

Agenda

1. IOSCO C6 Questionnaire: Outsourcing and Cloud Computing
2. Evolution of Outsourcing
3. Interplay of Outsourcing and Technology
4. Cost versus Quality
5. Decentralisation
6. Challenges and Trends

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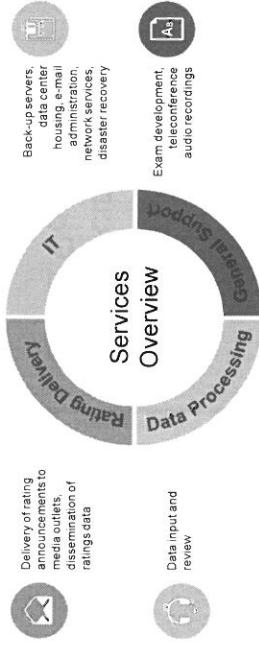
IOSCO C6 Questionnaire: Outsourcing and Cloud Computing

Scope of Outsourcing

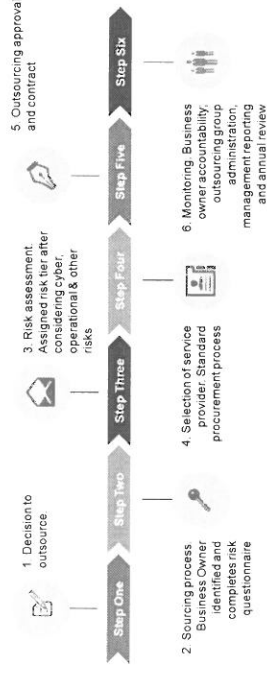
Important Operational Functions

- » What is an Important Operational Function (IOF) ?
 - Any activity for which a defect or failure in its performance would materially impair the soundness or continuity of credit rating activities or a CRA's ability to comply with legal or regulatory requirements relating to its credit rating activities
- » The scope
 - Arrangements by which a service provider performs an MIS process, service or activity that would otherwise be undertaken by the relevant MIS entity itself; and
 - The service or activity is outsourced to a service provider that is not an MIS entity or shared services company within the Moody's group of companies ("MSS")
- » Does not include purchasing/vendor relationships

Broad Categorization of Outsourced Activities



Outsourcing Process



Cloud Computing

Selected use of cloud services

- » Focused on customer relationship management and disaster recovery
- » Chief Information Security Officer heads up the Information Risk & Security Group
 - Tasked with identifying risks to data and systems
 - Implementing strategies that aid in mitigating risks

2 | Evolution of Outsourcing

Outsourcing Continues to Evolve

Changes in application and approach over the past ten years

- » IT service industry through offshore centers showed exceptional growth
 - IT service silos developed with specialized skills
 - Application services
 - Cloud services
- » Holistic approach in assessing costs / benefits – “Total Cost of Outsourcing”
- » Increased emphasis on centralized governance and controls
- » Role of service providers

Holistic Approach

Evolution of business case beyond labor arbitrage

- » Broad and systematic assessment of purpose and benefits
 - Not limited to labor arbitrage
 - Increased productivity metrics allow for fuller analysis of economics
 - Enables a focus on core business
- » Comprehensive view of risks
 - Consolidation prevents *ad hoc* and untracked use of providers
- » Maintain in-house capabilities and establish back-up contingencies to mitigate business continuity risks

Role of Service Providers

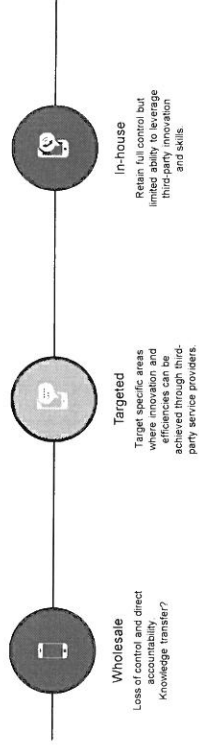
Consolidation

- » Consolidation with preferred service providers
- » Shift from data intake and harvesting to broader administrative and back office functions
- » Specialized skills to enhance process, product or service
 - Example: simultaneous distribution of credit ratings to wire services and other distribution platforms
 - Example: region/country-specific process requiring local expertise

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Interplay of
Outsourcing and
Technology

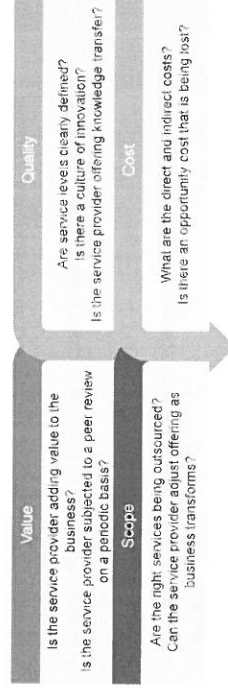
Technology Outsourcing Spectrum



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Cost versus Quality

Balancing Benefits and Costs



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Outsourcing and Decentralization

Decentralization

An existing dynamic that can be mitigated by outsourcing

- » Organizations with a global footprint can face decentralization challenges
- » Outsourcing is a tool to consolidate decentralized functions by:
 - Standardizing process
 - Identifying and implementing best practices
 - Maintaining consistency / efficiency / controls
 - Example: IT support services
- » Targeted outsourcing does not lead to a decentralization trend
 - Risks associated with outsourcing require mitigation

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Challenges and Trends

Challenges

Keeping pace with integration of technology developments

- » Cyber and information security risk
- » Sourcing required skill sets
 - Competition for talent
 - Narrowing labor cost differentials
- » Integration of increasingly complex technology systems
- » Ensuring that internal controls keep up with any outsourcing developments
- » Increasing focus on time to market
- » Control environment

Outsourcing Trends

- » Further consolidation with preferred service providers
- » Impact of innovative technologies
 - Data and analytics
 - Machine learning (automated intelligence)
- » Increasing demand of cloud computing
 - Need to manage and integrate public and private cloud
- » Rapid changes in technology and software development
 - Global delivery requires flexible solutions
- » Captive technology delivery centers

Outsourcing and Cloud Computing

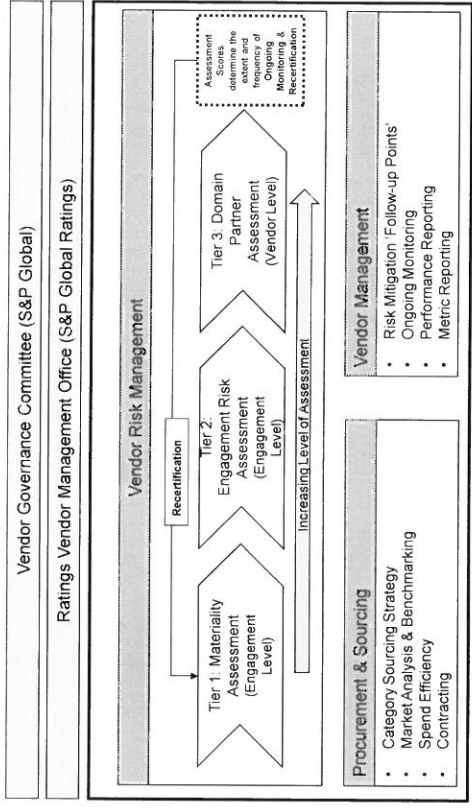
Presentation to IOSCO - Committee 6

Rio de Janeiro, Brazil
December 6, 2017

- Kelly Shen, Executive Managing Director and Chief Operating Officer
- Sherif Khalifa, Global Head – In Business Controls (Operating Office)
- Laura Deamer, Vice President – Chief Information Security Officer
- Christian Mittelberg, Vice President – Global Head of Risk Management
- Prasanna Ramaswamy, Vice President – Enterprise Architecture

S&P Global
Ratings

S&P Global Ratings Vendor Governance Framework



S&P Global
Ratings

S&P Global Ratings Cloud Computing

Cloud Drivers & Benefits

- Reduced complexity
- Higher reliability
- Increased security
- Elastic resource capacity (Increased Scalability)
- Geographic diversity
- Increased agility and speed
- Accelerated delivery
- Cost effective

Cloud Journey

- 2011: Private Cloud to enable 'proof-of-concept' and other non-production needs
- 2015: Public Cloud pilots
- 2016 and Beyond: Utilize various cloud models (e.g. PaaS, SaaS, IaaS).

Alignment with Outsourcing Strategy

- The engagement of cloud vendors is subject to S&P Global Ratings' Vendor Management Policy

S&P Global
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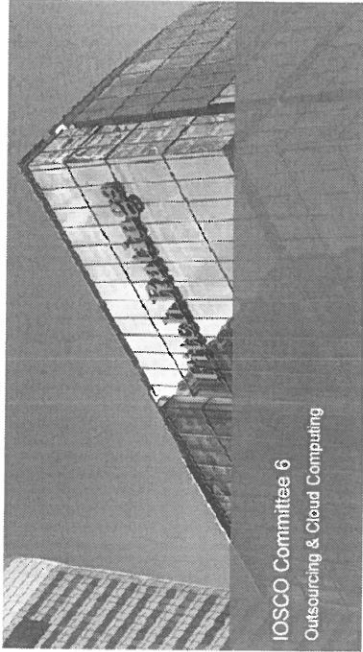
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S&P Global
Ratings

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Outsourcing & Cloud Computing Trends

- Commoditized processes that are standardized and repeatable
- New and emerging technologies
- Labor arbitrage vs. quality and timeliness
- Insource critical skills / core competencies
- Technology-enabled automation vs. outsourcing manual tasks
- SaaS for non-core competencies
- Shorter software development cycles and faster scalability
- Focus on security



IOSCO Committee 6 Outsourcing & Cloud Computing

Jeff Horvath, Chief Compliance Officer, Fitch Ratings
Robert Hajpel, Chief Technology Officer, Fitch Group
December 6, 2017

FitchRatings

Fitch Ratings' Response to IOSCO Survey

Fitch Ratings operates as a globally integrated rating agency, and manages its geographically disbursed analytical staff as part of global functional units, notwithstanding the fact that they may be employed by different entities in different jurisdictions.

- Fitch Ratings has integrated applicable local legal and regulatory requirements into its global operating model for international ratings.
- Therefore, regardless of the legal entity assigning a rating, this integrated approach leads to:
 - A largely standardized control environment, and
 - A consistent analytical product.

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Fitch Ratings' Response to IOSCO Survey (cont.)

The following elements should be considered when designing a control framework to manage third party provider risk:

- CRA's should apply a risk-based approach, with additional diligence and controls applied to more critical providers or in respect of more critical services
- Regulatory oversight should focus on the outsourcing of a CRA's regulated activities, and integral parts of the CRA's internal control structure
- A collaboration process whereby analysts in different countries or legal entities jointly participate in assigning a credit rating, should not be deemed a regulated outsourcing
- Controls should distinguish between "outsourcing" and "vendors", as they present different risks and issues
 - Outsourcing** is "a regulated entity's use of a third party (either an affiliated entity within a corporate group or an entity that is external to the corporate group) to perform activities on a continuing basis that would normally be undertaken by the regulated entity, now or in the future." The Joint Forum, *Outsourcing in Financial Services* (Feb. 2005).
 - Vendors** involve discrete purchasing contracts, which are not considered "outsourcings". Purchasing is defined as the acquisition from a vendor of services, good or facilities without the transfer of the purchasing firm's nonpublic proprietary or customer information. *Id.* Vendor contracts may involve software, legal and accounting services, consultants, financial market data, IT developers, etc.

Fitch Ratings' Response to IOSCO Survey (cont.)

Questions Regarding Survey Responses?

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Cloud Computing (cont.)

The migration to AWS met expectations set at the beginning of the project. It has:

- Improved reliability, resiliency and security of service
 - Applications are running across multiple Availability Zones ("AZ")
 - Infrastructure as code. Easier to set up secure environments
 - Easier to monitor changes to configuration
- Provides basic denial of service ("DDOS") protection
- Delivered a more productive and flexible work environment for developer
 - Easier to set up new test environments or conduct R&D in a sandbox environment
- Decreased costs
 - Lowers capital expenditure
 - Provides detailed breakdown of AWS costs by system, which is a level of cost visibility not possible in a legacy data center
- Enabled leveraging of next generation cloud based tools
 - Positions Fitch Ratings well to conduct R&D on artificial intelligence, machine learning, new database technologies and other new AWS services

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Cloud Computing

In Q2 2017, Fitch Ratings completed a migration to Amazon Web Services ("AWS"). The project history is as follows:

TIMING	KEY ACTIVITIES
Q4 2015	<ul style="list-style-type: none"> • Conducted study to determine feasibility and economics of moving to AWS • Assessed risks related to AWS and the migration
Q1 2016	<ul style="list-style-type: none"> • Reviewed plans with CEO, Compliance, Investment Committee, Exec Committee, Board • Developed plans to minimize risks associated with implementation and on going operations
Q2 & Q3 2016	<ul style="list-style-type: none"> • Built a cloud engineering team • Developed detailed designs and build standards • Configured the foundational components of applicable systems (e.g. VPC, IAM, AD, Key Dev Ops tools, Direct Connect)
Q4 2016	<ul style="list-style-type: none"> • Picked a limited number of key systems
Q1 & Q2 2017	<ul style="list-style-type: none"> • Migrated over 100 systems with weekly launches • Conducted extensive testing, maintained checklists, developed documentation
Q3 to Present	<ul style="list-style-type: none"> • Managing ongoing Cloud Operations
Q4 2017	<ul style="list-style-type: none"> • Decommissioned 50% of legacy HW in SunCard data centers • Consolidated remaining 40% of legacy HW to reduce data center footprint and expenses

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Cloud Computing (cont.)

The following lessons were learned in connection with the migration to AWS:

- Build team skills
 - AWS requires an entirely different set of skills and experiences
 - We allocated a consultancy to help with the migration as well as to help us hire, train and build our own cloud expertise
 - We worked closely with them for 1.5 years and we carefully managed the handover as we took over day-to-day operations
- Build a strong foundation
 - It is critical to set up the AWS foundation architecture and standards well before migrating applications
 - Before we moved our first application, the team worked for 6 months to ensure a good foundation (e.g. high-level and detailed design, environment set up, security standards, tagging, core scripts, documentation, processes for migration)
- Start slow
 - We migrated just a few key systems in the first 3 months of migration. This allowed our team to build skills, confirm our approach, and scripts
- Establish strong processes and governance when migrating
 - We were able to migrate our back-end rather quickly (over 100 apps in 6 months) because we had good project management, checklists, move requirements, testing procedures, etc.
 - See migration history on next page
- Develop discipline for operating in the cloud
 - CloudFin (monthly finance reviews)
 - DevSecOps (security built into DevOps scripts and processes)
 - Infrastructure as Code
 - Metric driven engineering

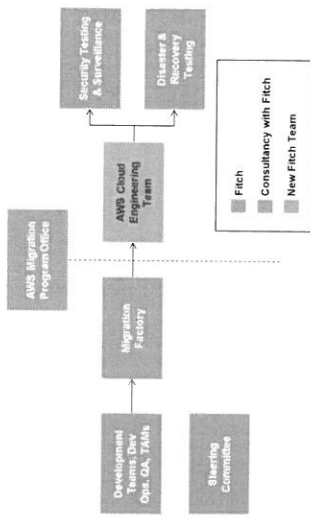
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Cloud Computing (cont.)

Fitch's Migration Factory



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Evolution of Outsourcing at Fitch Ratings (cont.)

In addition to its staff augmentation activities, Fitch Ratings has engaged third party service providers in a more traditional outsourcing capacity to provide:

- Routine operational functions such as the administration of payroll and employee benefits, front of house/reception staff and building management services in certain locations
- Third party data centers, which still support a small number of systems, along with AWS for cloud services
- Data entry and related management tasks* such as:
 - Collection, aggregation and database entry of financial data related to issuers or securities, that analysts use in the credit rating process
 - Translating and inputting information contained in trustee and servicer reports, into Fitch Ratings' surveillance databases

* Where data management functions have been outsourced, Fitch Ratings actively validates the quality of the data or the service provided. In addition, Fitch Ratings also purchases third party models and data for use in its analytical products, however it considers these to be vendor contracts and not an outsourced activity.

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Evolution of Outsourcing at Fitch Ratings

Fitch Ratings does not outsource core elements of its analytical or internal control processes.

Rather, it often seeks to leverage third parties for staff augmentation purposes, or to leverage specific skills or expertise offered by third parties, as opposed to replacing functions. Examples include:

- Augmenting internal IT resources to perform tasks such as:
 - Application development and testing services
 - Level 0' support and overnight monitoring of production systems
 - Application management support, and configuration support for the SAP e-accounting system
- Augmenting internal publishing resources to assist with the formatting and graphics of Fitch Ratings' research and rating content

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Evolution of Outsourcing at Fitch Ratings (cont.)

Fitch Ratings has no current plans to outsource core parts of its credit rating or internal control processes. However, it may:

- Explore a location strategy designed to increase the proportion of Fitch Ratings staff based in lower-cost locations
- Seek to deliver additional cloud-based services and functionality, given the clear benefits realized to date with AWS
- On a limited basis, continue to leverage third parties to provide certain models or data, where those providers are better positioned to develop the models or collect/aggregate the data

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Governance & Oversight of Outsourced Activities

Fitch Ratings is responsible for managing the quality and performance of all processes and services it has delegated to third parties. Its controls* include:

- Provider Onboarding Process
 - Role of Contract Owner
 - Due diligence and background screening
 - Risk assessment and provider / efficacy ranking
 - Appropriate contractual language
 - Oversight of Provider Relationships
 - SLAs / Transparency
 - Performance metrics
 - Ongoing Provider Due Diligence & Assessments
 - Operational Risk reviews
 - Periodic, risk-based due diligence
 - Review of audit, or other reports prepared by or on behalf of the third party provider
- * As discussed in its response to the Survey, Fitch Ratings' third party risk management controls continue to evolve. Historically, different groups have sought to manage this risk in different ways. Fitch Ratings expects to launch a comprehensive, third party risk management framework for those outsourcing partners and vendors that form part of the analytical or rating processes by year end.

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Governance & Oversight of Outsourced Activities (cont.)

Governance and oversight of outsourced activities is more challenging when service providers are geographically dispersed. However:

- Regular use of video and electronic communications, coupled with robust service and performance metrics, minimizes the risk of geographical diversity creating risks
- Fitch Ratings will undertake site visits for certain critical vendors where feasible and appropriate, which acts to build relationships and increase transparency
- Fitch Ratings currently operates in over 30 countries, and is experienced in managing and overseeing tasks and functions performed by different persons or groups at different locations
- Experience has shown that outsourcing certain activities can – with sufficient oversight – improve Fitch Ratings' analytical products. An example is as follows:
 - *Issue:* Most companies produce financial statements at a similar period after quarter-end, such that the required ingestion and analysis of this data leads to a large "spike" in workload at certain times each year
 - *Solution:* As referenced above, the Financial Institutions (FI) group leverages outsourcing partners in India and the Philippines to obtain, translate and upload relevant financial information into its databases. FI analysts review the data, conduct a number of tests to ensure the service meets agreed standards, and then make adjustments to conform to internal specifications. The net result is that Fitch Ratings has better utilized its highly trained and experienced staff, and ultimately improved the timeliness and quality of its analytical products

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Governance & Oversight of Outsourced Activities (cont.)

Globally consistent outsourcing requirements would be welcomed; however, given Fitch Ratings' limited use of outsourcing, it has not to date experienced significant conflict of laws challenges. This may be due to the fact that:

- Unlike in respect of other financial services firms, CRA regulators have not historically invested significant resources into the regulation or examination of outsourced activities
- Existing CRA requirements relating to outsourcings are generally at a "higher" level, which provides CRA's greater flexibility in managing third party provider risks
 - Where local CRA regulators address outsourcing risks, they generally involve prohibiting outsourcings that may impair the quality of ratings or internal controls, or impede a regulator's activities
 - However, certain countries have issued more detailed requirements (e.g., Singapore has issued a number of more defined requirements, and Canada prohibits outsourcing the Compliance Officer), which Fitch Ratings addresses on a case-by-case basis
- Certain countries, such as Australia and Hong Kong, reference or endorse IOSCO's *Principles on Outsourcing of Financial Services for Market Intermediaries* (February 2005), which provides greater consistency

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Conclusion

IOSCO's *Principles on Outsourcing*, coupled with existing references in local laws, provide sufficient guidance to enable Fitch Ratings to effectively manage risks arising from the use of third party service providers.

Fitch Ratings has effectively leveraged this existing guidance in the development and ongoing enhancement of its third party risk management program.

To the extent that Committee 6 believes further guidance is needed, Fitch Ratings would welcome a globally consistent approach.

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Cloud Computing

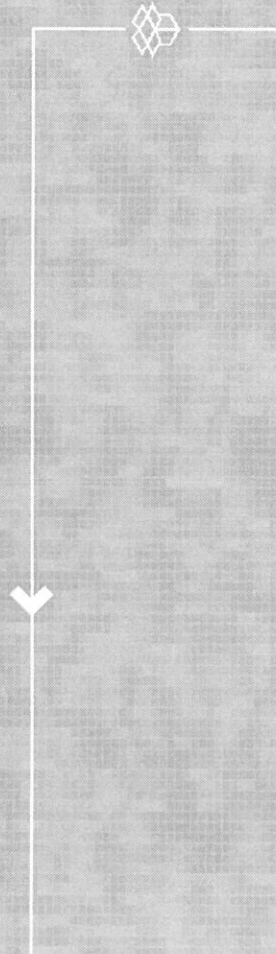


Informational Presentation to the BRSCB Committee on Credit Rating Agencies – Yes for Distribution
Dec. 6th, 2017

Agenda

- 1) Itaú Unibanco at a Glance
- 2) Why Public Cloud – Strategic Relevance and Key Benefits
- 3) Main Legal Issues
- 4) Brazilian Regulatory Framework on Cloud Computing

Itaú Unibanco at a Glance



Itaú Unibanco at a Glance

Leading position in Brazil

- US\$69.0 billion market cap ⁽¹⁾
- 96,326 employees in Brazil and abroad
- 4,919 branches and CSBs in Brazil and abroad
- 46,700 ATMs in Brazil and abroad

- Brazilian multinational bank
- Major provider of finance for the expansion of Brazilian companies
- Among the best talent pool in the Brazilian financial system

- For the 13th consecutive time Itaú Unibanco was elected by the Interbrand consultancy the most valuable brand in Brazil (R\$26.6 billion in 2016)

Global Footprint of
Brazil's Top Private
Sector Bank
as of September 30, 2017

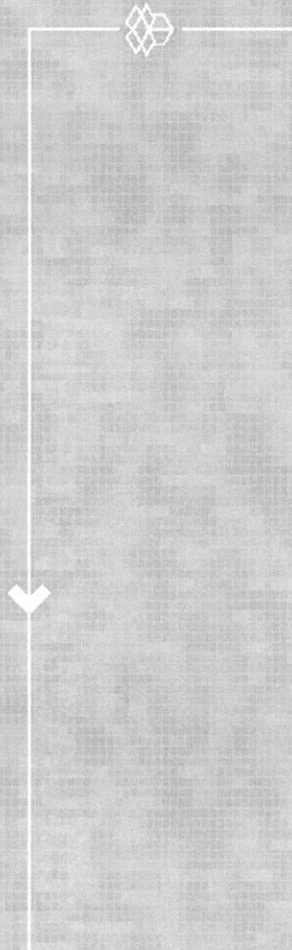


Itaú Unibanco Holding S.A.
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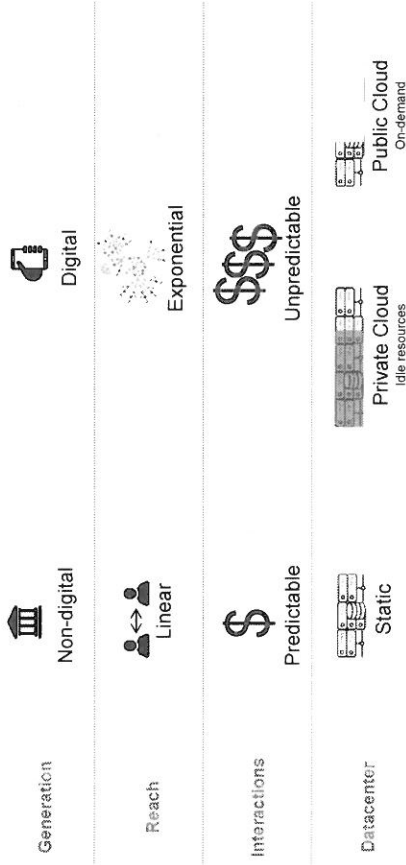


Why Public Cloud?

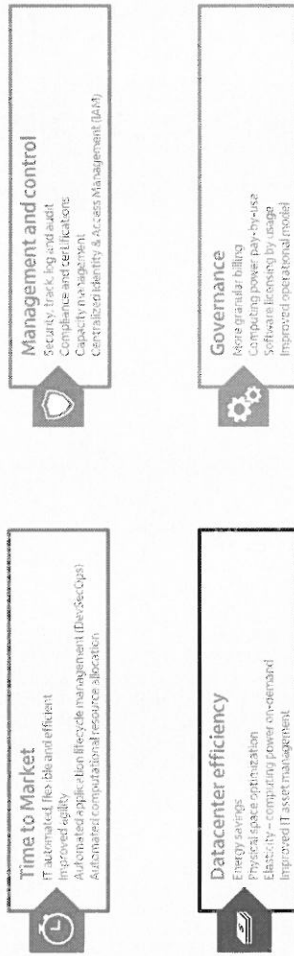
- Strategic Relevance and Key Benefits



Why Public Cloud Computing?



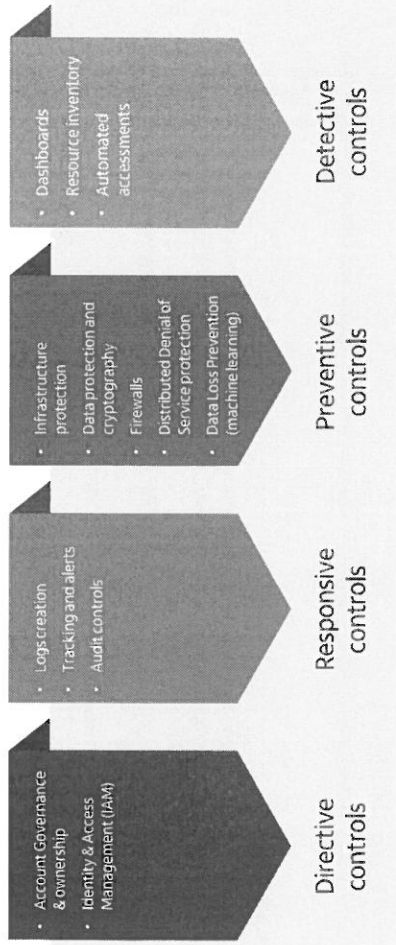
Cloud benefits



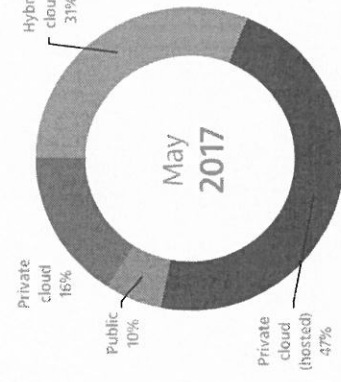
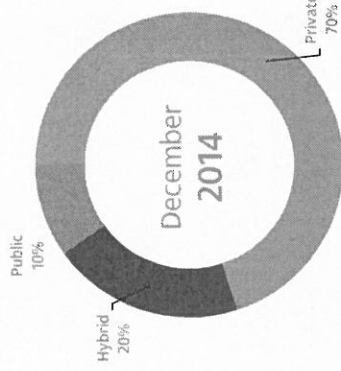
Public cloud (only) benefits

- Up-to-date technology, avoiding systems obsolescence
- High availability (99.999%) with geographically distributed data replication
- Computing power available on-demand
- No idle resources to accommodate unpredictable workloads (as opposite to private cloud)
- Reduced operational cost (TCO) bringing benefits to the customer
- Impacts of not using public cloud
 - Some products and technologies will only be available in public cloud. (E.g.: IBM Watson, Microsoft Cortana, Google DeepMind, etc.)
 - Reduced competitiveness and efficiency.

Public cloud security controls



Cloud adoption for Banking



Source: Gartner Inc.

Itaú Unibanco's journey

- On site visits to Cloud Providers
- Build its own understanding of public cloud security
- On site evaluation of the architectural and security capabilities
- Learn how other companies adopted public cloud
- Establishment of a Cloud Center of Expertise
 - Define a cloud adoption strategy
 - Define a governance plan
 - Develop policies, frameworks, metrics, risk and operational processes
 - Support cloud initiatives

Itaú Risk Management Governance for Cloud Computing



Brazilian Regulatory Framework on Cloud

- There is no specific regulation on cloud, but some aspects related to cloud are already regulated:
- Storage in Brazil
 - Digitalized documents and their backup copies related to banking operations and transactions (Resolution nº 4.474/2016)
 - Electronic documents and information related to the opening and closing of banking accounts by natural persons through the internet or Apps (Resolution nº 4.480/2016)
- Access to contracts, data and contractor's premises by the Central Bank of Brazil
 - Digitalization Outsourcing Contracts (Resolution nº 4.474/2016)
 - IT Outsourcing Contracts (Resolution nº 4.557/2017)

Cyber security

Processing and storage of data

Cloud computing

Divulga proposta de resolução que dispõe sobre a política de segurança cibernética e sobre os requisitos para a contratação de serviços de processamento, armazenamento de dados e de computação em nuvem, a serem observados pelas instituições financeiras e demais instituições autorizadas a funcionar pelo Banco Central do Brasil.

A Diretoria Colegiada do Banco Central do Brasil decidiu colocar em consulta

Central Bank of Brazil Public Consultation n. 57/2017



BANCO CENTRAL DO BRASIL

EDITAL DE CONSULTA PÚBLICA 57/2017, DE 19 DE SETEMBRO DE 2017

BACEN – Proposed Rules on Cloud Computing

Relevant Topics for the Market

Proposed Regulation	Market View	Market Proposal
<ul style="list-style-type: none"> ▪ Prohibits outsourcing relevant data processing, data storage and cloud services outside Brazil ▪ Data currently held/processed outside Brazil shall be brought back until Dec. 2021 ▪ Backup copies shall be stored in Brazil 	<ul style="list-style-type: none"> ▪ Prevents Brazilian FI from accessing technologies not available in Brazil. ▪ Limits innovation and competitiveness ▪ Increases costs and <i>Time to Market</i> ▪ Limits Contingency Plans ▪ Point of security vulnerability due to data localization ▪ Limits ability to use solutions that process high amount of data. 	<ul style="list-style-type: none"> ▪ Exclude prohibition and impose risk management requirements on FI ▪ Data being contractually and logically accessible guarantees data availability to FI and to Regulatory Authorities ▪ FI retains full responsibility towards Regulatory Authorities and customers

BACEN – Proposed Rules on Cloud Computing

Proposed Regulation	Market Concerns	Market Proposal
<ul style="list-style-type: none"> ▪ Applies to all outsourced data processing, data storage and cloud services ▪ Requires specific clauses that shall be included on contracts with service providers 	<ul style="list-style-type: none"> ▪ "Data Processing" - What is the extension of the term? ▪ Application of a high regulatory burden to such broad array of contracts increases costs and limits the competitiveness without providing necessarily a safer environment ▪ Too many or too specific clauses can make it impossible to outsource such services 	<ul style="list-style-type: none"> ▪ Scope of the Rule should be limited to critical services ▪ Regulation should be focused on principles to be applied according to the degree of materiality of the outsourced activity ▪ Focus should be on the principles, the risk management of FI and the requirement of having a suitable written contract, rather than on the language of specific sections

Thank You

Roberto Figueira Filho
Annette Pereira
Bruno Moura

