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Security Challenges of Cloud Providers

("Wie baue ich sichere Luftschlösser in den Wolken")

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Purpose today

Introduction

- » Who I am (http://archimatrix.com/jphilipp)
  Gh0st, Sanity Gambit, Unit-Y, ….

- » Why this topic:
  Security Challenges of Cloud Providers

Background Info

- » What are Clouds and what can they do

- » What Cloud security information already exists

Purpose today

Agenda

- » Cloud Challenges

  Targeted and opportunistic attacks against Cloud and EDCs

- » Security models, frameworks and white papers

  NIST, BSI, and ENISA – putting it all together

- » Explanations of the risks categories

  What goes where & what is different in the cloud

- » Working best practices from the field

  What all the existing tools don't adequately address

4x4 of: What are Clouds

- » "All that matters is results;
  I don't care how it's done"
- » "I don't want to own assets — I want to pay for elastic usage, like a utility"
- » "I want accessibility from anywhere, from any device"
- » "It's about economies of scale, with effective and dynamic sharing"

Acquisition Model
Service

Business Model
Pay for usage

Access Model
Internet

Technical Model
Scalable, elastic, shareable

Cloud Computing:

A style of computing where massively scalable IT-enabled capabilities are provided "as a service" to external customers using Internet technologies

Cloud vs. Traditional IT Platform

Similarities

- Sets of interfaces and infrastructure
- Extensible, solutions built on platform, platform hides infrastructure
- Multiple levels of platforms possible
- Platform as "you are here“ Value determined by what is made accessible
- Similar success factors (ecosystem)

Differences

- Not a stand-alone platform that is always purchased
- Separated by a network (the Internet)
- Not a client server platform, but a distributed platform - WOA
- Access to data and capabilities as a result of community
- Global-class and elastic Consumer-inspired

Cloud Challenges (Tech)

Service Management
Technologies immature

Costs
Economies of scale limits, or customer trades data or advertising for services

Culture
Trust, chargeback, sharing

amazon webservices™
EC2 & S3

Connection
Only as good as the Internet, unless you pay to "harden" your connection

High Availability
Stateless, no problem; stateful, same issue as in enterprises

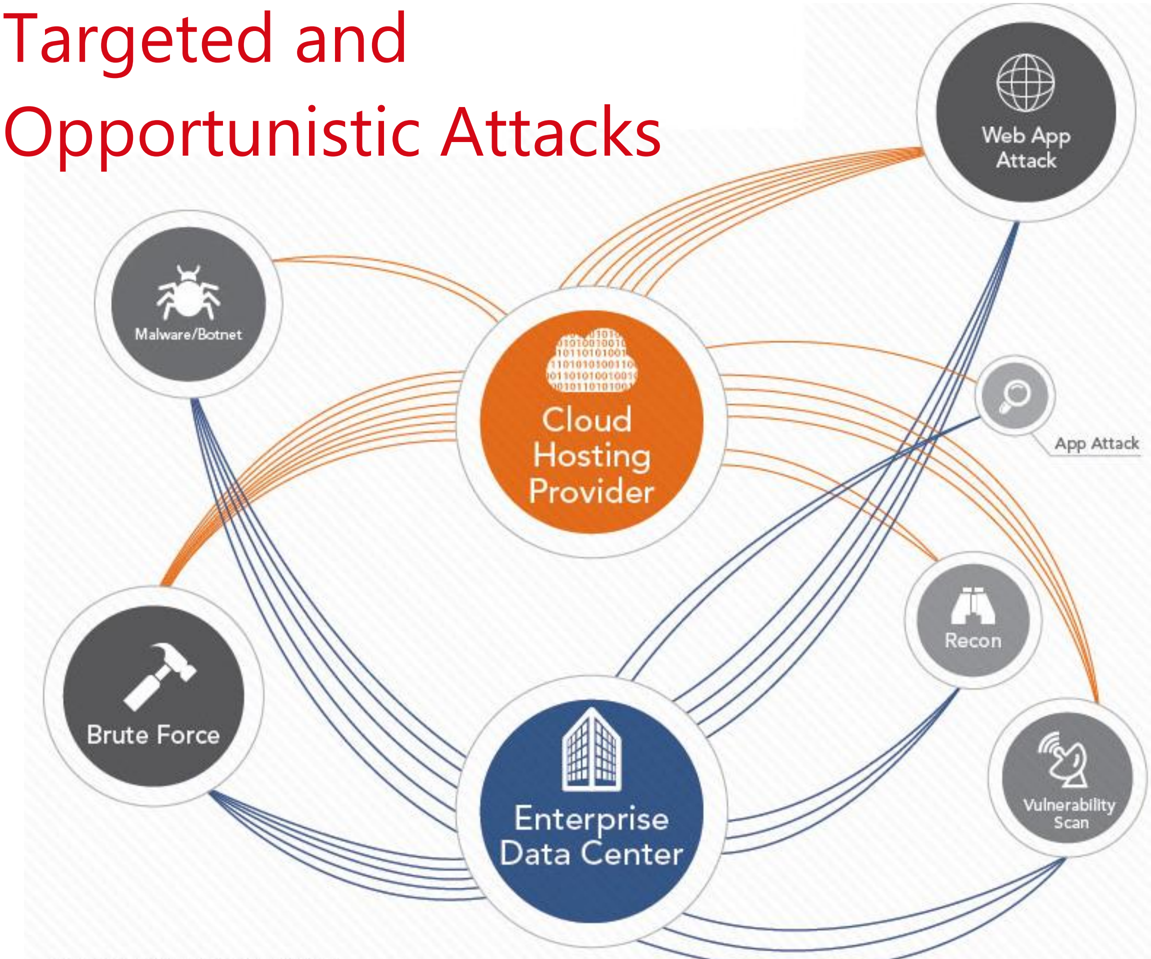
Scalability
Parallel processing, no problem; sequential processing, different story

Customization Difficult.
At least with monolithic applications

Adapted from: Gartner Summit Event

Cloud Challenges (Sec)

Targeted and Opportunistic Attacks



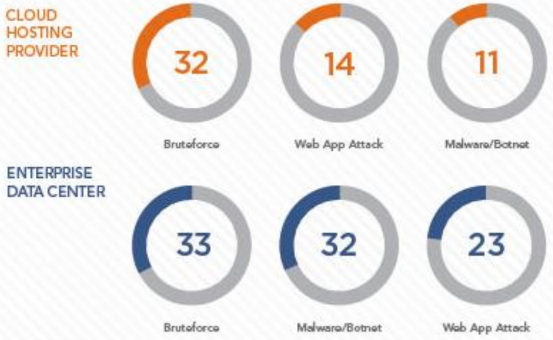
OCCURRENCE OF ATTACKS

> Size of circle indicates percentage of customers impacted.

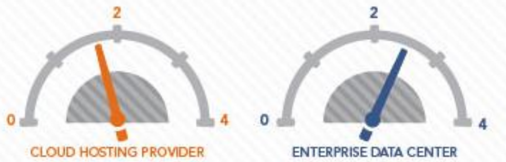
> Number of lines indicates attack volume.

Source: AlertLogic
2013 State of Cloud Security Report

AVERAGE FREQUENCY OF ATTACK
Top Three Incident Classes



AVERAGE NUMBER OF UNIQUE ATTACK TYPES
Threat Diversity



INCIDENT DESCRIPTIONS

Malware/Botnet
Malicious software installed on a host and engaging in unscrupulous activity, data destruction, information gathering or creation of backdoors.

Brute Force
Exploit attempts enumerating a large number of combinations, typically involving multiple credential failures, in hopes of finding a weak door.

Web App Attack
Attacks targeting the presentation, logic or database layer of web apps.

Recon
Activity focused on ping sweeps, mapping networks, applications and/or services.

Vulnerability Scan
Automated vulnerability discovery in applications, services or protocol implementations.

App Attack
Exploit attempts against applications or services not running over HTTP protocol.

Sec – Models , Framework, …

ENISA (European Network and Information Security Agency)

Cloud Computing
Benefits, risks and recommendations
for information security
Original Nov 2009, Updated Dec 2012

BSI (federal Office of Information Security)

Security Recommendations
for Cloud Computing Providers
June 2011

NIST (National Institute of Standards and Technology)

All compliant with the *Nov 2013*
NIST Cloud Computing 5
Security Reference Architecture

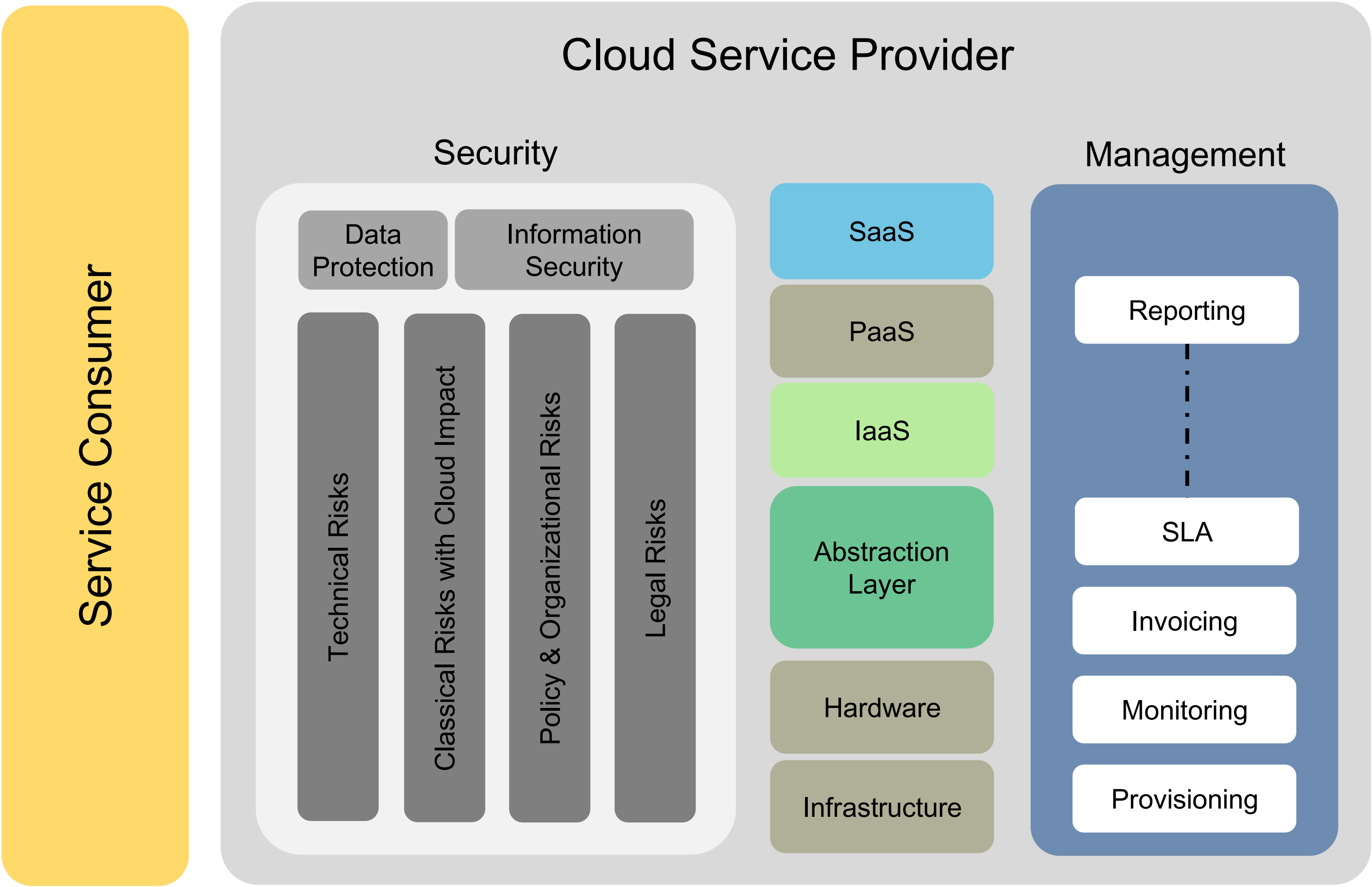
Cloud Computing
November 09
Benefits, risks and recommendations for information security
enisa

Federal Office for Information Security

White Paper
Security Recommendations for Cloud Computing Providers
(Minimum information security requirements)

www.bsi.bund.de

NIST / BSI / ENISA



– Typical Policy and Org. Risks

General risks

- Provider solution lock-in
- Loss of governance
- Compliance challenges

Event driven risks

- Cloud service termination or failure
- Cloud provider acquisition
- Loss of business reputation due to co-tenant activities
- Supply chain failure
  (due to Cloud provider outsourcing specialized tasks to 3rd parties)

🌩 – Typical Cloud Technical Risks

Confidentiality

- Isolation failure
- Data leakage
  On up/download, intra-cloud, interception in transit
- Insecure or ineffective deletion of data

Integrity

- Cloud provider malicious insider (abuse of high privilege roles)
- Undertaking malicious probes or scans

Availability

- Loss of encryption keys
- Resource exhaustion and denial of service DDoS/EDoS
- Conflicts: Customer hardening vs. cloud environment
- Compromise service engine

🌩 – Legal Risk Considerations

General legal risks

- Subpoena and e-discovery
- Risk from change of jurisdiction
- Export controls
- Data protection risks

Additional legal considerations

- “Bundesdatenschutz” (BDSG)
- Information Security (ISO27001)
- Governance (ISO38500)
- Risk Management (MaRisk, KontraG)
- Internal control systems (JAP) (IDW PS261, 330, ERS FAIT 1)
- Outsourcing (PS951/SAS70//SSAE16, ISAE3402)

Classical IT Risks: Cloud Impact

Confidentiality

- Privilege escalation
- Social engineering attacks, like impersonation
- Backups lost or stolen, or theft of computer equipment

Integrity

- Modifying of network traffic
- Loss or compromise of logs
  (manipulation of forensic investigation)

Availability

- Network breaks
- Poor network management (congestion, mis-connection, ...)
- Natural disasters
- Transitions

Security: Best practices

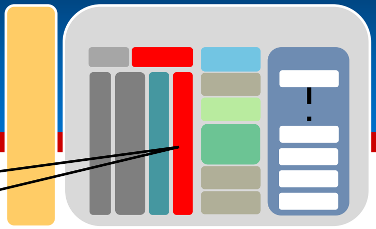
Tips and Best Practices

From the Field

For

Cloud Providers

Sec: Best practices



Policy & Organizational Risks

- Provide the Security Architecture Drawing
- Allow Access to the Environment Log and Systems
- Allow the Use of Correlation Tools and Log Retention
- Have a Security Point Person to Serve the Contractor During the Contract Period
- Manage Vulnerabilities, Threats and Risks by Aligning With the Contractor/Tenant
- Have the SAS 70 Certification or Similar
- Permit External Audits for Cloud Security

Relevant Statements

Share information between Cloud provider and tenant/contractor

Be transparent as provider.

Sec: Best practices

Legal Risks

- Establish SLAs in the Contract, Including in the Cases of Security Incidents
- Detail the End of Business Operations Process in the Contract
- Detail the Process for Responding to Legal Requirements
- Identify Where the Solution Data Center(s) Will Be to Meet Local Legal Particularities

Relevant Statements

You have to think of everything both as cloud consumer and provider at the beginning!

You have to make provisions for all potential changes at the beginning.

Sec: Best practices

Technical Risks

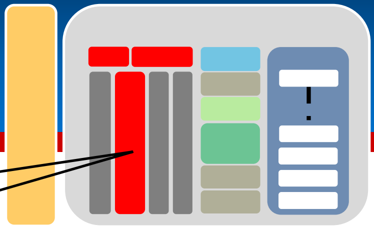
- » Have Specialized Protections for the Perimeter
- » Hold the Firewall Segregating All Networks, including Server Environment Operators and Users
- » Segregate Functions Inside the Provider
- » Detail How Much the Environment/Infrastructure Is Shared With Other Clients
- » Notify How Information Leakage Control is Managed
- » Detail Procedures in Case of DDoS Attacks
- » Demonstrate the Process of Cryptographic Keys Management

Relevant Statements

Treat the cloud as your company perimeter – it's not just firewalls

Understand the other types of tenants hosted and how they are separated.

Sec: Best practices



Classic IT Risks with Cloud impact

- Allow Vulnerability
  Analysis and Ethical Hacking

- Share the Business Continuity Policy and Disaster Recovery Plan

- Detail the Data Disposal Process in the Contract

- Access Control with Strong (ideally multifactor) Authentication

Relevant Statements

Treat the security and access of Cloud applications like you would any other application.

Plan for disaster and change in the Cloud and include it in your plans.

Thanks for coming out!

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"Cloud klaut" aber trotzdem

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