrul Regional de Excelență pentru Industrii Creative – The Regional Center of Excellence for Creative Industries)
- **Academic Center:** Cluj-Napoca is a historically and regionally renowned academic center: the fortress hosts 11 universities. Four universities are part of the country's elite institutions: The Technical University of Cluj-Napoca (UTCN), Babes-Bolyai University (UBB), University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca (USAMV Cluj-Napoca) and University of Medicine and Pharmacy Iuliu Hatieganu from Cluj-Napoca (UMF). In total, about 100,000 students study in Cluj-Napoca, reaching almost 25% of the current urban inhabitants' volume. About 1,000 students graduate yearly in Information Technology and Computer Sciences; this means that more than 4,000 students are enrolled in ICT curricula.

- **Multiculturalism:** From a demographic perspective Cluj-Napoca is quite diverse: 75,71% Romanians, 15,27% Hungarians, 1,01% Roma, 0,18% Germans, 0.05% Jews and the rest includes Serbians, Ukrainians and others. At the local universities students may choose to study in Romanian, Hungarian, English, German or French. The business environment includes an important number of expats living in Cluj-Napoca. Several international business clubs support the development of foreign investments in the city: Cluj Chamber of Commerce and Industry, The Romanian-Hungarian Chamber of Commerce, The “Dutch Business Club Cluj”, The French Business Club, Cluj International Club, The German Business Club Northern-Transylvania (DWNT).

Cluj-Napoca's European Nominations and Awards

In 2014 and 2015, Cluj-Napoca has grabbed a series of titles and awards from various organizations. This proves the growing appeal of the city on the European and International map.

- **European Youth Forum:** Cluj-Napoca, European Youth Capital in 2015
- **Eurostat:** Cluj-Napoca, the Capital of Tolerance, 2014 the Friendliest City in Europe, 2014
- **“Respire” Association in partnership with “We Demailn” magazine:** Cluj-Napoca, the City with the Cleanest Air in Europe
- **Huffington Post:** Cluj-Napoca the City that will Shake Up the Art World in the 21st Century
- **Forbes Romania:** Economic Capital of Transylvania, 2014
- **KPMG consulting company and the Management Authority for the Regional operational Programme (AM POR):** Cluj-Napoca, the most attractive growth pole in Romania

The trends and facts presented above indicate the transformations that Cluj-Napoca is undergoing at the moment. The wealth of opportunities typical to such growing economic and academic centers relies on a set of complex resources.

Diana Ciorba

Industry Insights

The Connected-Home: A New Life

What sometimes seemed to be a utopia is now turning into reality: the connected home – a modern shelter where devices work interactively and the residents can access status information via high-speed broadband. Increased mobility and connectedness allows the manifestation of Jules Verne's savvy captain Nemo's principle: "Mobilis in Mobili" ("moving amidst mobility") thus changing the way in which we experience domestic life. Connected home technology claims a big stake in the IoT (Internet of Things) universe due to its unquestionable weight in human life.

Dramatic Growth Trends Forecasted for Connected-Home Category

In January 2015, the Connected-Home Report issued by BI Intelligence highlights the following global trends:

- *Connected-home device shipments will grow at a compound annual rate of 67% over the next five years,*

much faster than smartphone or tablet device growth, and hit 1.8 billion units shipped in 2019, according to BI Intelligence estimates. Connected-home devices include all smart appliances (washers, dryers, refrigerators, etc.), safety and security systems (internet-connected sensors, monitors, cameras, and alarm systems), and energy equipment like smart thermostats and smart lighting.

- The connected-home category will make up about 25% of shipments within the broader Internet of Things category this year, but that share will increase gradually to roughly 27% in 2019 based on our forecast, as growth in other IoT areas picks up.

- Connected-home device sales will drive over \$61 billion in revenue this year. That number will climb at a 52% compound annual growth rate to reach \$490 billion in 2019.

- Home-energy equipment and safety and security systems, including devices like connected thermostats and smoke detectors, will become popular first, leading the way to broader consumer adoption. *(source: <http://www.businessinsider.com/connected-home-forecasts-and-growth-2014-9>)

Both the connected-home and the connected-car are phenomena that people in highly connected societies have been educated for. The latest year's technologies have pushed the development of devices and systems that can implement these two concepts. There are however challenges of integrating digital Internet technologies with physical infrastructure.

Applications of the Connected-Home Field

The Connected-Home requires a well woven fabric of devices, connections, data and processes. The highest state of a connected-home leads to the materialization of the intelligent house/home. The main applications focus on *home automation*, *home monitoring*, and *home security*, tracking of devices or beings and the *smart home hub*.



In **home automation** the main challenge is to put into correct interactions the following: *sensors* (that detect variations of temperature, humidity, light and motion), *controllers* (PC or home automation dedicated controllers), *actuators* (motors, switches or even virtual instrumentation), *buses for communication* (wired or wireless) and *interfaces* for H2M and/or M2M interactions. The final goal is to achieve efficient home management and increase personal comfort.

For **home monitoring** it is essential to provide access to the home control system, from anywhere, anytime and recently – from any device across the web. A challenge is to allow the owner or the resident to intervene and check the systems, and another to make sure that the professional entities (thermic agent supplier, electric agent supplier, assistive health care provider) can safely monitor your domestic unit and its variations.

That's how we get to the third critical aspect of the connected-home: **home security**. Designing a sound security system is more than a traditional anti-theft and alarm system. It should also feature residents' security and pet security tasks. Video monitoring, live or on-demand video streaming, lights control, locks control and remote access to the recordings and in the system can now be integrated in a complex real-time or near real-time system.

Tracking the residents' keys, phones, cars, pets or the resident themselves require a set of mobile dedicated equipment and a clear alert system. The convergence of GIS, GPS, RFID and WLAN technologies are used to create location-tracking and location-based systems.

In the end, in order to control and connect as simply and intuitively possible the final piece of hardware is mandatory: **the hub**. Smart home automation hubs are actually a one-stop solution for unifying the connected gadgets, and controlling them from one simple app.

Depending on the connectivity protocols - Bluetooth LE, Lutron ClearConnect, Wi-Fi, Z-Wave, ZigBee – you ought find a hub that support as many of these standards as possible. IFTTT (If This Then That) is desirable, since it will allow multiple ways to configure your connected devices.

Codespring Experience with Connected Home Technologies

Codespring has been involved in projects having as final purpose the delivery of smart buildings, or even more specific goals such as smart warehousing. From these large scale industrial projects it was a natural step to enter in the development of smart home solutions with specialized technology partners.



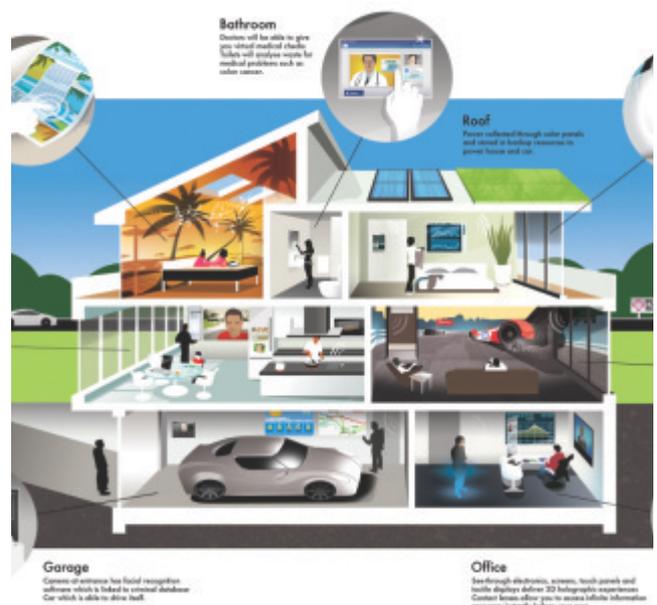
“Those projects that require embedded and mobile programming expertise (e.g. IoT – Internet of Things), especially applications that run on dedicated hardware are part of Codespring’s toughest points. In the connected home field we have been seeing new use cases emerging. Again, an important aspect is the revival of hardware optimized software architectures. It is good to witness the emphasis on performance, well-structured code and development system that leads to a lower software product maintenance cost.” states eng. Walter Brem – Codespring, COO.

Eng. Török-Vistai Tamás – Project Manager continues as follows: *“Building technology solutions that deliver personalized comfort, safety and energy savings in an effortless manner for the end user are the main requirements when speaking about connected homes. From the technical perspective, connecting objects and systems in a single and easy to use system is quite challenging. There are a few platforms that enable connected homes: from the simple IFTTT that has channels for a variety of sensors to the Arduino based Temboo or The Thing System, for example.”*

As a final thought, rethinking our homes is an essential aspect of the modern society. Therefore the connected home is at the core of the current

information technology researches and development project. Based on the *connected homes* or *smart homes*, we will be able to develop *connected cities* or *smart cities*, therefore a *connected world*.

Diana Ciorba



Special Talks with Mr. Alexandru Borcea – President of the Board, ARIES

I have personally met Mr. Alexandru Borcea on the occasion of Romania's country presence at the major international ICT events in Germany. With a discrete elegance and a courteous attitude, Mr. Borcea – President of the Romanian Association for Electronic Industry and Software (ARIES) has been one of the most active and perseverant promoters of Romania's information technology capabilities and potential on the global market, in the last decades.



Founder of ARIES in 1992, Mr. Alexandru Borcea has coordinated the association in order to ensure the high visibility of Romanian ICT abroad. His constant efforts have managed to attract important partners from the public and private sector, such as: the Electronic

Industries Association, Los Angeles Regional Technology Alliance, ZVEI, OPIC, Chambers of Commerce from USA, Denmark, Netherlands, CNA Veneto, The Romanian National Agency for Science, Technology and Innovation, The Romanian Ministry of Economy, EICTA, BITCOM, ZVEI, JISA, IAESI and many more.

In the current edition, Mr. Borcea agreed to share with us some of his thoughts on the Romanian ICT industry and to speak about the association's plans and objectives.

1. Based on your long term experience in developing international partnerships, how do you view Romania on the future global ICT map?

I can thoroughly declare that the Romanian ICT industry may be considered as one of the most redoubtable industries at global level. The above statement is based on our country's exceptional results of IT exports (1.5 billion EURO in 2013, starting from 30 million USD in 1999; unfortunately I did not yet receive the data for 2014) and of electronics export (2.7 billion EURO in the same year), and also on the interest that many foreign companies manifest in order to invest in Romania. This last month only (!), we have been visited by TELUS Canada (which has already started its investment) and BAUMER from Switzerland, for the same purpose.

Another encouraging fact for me and a strong argument for our members' business partners is the considerable increase in sophistication and innovation of the Romanian ICT counterparts. If a few years ago I could rely only on skills (outsourcing) when establishing the ICT exports promotion programs, today, I can barely count a member who could not provide evidence of competencies in one of the following: mobile applications, transportation, health, Security, automotive, education and others. In such context the number of European Research projects has meaningfully increased and they currently support a set of competencies and products acknowledged at international level.

2. What are the challenges that ARIES is facing today, compared to similar associations from Europe?

The biggest challenge that we are facing is the frail associative and entrepreneurial culture, doubled by the weak capacity of sharing trust among the communities in our country, including ARIES community. We have a culture focused on individualism, specific to the southern regions with warmer climate and a low engagement in the European community. Considering the human potential that we have and the opportunities that constantly appear from around the world, should we demonstrate the community and

entrepreneurial culture from the Western Europe, we could definitely raise up to the most developed countries' results.

3. You are one of the most active promoters of Romania as a software development and IT services partner; what determined you to persevere in your actions with ARIES?

I have founded ARIES in 1992 and I have promised my cofounding friends that I will turn this association into a viable and durable organization. During the 24 operating years we have faced many challenges, including the threat of abolishing the association. I did not and will not give up my initial promise, no matter whom and what will promise me. It is not about me, but about the community I represent. I think that this attitude is rooted in my family's culture, in my region of provenience's culture – Făgăraș and in the German school that I attended to. I strongly hope that these values will not disappear from the Romanian ICT community after my retirement, even if I am aware that this attitude is still disturbing for some people in Romania, including some ARIES members.

4. What are your expectations from ARIES members for the upcoming years?

My most ardent expectations relate to adjusting ARIES members' culture to the new innovation paradigms and to the new societal and Community challenges. I strongly hope that in the following years we all understand that we cannot live in a world and in a community from which we receive without giving something durable in return. This attitude will help not only to consolidate their self-confidence, but also to win the trust of the partners and communities they belong to; thus they will be able to evolve into durable and consolidated organizations, maybe multinational, and to build their wealth based on their reputation.

5. Which are ARIES objectives at the featured 2015 international fairs and events?

One year ago, when we were building the ARIES international events plan, the Ministry of Economy from Romania has asked the same question. I answered that I commit to demonstrate a minimum 10% growth of the Romanian ICT exports through this plan. The proposed program has been developed with our offices from Timișoara and Craiova. Cluj and Brașov offices did not suggest any particular events. Yet, we also took into consideration some discussions we had with the more active members of the association. Hopefully, the program will present enough diversity and scope in order to satisfy the majority's objectives. By the opening of ARIES Iași office, I hope that in 2016 we will have a more consistent program, tailored on the regional specializations.

6. In your opinion, what segments of the Romanian ICT exports will be more likely to grow? Any foreseeable changes?

I can gladly observe signs of ICT industry restructuring and consolidation. Good examples of competitive segments are the mobile applications and security. Emerging segments are, in my opinion, e-health, e-government and e-learning. Considering the great university centers from Romania and the competencies that they are currently shaping, I believe that in a few years from now we will speak of clusters that will point out the technology advancements in which Romania will be quite competitive. The ever growing appetite – be it conscientious or not – for innovation, determines me to hope that in the coming years we will have a clearer view on the ICT domains where Romania will be competing.

7. A few thoughts about Cluj-Napoca and its' local ICT community? (What impressed you the most, and what would you recommend us?)

Even though, personally, I did not manage yet to build a trustful enough relationship with our members from Cluj-Napoca, therefore sometimes I feel that the information I have are not enough to give me a clear view on their needs and aspirations, through my contacts with the Technical University from Cluj-Napoca, I can declare that this center has an extraordinary potential, in my opinion.

It is in Cluj-Napoca that we have certified the first engineering program according to the EUR-ACE standard and I would like to grant the first Euro Inf certificate for university IT programs in Cluj, also. Actually, Cluj is the city where my grandfather has graduated university, more than one century ago, and even if I personally graduated in Bucharest, I have wide knowledge about the universities from Cluj. As I visited the Technical University from Cluj-Napoca, I was strongly impressed by the research capacity of this university. I think that our Cluj members have one of the best innovation resource pools in the country.

As a closing note, I would recommend to trust more in your own capacities, to trust more the communities where you belong in order to effectively respond to their needs and aspirations and to trust our Romanian ICT community that we will not let you down when difficult times occur. Be more clear in your options and stop inventing challenges; put more effort to understand the people and the communities that surround you in order to find durable and viable solutions. With such conduct, I sincerely believe that you will be invincible.

In the end, we would like to thank Mr. Alexandru Borcea – President of the Board, for his 24 years activity at ARIES and we hope to further cooperate on common projects.



About ARIES

ARIES is the Romanian Association for Electronic Industry and Software. Founded in 1992, ARIES currently counts more than 250 members and has 5 regional branches: Timisoara, Brasov, Cluj, Craiova and Iași.

The premise that created ARIES is the support for the informational competitiveness of Romania at the same level with other countries of the world.

Partner of the central and local Romanian authorities, ARIES has become the symbol of the sustainable development of the information society. Considered to be the largest association of its kind in South-Eastern Europe, it is presently the most important and reliable source of information for the ICT business community.

The ARIES community grew in the same time as the SMEs and large enterprises of Romania and is continuously developing through innovation, partnerships, clustering, technical support services and technological transport, all of these being communicated in a sustainable and transparent manner.

Moreover, it proves involvement in the economic life of the industry by initiating legislative projects, direct participation in CSR campaigns, organizing the most important events for promoting the field globally (workshops, fairs and exhibitions) and access to European projects, human resources, quality and consultancy.

For cooperation opportunities or information about ARIES projects we invite you to use the following contact details:

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Thinking Point

Java Role in the Development of the Internet of Things (IoT)

The Internet of Things (IoT) is a field undergoing constant development. For the software development



community across the globe, IoT has become one of the most important areas of the Future Internet. Java is already key in the development of emerging IoT technologies and Java aficionados state that Java will be the leading IoT platform.

The Internet of Things: A New Model

First, one should understand the degree to which IoT is changing our model of interacting with the Internet. The major aspect is that now things will communicate with things across the Internet, processes can interoperate at local and global level. Preset rules for devices and systems will result in automated decisions and actions, without a human intervention.

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