

Lean, Efficient IBM System z™ Mainframe Platform Powered Caixa Galicia's Dramatic Growth, National Success – Delivers Bank Transaction Costs 30% Below Spain's Average!

1. Caixa Galicia, Region's Financial Powerhouse, Now Also National Force

Bank Introduction

Caixa Galicia, for over 40 years a major IBM System z™ mainframe user – and our subject in this case study – is Galicia's **premier financial institution**. The bank is a **world-class IT innovator and banking technology leader**. For international readers, the unique region that shaped Caixa Galicia's development and expansion is profiled in Appendix A. Today, this successful savings bank is **ranked as Spain's 6th largest, after becoming a powerful national force** with international reach. Again for international readers, Appendix B introduces Spain's distinctive savings banks (*cajas*), and reviews their rapid consolidation following the nation's property crash and downturn.

Caixa Galicia, for over 40 years a major IBM System z™ mainframe user, is Galicia's premier financial institution.

Headquartered in Galicia growth city A Coruña, the bank serves ~2.0M customers, now runs 828 branches across Spain and in ten other countries of Europe and The Americas, and employs 4,651 people (*end Financial Year (FY) 2009*). Caixa Galicia was formed in the **1978 merger** of the **A Coruña & Lugo savings bank** with that of **Ferrol** (*a predecessor of the former dating from 1842*). Commercially innovative, ambitious Caixa Galicia grew fast via a **dozen acquisitions** of cajas/branch networks,

by funding Galicia's **economic growth**, and via rapid **Spain-wide national**, and Galician **diaspora centres international expansion**. The bank's logo is shown in Figure 1.



Figure 1: Caixa Galicia Logo

Today, Caixa Galicia successfully serves **individuals, families, non-residents^o (emigrants), new citizens^o (immigrants)**, Small to Medium-sized Enterprise (**SME businesses^o**), the **self-employed^o**, **larger enterprises**, and **government bodies** (*those marked^o are strong recent growth areas*). The bank's **progressive, retail-focused business model** delivers **top-quality customer service** to those segments and a combined total ~2 million customers. In Spain's ultra-competitive bank market, with limited price differentiation, only via service quality can banks win new, and retain/grow existing, customers today.

De-duplication/modernization has optimized the branch network down to 828 (-63) by 09.30.09. **444 Galicia branches** now offer the widest home region coverage, where Caixa Galicia is the **most important bank** for citizens, businesses, the regional economy, and for its funding of local social programs.

367 more branches outside Galicia have now been modernized and automated to deliver top-quality service to the bank's largest segment, individuals, extending its network over all other autonomous regions of Spain. 80+ private banking managers provide tailored services for customers with complex needs. 31 specialized business/SME branches support business customers, a bank high-growth segment.

Caixa Galicia also runs 17 branches abroad – the widest international network of any caja – in the Galician (+Spanish) diaspora centers of Argentina, Brazil, France, Mexico, Panama, Uruguay, USA, UK, Switzerland, and Venezuela, plus a 7-branch business banking chain in nearby Portugal. Via this network, it channelled remittances of €1,756M in 2008: the bank also managed 6% of the Spanish non-resident sector's deposits – the highest percentage of any caja. This strong focus on non-resident customers continues successfully.

Another success was services tuned for immigrants, now 5.2M (11.3%) of Spain's 46M people (2008), which is the highest in the European Union (EU) (up more than ten-fold since 1996). North Africa, Latin America, Western Europe, and Eastern Europe, are Spain's four largest immigrant sources. The bank's remittance services are rated as among this country's most advanced and competitive.

The bank personalized services, exploited new electronic channels, and added innovative new offerings for each customer segment. Caixa Galicia won major customer uptake of its virtual electronic banking and alternative channels of distribution, and extensively deployed self-service automation replacing two-thirds of branch manual transactions, see Figure 2's metrics.

...enabled by its state-of-the-art, lean and efficient IBM System z™ mainframes, giving Caixa Galicia sharply lower transaction costs...

All these bank advances were enabled by its state-of-the-art, lean and efficient IBM System z™ mainframes, giving Caixa Galicia sharply lower transaction costs than sector average. We assess these systems' role in the bank's success in Sections 2 and 3.

Robust Downturn Performance Shows Caixa Galicia's Strength

Group business volume has grown sharply by 70.4% from 2005 to €76.77B in 2009 (+4.1% on 2008) – made up of €36.4B in customer credit and €40.37B in funds managed –

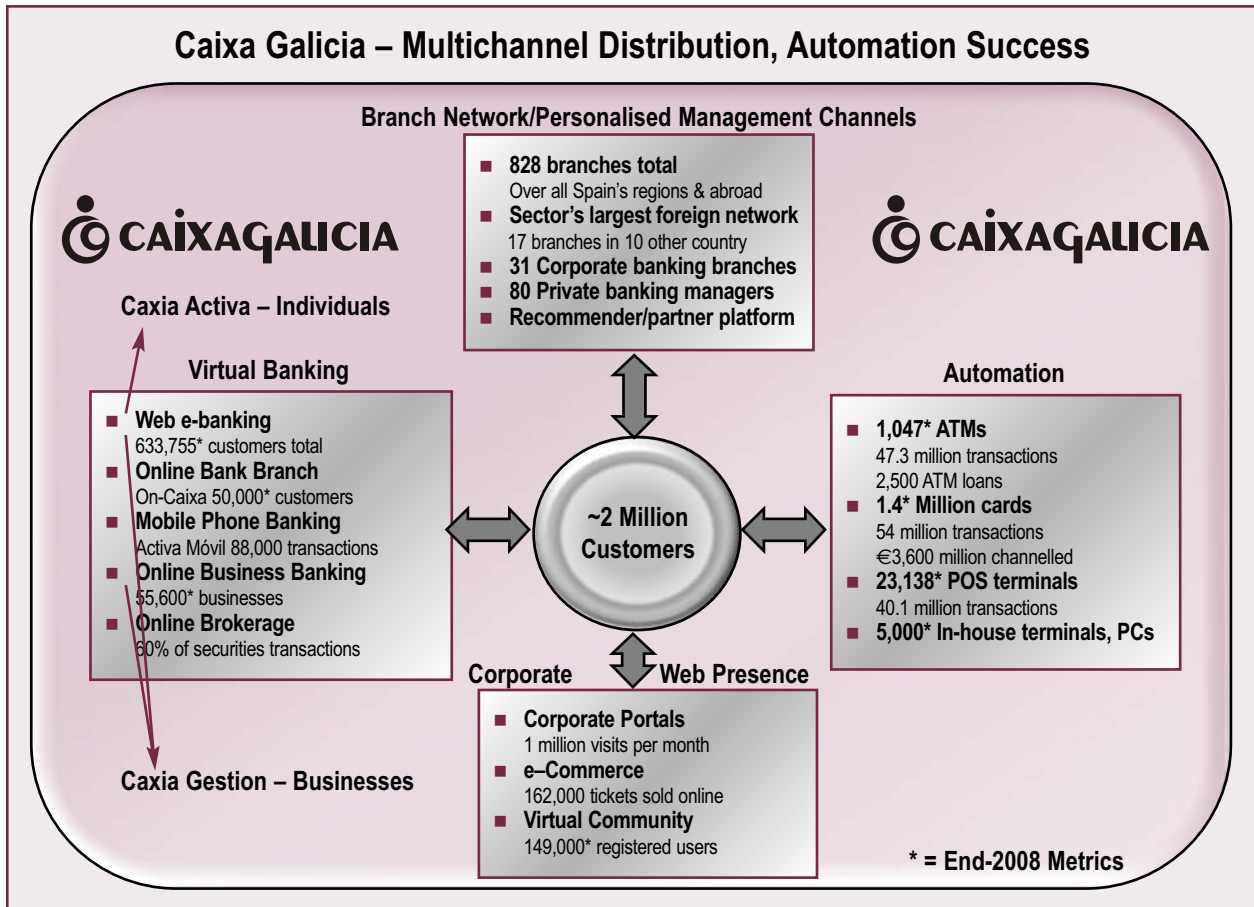


Figure 2: Caixa Galicia Multi-channel Distribution Success

with assets of €46.08B (at 31.12.09 YE). In 2009, during Spain's deep recession, Caixa Galicia opted for maximum prudence and stability, prioritizing solvency, liquidity, efficiency, and NPL control, ahead of profits. Accordingly, the Group allocated **€395M of profits to provisions/write-offs**, giving a **€141M operating profit**, up 2.3% on 2008. A **€58.7M extraordinary provision**, to anticipate further deterioration in the real estate portfolio, was also taken, resulting in a **€91M net consolidated Group profit**. **Customer deposits grew 8.3% to €29.12B** (2nd highest family and company savings growth *caja*). These funded a strong 80% of 2009 bank credit, reducing recourse to wholesale funding to below *caja* average. **Interest margin rose 4.0%** (to €677M), while **operating expenses ran at 49.0%** of gross margin (from administration costs down 10.0% with 63 branch closures), both strong indicators of bank efficiency.

Galicia property/construction lending had been modest, but Spain-wide bank expansion gave some sector exposure elsewhere. However, **2009's Non-Performing Loan (NPL) rate was 4.90%** – still below *caja* average – whilst prudent **insolvency provisions were increased 18.0% to €934M**. In 2009, doubtful loans increased by €468M, only 41.6% of 2008's €1,126M increase – with €314M of the 2009 increase in 1H and €154M in 2H – a sharp falloff in doubtful loan

...these strong results position Caixa Galicia well to emerge ahead, as “*caja consolidation*” unfolds...

increases. Caixa Galicia backed the productive economy with **€5,709M in new loans to firms** (70% of new lending, up 3.7% over 2008), within total new lending of **€8,229M** – mainly financing SME businesses, the self-employed, and families – made in 2009. The bank also won a healthy **70,398 new customers** through its branches in 2009.

FY-end 2009 saw the bank's **core capital reach €2,252M**, up 61.5% from June 2007 – when the world financial crisis began – and **up 12.43% on 2008**. Main solvency metric **Tier 1 capital climbed to 8.46%** at 2009-YE, 183 basis points (+27.6%) above 2008's 6.63% rate – and double minimum International Solvency Standards requirements – whilst the bank's BIS II ratio also improved to 11.33% (from 10.08% at 2008-YE). **Liquidity rose to ~€8,629M**, up \$4,149M (+92.6%) over 2008, and up 124% from June 2007. Bank **own resources climbed to €4,036M** at 2009-YE, up a healthy €1,187M (43.91%) over 2008-YE.

Given Spain's severe downturn, these strong results position Caixa Galicia well to emerge ahead, as “*caja consolidation*” unfolds (see Appendix B).

Fundación Caixa Galicia Art Gallery

A Coruña, Galicia



- Designed by Sir Nicolas Grimshaw.
- Completed in 2006.
- 7,700 M² floor-space.
- Located on Calle Canton Grande.
- Overlooking A Coruña port.
- Houses Caixa Galicia art collection.
- Used for many exhibits, meetings, etc.

Figure 3: Fundación Caixa Galicia Art Gallery – A Coruña, Galicia – By Nicolas Grimshaw

Major Industrial Investments, CXG Corporación CaixaGalicia

Majority subsidiary **CXG Corporación CaixaGalicia** is active in insurance, listed company, private equity, and real-estate, investments, making **strategic, economic, business, and infrastructure investments in Galicia (and beyond)**. CXG – with the bank itself – held shares in **131 companies across 15+ manufacturing/service sectors**, with a combined 2009 **business volume of €21,347M**, with **56,822 employees**, and **net profits of €1,254M**. Of these investee firms, **63 are based in Galicia, employing 13,400 people (up 400, 3.4%)**, and these achieved combined **revenues of €1,800M+**, and net profits of **€414M**, for the first nine months ending September 2009. The portfolio includes leading region enterprises like **Pescanova (world seafood/fishing leader)**, **Bank Echeverría, Cupa Group (slate products)**, **Factoría Naval Marín (shipbuilding leader)**, **Gas Galicia (natural gas distribution)**, **Faus Group (laminated flooring leader)**, **Reganosa (LNG handling facility)**, **Itinere and Autovía del Barbanza (Galician motorway operators)**, and the **Vigo Airport**.

Galicia's Top Social Programs Contributor, Good Corporate Citizen

In the 10 years to 2008, Caixa Galicia spent €679M on social programs. From January 2002 to September 2009, such spend was €497M, 11% more than all European Social Fund investments in Galicia. Despite the downturn, the bank held **2008 social spend at €112.3M**, the 3rd highest of any caja. For 2009, the bank refocused onto **employment creation, elderly care, and knowledge development** as its main priorities. The first grows new jobs via investments in micro SMEs, and via support for entrepreneurs. The last supports select region growth industries. 2009 social investment of €56M generated 2,260 jobs (*half for the disabled*), and will be increased 14.3% to €64M for 2010. Cultural programs also staged >1,500 social-cultural events at 7 Fundación Caixa Galicia centres across region cities – including at its spectacular showcase gallery (see *Figure 3 on page 3*) in the first 9 months of 2009.

Caixa Galicia applies top CSR standards in dealings with customers, employees, suppliers, and government, on all activities, and from economic-financial, social, and environmental, standpoints.

Caixa Galicia's societal commitments go beyond its strong social programs. It applies top **corporate social responsibility (CSR) standards** in dealings with customers, employees, suppliers, and government, on all activities, and from **economic-financial, social, and environmental, standpoints**. The bank's large renewable energy (*wind generation*) investments in its home region exemplify the latter.

2. Caixa Galicia – World-class IT Showcase of Region, Sector

Exceptional IT Success – IBM System z™ Mainframes Play Central Role

Caixa Galicia today proudly runs one of the most modern, highly-developed, and most efficient IT platforms in Spain's banking industry. Through this IT strength, it successfully integrated **twelve banks, won new customer segments, launched scores of innovative products, fully exploited multiple channels** to market, **achieved highest service quality**, and led this sector in **lower transaction costs**.

...the bank is widely recognised and admired as Galicia's most advanced IT showcase, a beacon of excellence, and as a technology leader among Spain's cajas.

Caixa Galicia's **exceptional IT organization**, and outstandingly **efficient IBM System z™ mainframe IT infrastructure**, enabled these business successes. Today, the bank is widely recognised and admired as Galicia's most advanced IT showcase, a beacon of excellence, and as a technology leader among Spain's cajas. For a mid-sized bank, located 592 km/362 miles far distant from Spain's capital of Madrid, and 1,108 km/683 miles from second city/industrial hub Barcelona, these are striking – but accurate – ratings.

These impressive IT achievements are the result of **visionary leadership, unusual strategies, and pioneering IT innovation** by the bank IT executives, from **high bank investments** in IT Research and Development and Innovation (*R&D&I*), and from **enduring IBM System z™ mainframe success**. We review these below.

Bank IT Executives Driving Success Speak

For our research, the **three top Caixa Galicia IT executives** kindly explained to us how their bank's IT success was achieved.

- **José Manuel Valiño, CIO/Bank Deputy General Manager of Information Systems**, led Caixa Galicia's successful IT strategy, extensive innovation, and superior software-service delivery this decade, and is a bank executive committee member. (See *Figure 4*). He also serves as influential Chairman of Architecture for the **Committee for Organisation, Automation, and Services (COAS) of CECA (Spanish Confederation of Savings Banks)**. Mr. Valiño's postgraduate executive education was at the USA's respected **Tuck (Dartmouth)** and **Harvard** business schools: he had earlier graduated in industrial engineering at El Mundo top-ranked Universidad Politécnica de Madrid's ETSI (*Escuela Técnica Superior de Ingenieros Industriales*).



Figure 4: José Manuel Valiño, CIO/Bank Deputy General Manager of Information Systems, Caixa Galicia

- **Ricardo Carballo, Director of Data Processing and Data Centers**, heads the bank's centralized data processing operations/platforms, running two central data centers, and holds responsibility for all operational processes. Mr. Carballo has led/managed Caixa Galicia's

ultra-efficient, high-performing IBM System z™ mainframe platform for much of his 32+ years of bank service, earning him the respectful tag of “Mr. Mainframe” from colleagues/suppliers. From 2004, he also assumed responsibility for Caixa Galicia's distributed systems, so as to apply his successful mainframe experience, methods, and disciplines, to these platforms. Mr. Carballo had previously gained 8 years of mainframe experience at another financial institution. See Figure 5.

- **Dr. Julio Angel Fernández, Director of Mainframe System Technology/Security**, heads the bank's architecture, mainframe systems engineering, security, and support, functions, and has served for 22 years. Dr. Fernández built up the bank IT Group's now-close links with Galicia's main universities. This led to many high-quality IT graduates joining the bank's IT team in recent years, many working on mainframe technology. Dr. Fernández earned his **PhD. at the University of Vigo's** IT school.

We quote their comments throughout this case study below.

Distinctive IT Strategies – Centralized IT, Mainframe Role Extended, Quality to the Fore

Explaining why new IT strategies became vital for the bank a decade ago, CIO José Manuel Valiño recalled:

“In 2000, we were a typical, mid-sized regional bank IT team, here in Spain's distant North-West – far from its big cities Madrid or Barcelona. Our team had good skills, deep mainframe expertise, and knew bank operations well.”



Shows our other executive interviewees, Dr. Julio Angel Fernández (40) standing center, and Mr. Ricardo Carballo (59) seated center. Other managers, clockwise from rear left, are Alberto Miguez (37) and Javier Abad (40) standing rear, Paula Tedin (39) and Rosa Seoane (37) seated front.

Figure 5: Caixa Galicia Data Center Management Team

However, IT outsourcers and software development offshorers (Indian firms, etc.) were threatening our IT jobs, with siren calls of big cost savings”.

Without radical IT change, Galicia could have lost precious, high-quality bank IT jobs to outsourcers...

Outsourcing and/or development offshoring were real, major threats for such in-house IT groups. Without radical IT change, Galicia could have lost precious, high-quality bank IT jobs to outsourcers in Spain’s big centres, or to developers offshore. Mr. Valiño continued:

“For survival, our IT Group had to get more competitive, and fast! We set out to transform ourselves into a world-class IT center of excellence, to proactively enable the bank’s aggressive growth plans with IT, and to become a “talent magnet” offering Galicia’s best IT jobs. Now, nine years on, I’m proud that our team achieved these three goals!”

Mr. Valiño continued: *“To get there, we followed six strategies; all still used today, some totally opposite to the conventional IT wisdom of the day. These were/are:*

- Stay **highly centralized**, with all bank IT systems run from our Galicia base.
- **Continue to fully exploit/extend our IBM System z™ mainframes**, for highest efficiency and lowest transaction costs.
- **Attain top quality certification** for our software development team (& others), to beat offshoring and outsourcing threats.
- **Make high IT R&D&I investments to drive bank innovation** in new channels, self-service automation, new products, and new segments; BI, CRM, etc.
- **Deliver premium-quality, IT-powered bank services** to all our *caja*’s customer segments.
- **Make our group an IT showcase in Galicia**, so we could attract/retain Spain’s best IT talent.

Our executive committee remained supportive because this IT Group always delivered results, enabling major bank expansion over all of Spain and to the Galician diaspora abroad. It was a challenging ride, but our strategies worked well!”

Mr. Valiño discussed how, since the mid-1990s, many other IT users in Spain that his team knew each wasted €10-100M+ on poorly-utilized/inefficient, unreliable, and costly distributed computing. Now discredited, these infrastructures never delivered on wild vendor claims, and were IT disasters that left toxic legacies. Those who reduced, or moved off, their IBM mainframes learnt bitter lessons. They found that no distributed systems (*still today*) can equal mainframe Quality of Service (QoS), nor compete on low Total Cost of

Caixa Galicia took the opposite route, by extending its lean System z™ mainframes and by retaining highly-centralized IT.

Ownership (TCO)/Total Cost Per Transaction (TCPT) for On-Line Transaction Processing (OLTP)-batch commercial workloads. He explained how Caixa Galicia took the opposite route, by extending its lean System z™ mainframes and by retaining highly-centralized IT. The bank now attributes much of its later business and IT success to these wiser choices.

Centralized IT With Mainframes – All Run From/in A Coruña – A Major Strength

Caixa Galicia retained **fully centralized IT**, with all systems located in **two A Coruña data centers**, all storage centralized alongside, and with all IT operations and in-house development staff close by. Current centrally-run systems used are:

Caixa Galicia retained fully centralized IT, with all systems located in two A Coruña data centers...

- **2 IBM System z™ mainframes**, a System z10™ Enterprise Class (z10 EC™) and a System z9™ Enterprise Class (z9 EC™), linked in a **z/OS® Parallel Sysplex mainframe cluster** under **Geographically Dispersed Parallel Sysplex® (GDPS®)** across the two data centers. These run all core, in-house-built OLTP and batch applications for Caixa Galicia’s nationwide banking operation, driving all ~818 Spanish branches, and running its newer zLinux workloads.
- **2 IBM System i** mid-range i5 OS, running a local banking package for the 7-branch network in Portugal.
- **4 IBM System p AIX UNIX** (3 POWER6, 1 POWER5) – Running an Oracle i-Flex banking application, remotely supporting Swiss and USA branch offices. Also run a new Group risk management application from Murex.
- **Teradata Enterprise Data Warehouse** used for Customer Relationship Management (CRM), profitability analysis, and Business Intelligence (BI).
- **~300 x86/x64 servers** – Web banking front-end applications for **Caixa Activa** and **Caixa Gestion** services, Web sites, etc. Partly now use denser Fujitsu PRIMERGY (*Egenera architecture*) blade servers. (*Moving some loads off x64 onto zLinux under z/VM.*)
- **300TB capacity** Storage Area Network (SAN) with EMC Symmetrix arrays, EMC storage replication software.
- **IBM 3494 robotic tape** systems with VTS.

Ricardo Carballo, who heads up the data centers, explained: *“By keeping our banking OLTP/Database (DB) work on our lean, efficient IBM System z™ mainframe cluster, with all IT operations centralized here in A Coruña, we could fine-tune, optimize, refine, automate, and take out substantial costs from, the bank’s main processes. We gained major lower transaction cost advantages. Winning ISO20000 certification (2008) for our IT service management proved our IT operations processes are top quality too.”*

Speaking about integrating a dozen banks during Caixa Galicia’s fast growth phase, Carballo continued: *“From 1978’s founding merger till 2000 alone, Caixa Galicia merged/integrated the businesses, branches, IT, and people, from a dozen banks in all. Each time, our IT team quickly moved them onto our mainframe applications, gaining better scale economies every time. With distributed IT, no such gains could have been won.”*

Achieved Transaction Costs 30% Under Sector Average

Caixa Galicia’s success in recent years in sharply expanding electronic banking, growing alternate channels, and deploying self-service automation (ATMs, POS, kiosks, deposit machines, etc.) – all powered by its highly-efficient IBM System z™ mainframes – allowed it to migrate the majority of low value transactions off manual in-branch processing, and onto electronic channels or self-service automation options. Over two thirds of all migratable transactions are now (end-2009) performed outside the bank’s branches using these lower-cost alternatives, whilst customer service also greatly improved.

...Caixa Galicia’s transaction cost to just €0.037 each, more than 30% lower than sector average €0.050+/transaction.*

CIO Jose Manuel Valiño explained: *“By migrating so much work out of our branches, and exploiting our lean, efficient IBM mainframe processing, we drove down Caixa Galicia’s transaction cost to just €0.037 each, more than 30% lower than sector average €0.050+/transaction*. This also sharply raised customer service quality, cutting branch queues with our more convenient on-line, or self-service, options. Because we are the sector’s lower transaction cost IT provider, keeping our full in-house IT operations “onshore” in Galicia is completely justified.”*

In 2008, in this way, and using its System z™ platform, the bank smoothly coped with a sharp 42% increase in transactions processed by the bank’s IT group. Capacity (early 2010) with current systems is estimated at up to ~2,000M banking transactions p.a. in total. With ~2M current customers, the bank’s systems can thus support <1,000 real bank transactions/customer p.a.

Footnote:

*From Accenture survey of banking IT transaction costs in Spain.

This multi-year effort was crowned in 2008, when Caixa Galicia became the first European bank to attain the coveted CMMI Level 4...

First European Bank to Win CMMI Level 4 Software Quality Rating

Early this decade, the bank began journeying toward **world-class IT quality best practices**, with in-house software development its first target. This multi-year effort was crowned in 2008, when Caixa Galicia became the first European bank to attain the coveted **CMMI (Capability Maturity Model Integration) Level 4** certification, only the second bank (after Bank of Montreal) worldwide to do so. Respected, independent **Carnegie Mellon Software Engineering Institute (SEI)** set/assesses these objectively-rated, public CMMI standards. The bank’s software development team earlier won CMMI Level 2 certification in 2002, and reached CMMI Level 3 in December 2005 before gaining this Level 4 milestone.

By working to such a high quality level, the in-house bank team beats the quality of almost every offshore development firm.

CMMI Level 4 validates that the bank’s development team is now a top-quality application supplier (to the bank or clients), using well-defined, best practice Application Development (AD) processes of this elevated global standard. By working to such a high quality level, the in-house bank team beats the quality of almost every offshore development firm. The bank now confidently **expects to reach CMMI Level 5 in 2010**; the highest possible.

Dr. Julio Angel Fernández commented: *“It took much staff time, and training money, to reach CMMI Level 4, but paybacks to our bank were high. Our applications quality is now far higher, defects are much lower, deployed software runs faster using less capacity, and the new market channels have higher availability. We are also proud of our proprietary development management tool that we built along the way. This now supports our team across the software lifecycle, giving us a further advantage.”*

CIO Valiño added: *“This software quality success sold bank management on keeping our Galicia-based, in-house “near-shore” software development – with our valuable bank IT jobs – within this region. Our top quality now also lets us sell our development services; for example our new Metropolis application that other cajas plan to use.”*

Emphasizing its **deep IT quality commitment**, the bank also won the demanding **ISO20000 certification** for ITIL compliance of its IT service management processes (2008),

ATENOR ISO 9001 certification for the quality of its call center operations (2007), and a **Six Sigma's** quality management rating (2005) for improving business processes via migrating customer transactions to self-service and Automatic Teller Machines (ATMs). Toyota's famous "Lean" manufacturing philosophy has also been deeply applied to the bank's mainframe IT operations, which are now truly "lean" today.

Big IT Investments Powered Bank Success, Climbing Again in 2010

Caixa Galicia efficiently consolidated a dozen banks onto its central System z™ mainframes (*in earlier decades*). The mainframes provided a rock-solid foundation for the major IT advances that implemented bank growth strategy since 2000. They enabled bank success in winning new markets, adding innovative products that better meet customer needs, and – above all – by delivering higher customer service quality. They also allowed the bank to be the more efficient and lower transaction cost processor among Spain's savings banks. This business strategy depended completely upon extensive IT innovation, on new electronic channels, on widespread automation, and on efficient, centralized OLTP/DB processing provided by its powerful, economical, long-proven IBM mainframes.

For this, substantial IT investments were needed, becoming a top bank priority this decade. In five years to 2008 alone, Caixa Galicia **invested €338.1M on technology** in the last 6 years, including **\$55.1M in 2009**, **\$83M in 2008**, and **€54M in 2007**, plus an average of €48.7M p.a. over the three prior years. The bank's IT research, development, and innovation (*R&D&I*) spend on new innovations, solutions, and processes, totalled **€18M in the last three years**, **€12M of this in 2009** (*up a dramatic 340%*), €3.53M in 2008, and €2.47M in 2007. Recent spending was to improve

relationship banking, with solutions to improve sales, enable better segmentation, and to win higher yields.

According to Jose Manuel Valiño: *"Our executives supported heavy overall technology investment, and increased new IT R&D&I spends because we delivered good results each year this decade. Caixa Galicia knows high IT investment is our only way to stay ahead competitively. IT remains a top strategic bank priority, and we are increasing again in 2010. We have a good portfolio of advanced projects underway/planned. It helps that these IT investments give us large tax deductions that fall straight to our income statement's bottom line."*

Current investments include the bank's major, new-generation (*Java-based*) **Metropolis front-end banking platform** (*that other cajas are due to use*), improved contact management, enhanced international units support, and new Group risk management solution deployment.

...made the Caixa Galicia IT Group the foremost center of IT excellence, and a magnet for the best IT staff, in Galicia.

Center of Excellence Drew Elite, Young IT Team

Sustained high IT investment in new IT/banking technologies created many **interesting, challenging new projects** for bank IT staff this decade. This, plus the IT Group's success in attaining **top quality levels** for software development and IT service management excellence, has made the Caixa Galicia IT Group the foremost center of IT excellence, and a magnet for the best IT staff, in Galicia. Senior bank IT executives invested time/effort to build close links with Galicia's universities (*Vigo, A Coruña, Santiago*), contributing to their seminars/courses, and offering know-



Figure 6: Caixa Galicia's Young Mainframe Team – Other Members – With z10™ EC

how/experience on real-world enterprise computing topics, **especially on IBM mainframes** – the heart of Caixa Galicia's IT infrastructure. This visionary effort predated IBM's own global Academic Initiative for System z Program that now ensures mainframe topics are taught in 600+ universities worldwide today.

Dr. Julio Angel Fernández, who played the leading role in building the bank's local university links, explained: *"Our links helped us recruit many top IT graduates from Galicia's universities into our team. Today, Caixa Galicia has a top-quality, well-qualified, young IT team, our system engineers averaging just 32 years of age. My mainframe team's average age is just 34 years!"*

José Manuel Valiño reinforced this, remarking:

"Our bank IT Group today deserves its reputation for offering Galicia's best IT jobs. We now have no trouble filling our open positions, and enjoy a staff turnover rate below 1% p.a. Our IT staff costs are highly competitive – about 86% of Spain's big city rates. Now we can attract good people to work for us from the big cities, and even abroad."

See young mainframe team in Figure 6 on page 8, plus young Data Center managers in Figure 5, page 5.

3. Caixa Galicia's Central System z™ Mainframe Environment

Faithful to IBM Mainframe, Strong "IT Jacobins" Approach

An independent-minded, iconoclastic, and confident IT innovator...

Caixa Galicia's 40-year **strong commitment to**, and **powerful endorsement of**, IBM's System z™ platform is all the more convincing because this bank is far from an "All-Blue" customer (*one always choosing IBM solutions*). An independent-minded, iconoclastic, and confident IT innovator, the bank maintains excellent relationships with IBM Espana, but still negotiates hard for the best cost-performance terms. However, Caixa Galicia was long unafraid to select other vendor IT solutions deemed best-of-breed when needed/acquired. For example, all enterprise disks for the mainframes (*and distributed platforms*) were long EMC Symmetrix, the bank's enterprise Data Warehouse (DW)/BI solution uses Teradata hardware/DW-BI software, whilst the enterprise tape/robot systems were long sourced from IBM, each seen as best solutions when first bought. Caixa Galicia's IT Group is well-known as a real banking industry technology leader and innovator in Spain, in part for this reason.

CIO José Manuel Valiño commented: *"We are the Jacobins in our sector, unafraid to pioneer revolutionary new technologies, while fully exploiting the best centralized IT – our IBM mainframes – even when these were deeply unfashionable years ago. So we warmly welcomed IBM's extensive z innovations, and big market resurgence/growth of System z™, this decade."*

IBM System z™ z/OS® Parallel Sysplex Cluster Provides Rock-solid National Service

Caixa Galicia's applications supporting its main national retail banking business over all of Spain run on the **lean, highly-optimized, efficient, and high-performing IBM z/OS® Parallel Sysplex cluster – with GDPS®** – shown in Figure 7 (*on page 10*). This links its two high-end **System z10™ EC** and **System z9™ EC mainframes** across both of the A Coruña area data centers.

Key features of this configuration include:

- **IBM z/OS® Parallel Sysplex cluster:** Provides high-availability and serviceability, cluster-linking the two System z™ machines, via **Integrated Coupling Facility (ICF) processors** (*see below*) across **two fiber-optic paths** of 6 and 10 Km. length, over Dense Wave Division Multiplexing transport equipment.
- **System z™ ICF specialty processors**, one on each mainframe, provide the cluster coupling horsepower needed to enable resilient z/OS® Parallel Sysplex cluster operation.
- **IBM GDPS® solution:** GDPS® (*Geographically Dispersed Parallel Sysplex*) – IBM's advanced solution for enhanced disaster recovery and continuous availability – manages remote data copy processes, controls both site's storage subsystems, **automates Parallel Sysplex** operation tasks, and drives **failure recovery** from this Single Point Of Control (SPOC).

This modest z/OS® MIPS capacity/no.of processors can run this 818-branch national bank's core workload.

- **Low capacity – big workload:** Just **~4,200 Million Instructions Per Second (MIPS) of z/OS® CP capacity** (*general-purpose processors*) on the two mainframes runs all bank z/OS® work, with 9,040 MIPS gross capacity on all active customer processors. 8 are active on the z10 EC™ production system, and 5 on the z9 EC™ backup/recovery system, so 13 customer processors host all production and development/test workloads on z/OS™ and zLinux. This modest z/OS® MIPS capacity/no.of processors can run this 818-branch national bank's core workload.

Caixa Galicia's IBM System z™ Mainframe Cluster – A Coruña

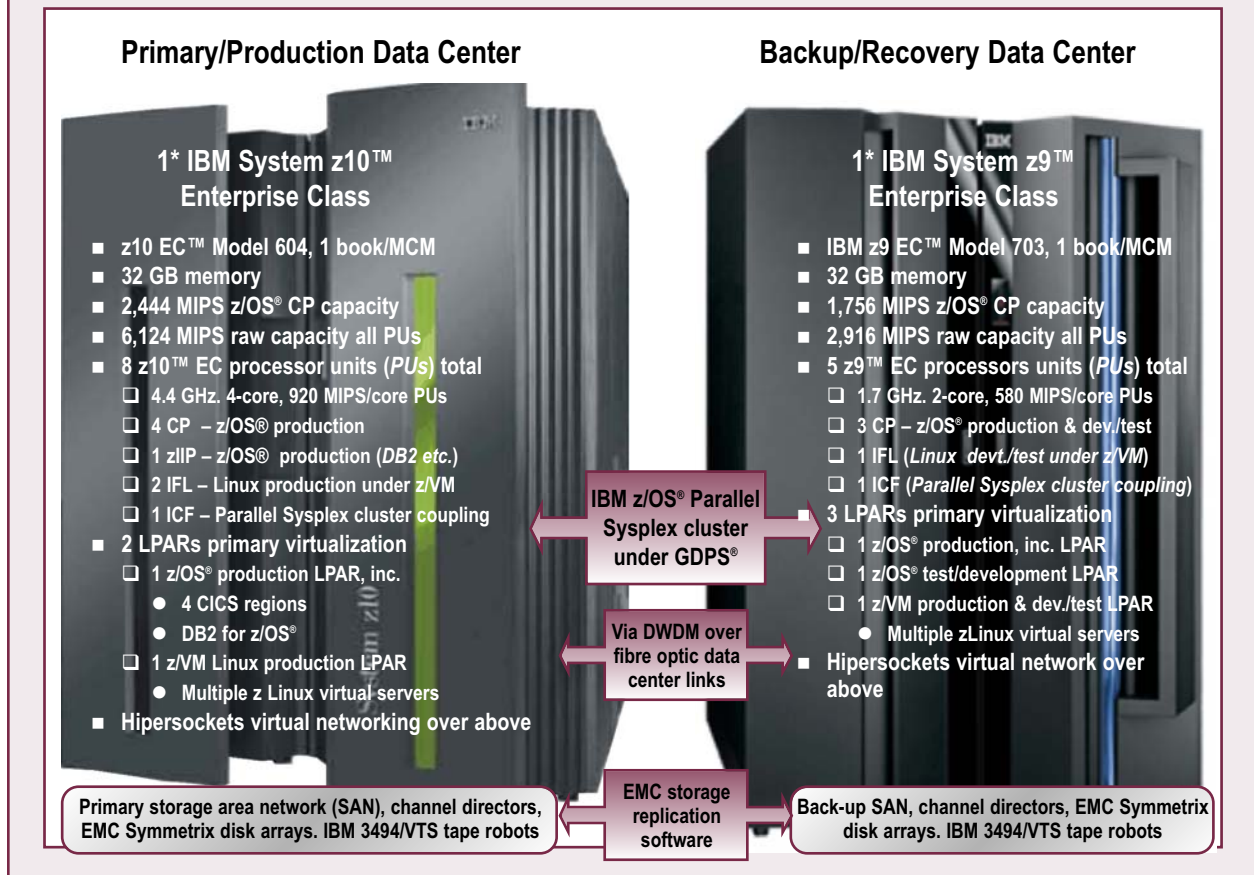


Figure 7: Caixa Galicia's IBM System z™ Mainframe Cluster – A Coruña

The IT Group estimates the configuration could handle <2,000M real-world banking transactions p.a. in present form. These facts show a **highly-tuned, lean mainframe** cluster, basis of our strong description above.

- Specialty processors exploited:** As well as using 2 ICFs (*above*) for cluster coupling, the bank exploits two other full-capacity, low-fixed-cost, z/OS® software license-cost-free **System z™ specialty processor engine types** to good effect. **3 IFL** (*Integrated Facility for Linux*) engines run all zLinux (*Novell SUSE Enterprise Linux*) workloads (*production and development/test*) under z/VM. With 2 IFLs on the z10 EC™, and 1 on the z9™ EC, this provides highly cost-effective Linux capacity. **1 zIIP** (*System z™ Integrated Information Processor*) specialty engine is also used on the z10™ EC production machine to offload much DB2 for z/OS® database processing, freeing up more costly z/OS® CP capacity.
- IBM Systems z software central:** The extensive stack of IBM System z software used, listed in Figure 8 (*on page 11*), is discussed below.

The System z™ GDPS® cluster guarantees operability of the bank's critical services at all times...

Ricardo Carballo commented: *"The IT service quality that our System z™ mainframe set-up regularly delivers is unbeatable. The central mainframe service regularly achieves 99.999+% availability for the whole year, and our end-to-end availability (including all our end-point devices – ATMs, Point Of Sale (POS), PCs, etc., networks, all server tiers, storage, etc.) averages well over 99.7%."*

Strong Business Continuity With System z™

The **System z™ GDPS® cluster** above, plus Caixa Galicia's **business continuity plan**, guarantees operability of the bank's critical services at all times under all (*realistic*) circumstances. The production-only z10™ EC system is backed up by the second z9™ EC mainframe, sited in the Backup/Recovery datacenter. Enterprise storage systems (*EMC*) in each center hold all data, which is synchronously

The Backup/Recovery datacenter system runs at all times, ready to recover critical bank working capability as quickly as possible...

replicated across the cluster links above. The **Backup/Recovery datacenter system runs at all times, ready** to recover critical bank working capability as quickly as possible, under automated GDPS control for more dependable failure recovery. The z9 EC™ secondary normally runs all development and test workloads, as well as some production z/OS® and zLinux, in an active-active mode. Each year, the bank stages a full activation test to verify all system components operate correctly, to check all recovery procedures work as intended, and to hone the IT crisis response team's skills/processes. The 2008 and 2009 tests both ran smoothly, meeting their recovery parameters.

Mr. Carballo noted: *"The bank depends absolutely on our mainframe cluster. It delivers both high business resiliency, and excellent business continuity, for our key application services. We exploit IBM's z/OS® Parallel Sysplex, and the GDPS® automated recovery technology, to cope with planned and unplanned outages. At all other times, we drive our secondary z9™ EC hard on its normal workloads."*

Fully Exploits Legendary System z™ Virtualization for Maximum Utilization

Caixa Galicia extensively exploits the **legendary virtualization strengths** of System z™, where it was long pioneered, and which today offers much the IT industry's **most advanced system virtualization**. It uses rock-solid **System z™ LPARs – dynamic logical partitions** – to securely isolate the bank's major workloads. It currently runs 2 LPARs (1 z/OS and 1 z/VM zLinux, both production) on the z10™ EC production-only primary, and 3 LPARs (1 z/OS test/development, 1 z/OS production, and 1 z/VM zLinux test/development) on the z9™ EC secondary. Instances of IBM's famous **z/VM extreme hypervisor**, secured within a dedicated LPAR on each machine, host multiple zLinux virtual servers now supporting a wide range of Linux workloads on the mainframes (see below). The bank also exploits **System z™ Hipersockets virtual networking** for low-latency communication linking applications, LPARs, and servers, within mainframes.

Ricardo Carballo explained: *"Utilization on our System z's runs smoothly up to near-100% in our busiest periods, without degradation. System performance is consistently excellent due to our fine-tuning, and also the outstandingly effective System z™ Workload Manager (WLM). Driving such usage from our modest z/OS® MIPS capacity is a major way we achieve our lower OLTP/DB transaction costs."*

IBM Mainframe Software Used By Caixa Galicia

IBM Monthly License Charge (MLC) Software

- IBM z/OS®, V1.9.
- IBM DB2 for z/OS®, V8.1.
- IBM CICS Transaction Server for z/OS®, V3.2.
- IBM WebSphere MQ for z/OS®, V6.0.
- IBM Enterprise Cobol for z/OS®, V3.0.
- IBM Enterprise PL/I for z/OS®, V3.0.
- IBM Tivoli NetView for OS/390, V1.4.
- IBM Print Services Facility for z/OS®, V4.2.
- IBM GDDM Image View Utility, V1.1.2.
- IBM Overlay Generation Language/370 (OGL), V1.1.
- IBM WebSphere Application Server for zLinux.

Note: Caixa Galicia expects to upgrade to newer releases of some of these IBM products during 2010.

IBM One Time Charge (OTC) Software

- IBM z/VM, V5.3.
- IBM CICS Transaction Gateway for z/OS®, V7.1.
- IBM Application Performance Analyzer for z/OS®, V8.1.
- IBM File Manager for z/OS®, V8.1.
- IBM Fault Analyzer for z/OS®, V8.1.
- IBM Tivoli OMEGAMON XE for DB2 Performance Expert on z/OS®, V4.1.
- IBM Tivoli OMEGAMON XE on z/OS®, V4.1.
- IBM Tivoli OMEGAMON XE for Mainframe Networks, V4.1.
- IBM Tivoli OMEGAMON XE CICS on z/OS®, V4.1.
- IBM Tivoli OMEGAMON DE on z/OS®, V3.1.
- IBM Tivoli Workload Scheduler for z/OS®, V8.3.
- IBM DB2 Cloning Tool for z/OS®, V2.1.
- IBM DB2 Utilities Suite for z/OS®, V8.1.
- IBM Tivoli AF/Operator for z/OS®, V3.4.
- IBM Tivoli Decision Support, V1.7.

Figure 8: IBM Mainframe Software Used By Caixa Galicia

Linux On System z™ Expands, MS .NET Legacy Use Declines

The bank has greatly expanded the **Linux virtual server-supported workloads** on System z™. It runs these under **z/VM** in one LPAR on each System z™ machine, exploiting its (3) activated IFL specialty engines for their low-cost, full-capacity processing benefits. zLinux workloads already live now include the bank's flagship, new-generation **Metropolis front-end banking application** (in Java, on WebSphere Application Server for zLinux), providing access to host DB2 (e.g. *DB2 Connect*) and CICS for client applications, Samba file serving, the Tivoli monitoring servers, system usage data logging, and the pioneering **zBack Trust** (major electronic signatures application). These use **System z™ Hipersockets** high-speed virtual networking inside the mainframe for ultra low-latency, close-coupled communication with other host applications. Dr Julio Angel Fernández, speaking of this increasing role zLinux is playing at the bank, said:

“We are actively moving off legacy Microsoft .NET applications (on x64 distibuted systems), onto higher-performing zLinux...”

“We are actively moving off legacy Microsoft .NET applications (on x64 distibuted systems), onto higher-performing zLinux on our System z™ machines. We get better performance, easier integration with core bank systems, better management, higher availability, as well as lower costs. We found zLinux the clear winner for a majority of such workloads.”

Core Banking Applications Developed In-house, Mainly PL/I

Caixa Galicia's national retail banking host applications are developed, maintained, and supported by the bank's **young, dynamic, in-house development team**, operating to **highest quality standards** (as per Section 3). For its excellent runtime performance/low resource use, the applications are written in **IBM's Enterprise PL/I language**, most access **central DB2 for z/OS®** relational databases, with OLTP programs under IBM's **popular, efficient CICS Transaction Server** TP monitor. The bank today supports >18,000 mainframe PL/I programs, >11,000 online and >7,000 batch programs, built mainly using traditional System z AD tools like the **Interactive System Productivity Facility (ISPF)**, and the **IBM Problem Determination Tools (PDT) for z/OS®** suite. PDT suite products (listed in Figure 8) are heavily used during mainframe AD, test, and for operational troubleshooting. Dr. Fernández takes up the bank's AD story:

“Both our long-serving and our younger System z developers are comfortable with, and experienced in, traditional mainframe AD tools. We have begun using the new-generation IBM Rational Developer for System z (RDz). We like the modern

Graphical User Interface (GUI), and increased productivity this comprehensive, Eclipse-based, Integrated Development Environment (IDE) for System z™ offers. We'll be using RDz a lot more as we build more new Java-based applications (including Metropolis) to run on WebSphere Application Server, many on Linux under z/VM on System z™.”

Future Trends in Electronic Document Management

Caixa Galicia has a vision where electronic documents are managed together with their business transactions. This creates a paperless environment, whilst maintaining evidential proof of the documents. For its electronic document management, Caixa Galicia adopted several initiatives aligned with European legislation on e-Procurement and e-Government. zBackTrust, an Albalia Interactiva solution (recently endorsed by IBM), was the platform the bank selected to manage electronic signatures according to standards developed by OASIS and ETSI. Buzzwords like XAdES, PAdES, and Digital Signature Services represent some of the specifications of this advanced solution.

Caixa Galicia reports the richness, maturity, performance, stability, and good integration between IBM's System z™ software stack is a strong platform advantage...

Extensive IBM Mainframe Software Vital

Caixa Galicia reports the richness, maturity, performance, stability, and good integration between IBM's System z™ software stack is a strong platform advantage that the bank fully exploits and greatly appreciates. Figure 8 shows the IBM Software products deployed on the bank's mainframe cluster. The list includes operating systems **z/OS®**, **z/VM** (extreme hypervisor), **zLinux** (Novell SUSE), and the foundation **DB2 for z/OS®** (relational Database Management System (DBMS)), **CICS Transaction Server** (TP monitor), **CICS Transaction Gateway** (client access to CICS TP), and **WebSphere MQ for z/OS®** (message-queuing middleware) host subsystems, and many more. IBM devotes much time and money to engineering close integration, thorough testing, and building strong reliability into, the entire extensive System z™ software portfolio, now over 200 products today. In recent years, many new products were added, and a tremendous rate of new feature and function development achieved, in keeping with the platform's resurgence, and its adoption of strategic new technologies such as Java, Service Oriented Architecture (SOA) and Linux. A very welcome development is the now-regular annual September new z/OS™ release timing, with many other products following this cycle, making upgrade planning much easier for users. Since IBM earns almost 50% of its total software revenue, around ~\$10B p.a. (our estimates), from mainframe software such as the set used here, huge resources are again deployed to its rapid advancement and support.

...we squeeze a lot more real transactions from our MIPS capacity than other banks of our size...

Picking just one example of the value the bank gains from one suite of IBM mainframe software tools used, “Mr Mainframe”, Ricardo Carballo observed:

*“Our mainframe performance experts intensively use our advanced **IBM Tivoli OMEGAMON** monitoring tools. These, plus our long experience, let us optimize, fine-tune, and get the most throughput from our lean mainframe cluster. Thus we squeeze a lot more real transactions from our MIPS capacity than other banks of our size, which is a huge advantage.”*

System z™ Banking Powerhouse Extends 40-year Caixa Galicia Success

IBM's **System z™** mainframe **dominates the worldwide banking industry** as the enterprise IT platform of choice for mid-large banks, and also for the majority of other Fortune 5000 enterprises. IBM deservedly enjoyed **strong System z™ market share/capacity growth** resurgence since 2000, as its **\$10B hardware/software investment** advanced System z™ technologies and capabilities dramatically ahead of distributed competitors. At Caixa Galicia, the System z™ mainframe cluster (*Figure 7*) above remains the bank's IT backbone, and is today expanding its central hub platform role, adding new zLinux workloads as well as handling increased transaction volumes. IBM mainframes supported all major bank advances for over 4 decades (*The 40th anniversary of Caixa Galicia's use of IBM mainframes was celebrated in November 2009*). Concluding, Ricardo Carballo recalled: *“The basis for good results our System z installation delivers today are decisions we made at the start of the 1980s, when we moved up from the DOS/VS to the MVS mainframe operating system, forerunner of today's flagship z/OS®. Colleagues Manuel Gato, Jose Penin, and I, defined and implemented the operating, nomenclature, and control, standards that remain the methodological base of our high-quality mainframe service today.”* In summary, CIO, José Manuel Valino, concluded with the comment:

“Our IBM mainframes today deliver high-performing, reliable, secure OLTP/DB, batch, and Linux processing for our retail banking business. With them, we earlier absorbed a dozen banks smoothly, enabled strong national growth, entered new segments, and added scores of new products, this decade. System z™ OLTP/DB underpins our now-extensive electronic banking channels, our high self-service and automation levels, and the high-quality service that the bank's customers enjoy.”

“When distributed IT spread 15 years ago, mainframes were unfashionable or “legacy” for a while. At Caixa Galicia, we knew different, and stayed mainframe-based. So our bank avoided the costly, distributed IT fiascos that many others suffered. The mainframe was our right choice then, and remains right today.” Mr. Valiño concluded.

The mainframe was our right choice then, and remains right today.

Appendix A. About Galicia for International Readers

In Spain's far north-west, lies the rugged **Galicia autonomous region** (home to subject *Caixa Galicia*), bounded by the Atlantic on the west, by the Cantabrian Sea/Bay of Biscay to its north, and by Portugal to the south. **Population is ~2.78M** (2008, Spain's 5th largest, falling) and **land area is ~29,500 km²** (7th largest). Attractive and densely-forested (~69% covered by ~600M trees) Galicia is proud of its **historic nation status**, of the **Galician** (close to Portuguese) official second language (taught in region schools), and of its **Celtic origins** – with bagpipe (*gaita*) music played!

Green, rainy Galicia's dramatically beautiful 1,659 km-long coast...

Green, rainy Galicia's dramatically beautiful 1,659 km-long coast is known as “A Costa do Marisco” (*“The Seafood Coast” in Galician*). With its famous rias (*fiord-like sunken valleys*), it hosts Europe's biggest fishing industry, and now **attracts ~5M tourists a year**. The region's four provinces are A Coruña (NW coast), Pontevedra (SW coast), Orense (SE inland), and Lugo (NW interior/coast), see *Figure A1* on page 14. The first two saw a century+ strong population growth, **A Coruña's rising 72%** (1900 to 2008), and **Pontevedra's 106.3%** (1900 to 2006). But Galicia's rugged interior, split by low mountain ranges and many rivers, suffered **exodus from the fragmented agriculture/land**. Populations in Orense and Lugo provinces fell 15% and 21.9% (1900 to 2008).

Because of this wide diaspora history, Galicians are often called the “the Irish of Spain”.

The late-19th to early-20th centuries sadly saw **mass-migration** from a then-poor and undeveloped Galicia to Spain's industrial regions, and to the Americas (*notably Argentina and also to Brazil, Cuba, Mexico, Panama, Uruguay, the USA Venezuela*). Franco's era drove region foes into political exile in France, Switzerland, UK, etc. In all, 1M+ people left Galicia from 1860 to 1970. **Strong Galician groups** live in those countries today, whilst the now-thriving region welcomes most “returnees” (<10,000 p.a.) back to Spain today. Because of this wide diaspora history, Galicians are often called the “the Irish of Spain”.



Figure A1: Spain's Galicia Region – Map of Provinces, Main Cities, Coast

Main region cities are **Vigo** (largest city, world's # 1 fishing port, ~297,000 people), **A Coruña** (2nd largest, port and economic hub, ~245,000 inhabitants), **Ourense** (provincial capital of ~107,200 people), **Lugo** (provincial capital, 4th city of ~95,000 people), and most famous **Santiago de Compostela** (historic Christian pilgrimage city, region capital of 94,000 residents), see Figure A1. Three region airports serve the first two, and last, city.

To traditional **fishing/seafood, agriculture, Spain's largest forestry/timber cluster** (8M m³, 50% of nation's timber in 2008), renewable/traditional energy, plus **expanded manufacturing**, sectors, Galicia added newer **tourism** and **financial services industries**. Manufacturing now includes two younger clusters. An automotive cluster – around a big PSA Peugeot Citroën plant at Vigo – now counts >80 companies directly employing 21,700 people. This cluster generated €8.4B turnover (~14% of region Gross Domestic Product (GDP)), shipped 35% of region exports, and built 17.3% of Spain's vehicles (2008). Galicia also hosts a **spectacularly successful apparel** cluster of >1,250 companies (including world fashion leader Inditex Group –

Zara fashion chain owner, with HQ in A Coruña) that shipped **48% of Spain's 2007 apparel exports**, and grew @24% p.a. over the last decade. This triumph leveraged Galicia's garment traditions, entrepreneurial/design flair, and logistics strengths! This region happily avoided much of the now-collapsed property/construction bubble trauma afflicting Spain's other growth regions from 2008.

Atlantic-facing Galicia also boasts a **maritime, shipbuilding, and naval** cluster, with ports at A Coruña, Vigo, Vilagarcía, and Ferrol. The Spanish Navy's northern maritime intervention command is based at Ferrol, with other Navy stations at the Galician port above, plus Miño. Region challenges include smuggling (cocaine today), illicit fishing, and environment issues (e.g. forest fires and land abandonment).

The industry dynamism above, Xunta de Galicia and Caixa Galicia support, plus EU regional aid, brought Galicia economic success over recent decades. Employee productivity, GDP per head, and wage levels, all remain competitive and still below Spain's averages, but Galicia now has lower unemployment (12.2% @ March 2009) than the nation's average (~17.4% rising, same date).

Appendix B: Consolidation Gathers Pace Among Spain's Savings Banks

Spain's Savings Banks – International Reader Introduction

Spain's savings banks (caja de ahorro) are region-rooted, non-profit institutions, first formed in the 1830s to encourage thrift.

Spain's savings banks (*caja de ahorro*) are region-rooted, non-profit institutions, **first formed in the 1830s** to encourage thrift. They specialized in taking deposits from, and giving loans to, society's poorer. **Caja numbers rose to ~150** by end-1925. Consolidation halved that to 77 by 1988, and again to the 45 *cajas* of end-2009. Only one *caja* (*CAM*) is listed. The top six (*including largest La Caixa and Caja Madrid – and Caixa Galicia*) led those prior *caja* consolidations, becoming powerful national banks, now often competing head-on with Spain's top commercial banks. These giants (*plus smaller cajas*) remain rooted in, and important to the economies of, their home regions. *Cajas* are charitable foundations, spending part of their profits (*total €1.128T in 2008*) on regional economic, social, and cultural causes; a strong reason for local control. Local politicians often steer the governance/policies of "their *caja(s)*" (*politics distorting business logic, critics claim*). With politics also dividing regions, politicians resisted loss of control to cross-regional *caja* mergers. Their trade association, the **Confederación Española de Cajas de Ahorro (CECA)**, represents the *cajas*, and is also a credit institution providing competitive technology/financial products/services.

The *cajas* had combined **assets of €1.239T (+7.3%)**, customer funds of €1.128T (+2.7%), mortgage loans of €600.1B (+3.4%), and had post-tax profits of €6.41B (-41.7% *downturn impact*). They also held 59.3% of Spain's household deposits, made 53.0% of household loans, and issued 56.9% of mortgage lending. *Cajas* **employed 134,867 people (+2.4%), ran 25,033 (+1.7%) branches,** provided **35,864 (+2.3%) ATMs,** and had **37.9M (+1.1%) cards** issued, making them a powerful national force. (*CECA data at/ for YE, 12.31.2008*).

Economic Downturn/Property Crash Sparks New Caja Consolidations

Few Organisation for Economic Co-operation and Development (*OECD*) countries – or their banks – avoided impact by 2008's financial crisis. But strict **Bank of Spain (BoS) rules** saved this nation's banks from toxic US sub-prime securities that wreaked havoc elsewhere. But severe economic downturn, and especially Spain's property crisis,

hit *cajas* with big "property bubble" exposures hard. Average NPL rate rose 2.7-fold to 3.68% in 2008, as **delinquent loans** to failed developers/construction firms, and mortgage losses from holders unable to repay, were surfaced.

In March 2009, **Caja Castilla la Mancha (CCM)** was the first (*and to date only*) bank in Spain to need full **state bail-out**. Management were sacked, and **BoS** took CCM under direct control. That rescue launched the BoS's Fund for Orderly Bank Restructuring (*FROB*) lifeboat, with €9-€99B state loan guarantees on tap to help restructure troubled banks.

"...at least 15 (of the country's 45) cajas should merge with stronger institutions".

In November 2009, **Miguel Fernandez Ordonez, BoS Governor**, told the Financial Times that "at least 15 (*of the country's 45*) *cajas* should merge with stronger institutions". The property bubble/downturn impact, plus these BoS urgings, since sparked the new "caja consolidations" discussed below.

Agreements for 14 *cajas* to merge into 5 larger groupings have been announced to date of writing (28.02.10). Three *cajas* in South-West **Andalucia – Unicaja, Cajasur, and Caja de Jaen** – announced a triple merger, to close early in 2010. In the north-east's Catalonia region, the four-way merger of **Caixa Sabadell, Caixa Terrassa, Caixa Girona, and Caixa Manlleu**, was agreed, closure also expected in early 2010. Again in Catalonia, business plans for the three-way merger of **Caixa Catalunya, Caixa Manresa and Caixa Tarragona** were agreed, with €1.3B *FROB* funding (*from the BoS*) sought, and approvals due in February 2010. In **Catalonia** yet again, the boards of **Caixa Penedes and Caixa Laietana** earlier agreed a merger, broke off, and are now again in deep negotiations. In January 2010, **Caja Duero and Caja Espana**, both from the northern **Castilla-y-Leon** region, concluded months of negotiations with an agreement to merge.

Note that all five announced mergers to date are "within-one-region" consolidations. These moves will reduce *caja* groups from 45 to 36 if all are concluded as planned, while others are still in discussion, see below.

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About Software Strategies

Software Strategies is an analyst firm focused on enterprise IT platform strategies and issues. Specialist expertise on mainframes, servers, operating systems, and middleware software/tools, are our main areas of focus. Since 1997, we have worked closely with numerous industry leaders, including: IBM; Unisys; Microsoft; Intel; Misys; Fidelity National Information Systems; CA; BMC; Stratus Computers; ICL; NetIQ; and others. Many tens of thousands of Enterprise IT users have benefited from our authoritative reports, white papers, and our presentations at scores of IT events, seminars, and conferences.

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This new System z™ mainframe case study was researched/written by Ian Bramley, Managing Director of Software Strategies, and was published in March 2010. The customer facts, experience, and quotes are from Caixa Galicia executives and materials, but all interpretation and analysis are by Software Strategies, leveraging our proprietary mainframe and software research. Ian founded Software Strategies in 1997. He is an experienced enterprise IT infrastructure analyst, has published scores of popular reports and white papers, and has served as a keynote speaker at countless industry events.

Previously, he was Director of Enterprise Platforms at Butler Group, and Founder/Chairman of the Enterprise NT Management Forum industry group from 1998 to 2001. Before starting this firm, Ian held a number of executive positions with four international software/services vendors over his 32-year prior IT industry career.

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