



# Big Data, Cloud Computing The Perfect Trade Control Storm? Or Opportunity?

**David Harris**

*Global IT Trade Control Focal  
Engineering Operations and Technology  
Business Operations and Governance  
The Boeing Company*

**MetricStream**

**GRC**

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# Agenda

## **Global Trade Control, Big Data and Cloud Computing**

- Big Data and The Cloud, a starting point
- Trade Control and Intellectual Property requirements
- What happens when the 'Wrong' data is released?
- The Global Challenge, release to 'users' only the 'Right' data
- Computing Architecture approaches to Compliance
- Early engagement with The Cloud vendor drives success
- Using Big Data analytics to ready Big Data for release
- Questions and Answers

# What is 'Big data'?

Big Data is best defined by the Three 'V's

**Volume**

**Velocity**

**Variety**

## Systems with Big Data

### Structured vs. Unstructured Information

Structured Data allows for querying and reporting against predetermined data types and understood relationships.

Unstructured Data is non-transactional (i.e., documents, drawings, images, audio, video, etc) with more complex interrelationships than structured data.

If you cannot 'manage' your data with standard tools – you have Big Data



Image source – DARPA – Public Domain

# What is 'The Cloud'?

## Compaq Engineer's 'Coined' Cloud Computing in late 1996

### Cloud Types

#### **SaaS** – Software as a Service

- Execute Applications

#### **PaaS** – Platform as a Service

- Develop applications using a common platform

#### **IaaS** – Infrastructure as a service

- Provide an Infrastructure for applications and platforms

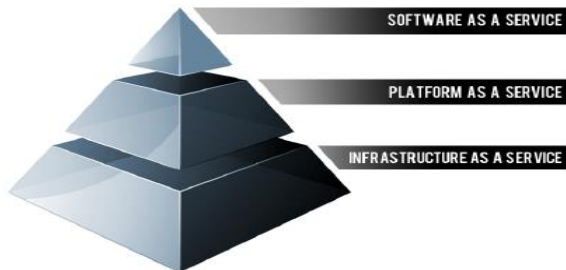


Image source – [rackspace.com](http://rackspace.com) – Public Domain

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National Institute of Standards and Technology  
Per NIST - Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources...



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# Trade Control and Intellectual Property requirements.

## **Arms Export Control Act**

International Traffic in Arms Regulations (ITAR)

Department of State

## **Export Administration Act**

Export Administration Regulations (EAR)

Department of Commerce

## **Treasury/OFAC Regulations**

## **Dept. of Energy Regulations**

### **An export can be any of the following:**

actual shipment of any covered goods or items;

the electronic or digital transmission of any covered goods, items, or related goods or items;

any release or disclosure, including verbal disclosures or visual inspections, of any technology, software source code or technical data to any foreign national wherever located; or actual use or application of covered technology on behalf of or for the benefit of any foreign entity or person anywhere.

# Trade Control and Intellectual Property requirements

## Regulations



**EAR – Export  
Administration  
Regulations**

**(ECCN)**



**ITAR – International  
Traffic in Arms  
Regulations**

**(USML)**

If you can **'answer'** the '6 W's' you have the facts required for compliance with Trade Control.

**What** is the item?

**Where** are you releasing it?

**Who** needs it?

**Why** do they need it?

**How** is it authorized?

**When** are you releasing it?

## Corporate Legal, Intellectual Property



**Office of Internal Governance**

Ethics and Business Conduct • Global Trade Controls  
Corporate Audit • Compliance Risk Management



**Engineering, Operations & Technology  
Intellectual Property Management**

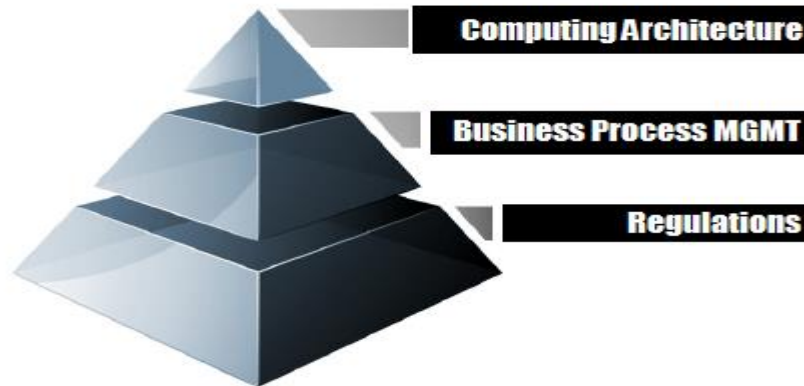


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# What happens when the 'Wrong' data is released?

The EAR (export Administration Regulations) provides the following sanctions:

## Criminal Sanctions

### Willful Violations

1. Company
  - A fine of up to the greater of \$1,000,000 or five times the value of the exports for each violation.
2. Individual
  - A fine of up to \$250,000 or imprisonment for up to ten years, or both, for each violation.

### Knowing Violations

1. Company
  - A fine of up to the greater of \$50,000 or five times the value of the exports for each violation.
2. Individual
  - A fine of up to the greater of \$50,000 or five times the value of the exports or imprisonment for up to five years, or both, for each violation.

## Civil (Administrative) Sanctions

1. The imposition of a fine of up to \$12,000 for each violation, except that the fine for violations involving items controlled for national security reasons is up to \$120,000 for each violation.

**Additionally, for each violation of the EAR any or all of the following may be imposed:**

1. The denial of export privileges; and/or
2. The exclusion from practice; and/or
3. Seizure/Forfeiture of goods.

The ITAR (International Traffic in Arms Regulations) provides the following sanctions:

## Criminal Sanctions

1. Company
  1. A fine of up to \$1,000,000 for each violation
2. Individual
  1. A fine of up to \$1,000,000 or up to ten years in prison, or both, for each violation.

## Civil Sanctions

1. Company
  1. A fine of up to \$500,000 for each violation.
2. Individual
  1. A fine of up to \$500,000 for each violation.

**Additionally, for any violation of the ITAR either or both of the following may be imposed:**

1. the denial of export privileges; and/or
2. seizure/forfeiture of goods.

## ITAR Violations and Fines -

[http://www.pmddtc.state.gov/compliance/consent\\_agreements.html](http://www.pmddtc.state.gov/compliance/consent_agreements.html)

## EAR Violations and Fines -

<http://efoia.bis.doc.gov/index.php/electronic-foia/index-of-documents/7-electronic-foia/227-export-violations>

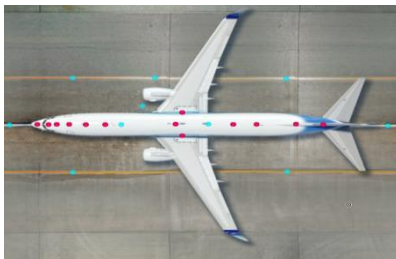
# The Global Challenge, release to 'users' only the 'Right' data

## Hypothetical Intellectual Property Agreement compliant release use-case

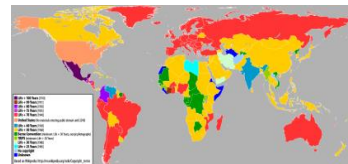
Technical Data related to this Pressure Module Valve which is Boeing Proprietary



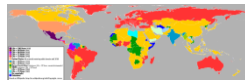
of the 737-800 Program



May be released to support product design and prototyping in Germany or Italy



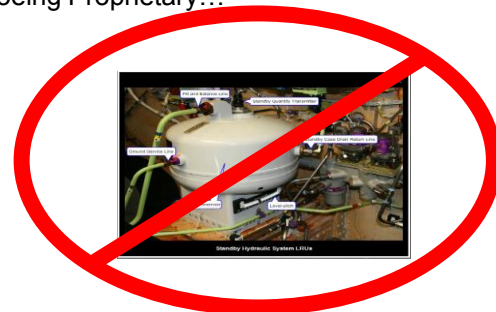
To any designer from Company X, provided they are employed by Company X and are Designing, Prototyping or Engineering the CAD for parts,



Which is authorized by the Intellectual Property clauses in Company X Statement of Work.



And are not using it in connection with any of these other parts ..nor will they have access to them, which are also Boeing Proprietary...





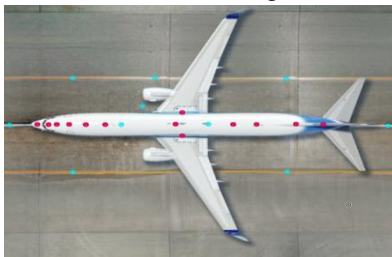
# The Global Challenge, release to 'users' only the 'Right' data

## Hypothetical EAR Trade Control compliant release use-case

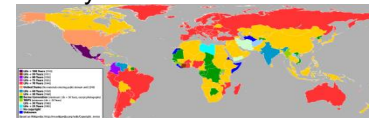
Technical Data related to this Pressure Module Valve with an ECV of ECCN 9E001



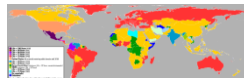
of the 737-800 Program,



May be released to Germany or Italy



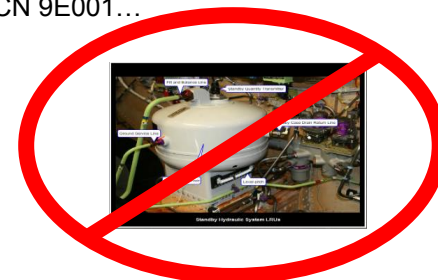
To any designer with citizenship of United Kingdom or France, or dual citizens of Italy and Germany, provided they are employed by Company X and are Designing or Engineering the CAD for parts,



which is authorized by the EAR authority D000001



and are not using it in connection with any of these other parts ..nor will they have access to them, which are also ECCN 9E001...



[http://airplanevirtualtour.web.boeing.com/tours/737/737-800\\_VR\\_Version2/737-800\\_VR\\_Tour\\_V2.html](http://airplanevirtualtour.web.boeing.com/tours/737/737-800_VR_Version2/737-800_VR_Tour_V2.html) -Images Source, Public Domain

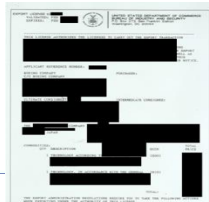
# The Global Challenge, release to 'users' only the 'Right' data. Agreement Types and Functional Process Maps (redacted for example purposes)

## Trade Control

### ITAR

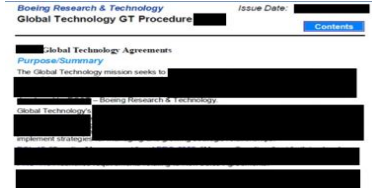


### EAR



## Intellectual Property

### R & D

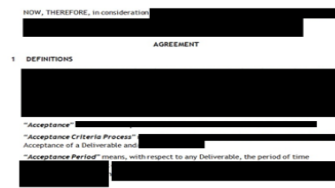


### SOW Clause



## Privacy

### PII Release

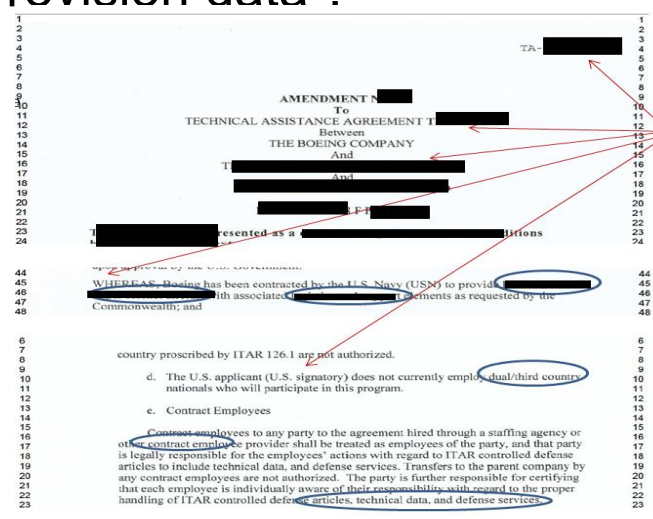
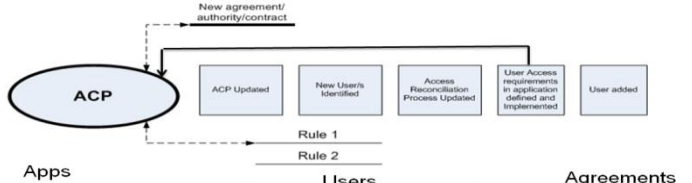


Manual Release Processes are defined within Stakeholder domains

Most release use-cases require compliance to both Trade Control and Intellectual Property agreements. There are some use-cases where all three domains may be in scope.

# Computing Architecture approaches to Compliance. How does an Application 'Entitle/Provision data'?

With each new 'Agreement', selected applications require 'entitlement/provisioning' for a scoped group of users that are party to it. This process is usually conducted with a team made up of, supplier management, trade control, application SME, technical data SME, security/information protection, application compliance, architecture...



- Application Entitlements**

  1. Applications are selected.
  2. Roles/Groups/Folders... are created in applications to support agreement.
  3. Application provisioning desktop procedures for the applications are updated.
  4. Account requests are created for the users.
  5. Users which are 'in scope' to the work to be performed are then 'provisioned' in the application.
  6. Application access reconciliation processes are updated.
  7. User access is terminated when project/deliverables are completed.

← Lots of People, \$\$\$\$ and time →

# Computing Architecture approaches to Compliance. What are the concerns at scale?

## Agreement Types and Scale

- Export Agreements - +- Thousands Active
- Intellectual Property - +- Tens of thousands
- Privacy Agreements - +- Hundreds
- Applications - +- Thousands
- Locales - +- All over the World
- Citizenships - +- All over the World

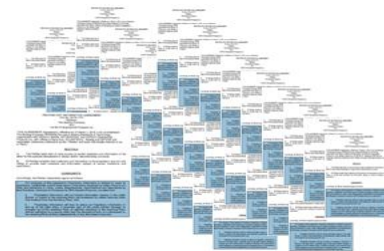
+ - 400,000 Users



+ - 10,000 Applications



+ - 60,000 Agreements



Images source – The Boeing Company– Public Domain

# Computing Architecture approaches to Compliance. Common Services built-into the 'Infrastructure' are leveraged by applications.

A Policy Service is a high-performance, scalable component of the infrastructure. It presents verdicts on information release to applications. It uses information from the infrastructure (Master Data) in conjunction with the application data to make these verdicts.



Agreements/Authorities are 'provisioned' directly into the policy service. When a new agreement is added to the Policy Service, all enrolled applications are affected. There is no application level entitlement or provisioning requirements specific to the new agreement.



Users can be located anywhere and simply access applications. When the rules allow specific data to be 'released', it is.



Technical Data is 'attributed' using a common vocabulary and taxonomy. This common compliance language allows for the service to use one set of rules for all applications enrolled.

# Early engagement with The Cloud vendor drives success.

## Selecting a cloud vendor

### Important elements to consider in Cloud Vendor Selection

1. The SLA (Service Level Agreement)
2. Record keeping and forensics
3. Cloud access, performance and global availability
4. Compatibility with your infrastructure
5. Federation of your existing SOA and BPM (Business Process Management)
6. Understanding of Trade Control sensitivities
7. Disclosure and restriction of resource allocation to 'your servers and data'
8. DDTC Registration
9. Disaster Recovery and Fault Planning
10. Computing and Cyber security standards and certifications

It is very important your Cloud vendor understands the specific release and compliance use-cases in scope.

If, for example, comprehensive record keeping is not available, you may open yourself up to administrative violations in the EAR or ITAR. If you have developed services in-house you would not want to have to go back to application level entitlements – this may drive unforeseen costs into the management of your Cloud space.

**Once a Cloud vendor is selected it is very difficult to migrate to another vendor or solution provider, interoperability between vendors is uncommon and poorly defined at this time.**

# Using Big Data analytics to ready Big Data for release

The most common barrier to proper information management and release automation through common services is the data itself.

Leveraging HDFS (Hadoop Distributed File System) and MR (Map Reduce) to 'ready' your enterprise data in legacy systems for a fraction of the cost of 'tagging/updating' data.

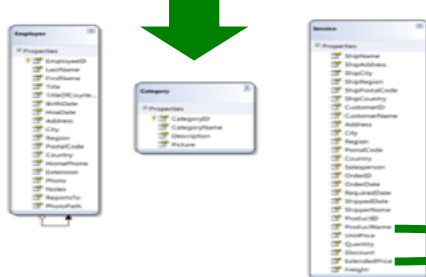


Images source – apache.org, Veritica.com, – Public Domain



Images source – principals-emaillist.com – Public Domain

Map Reduce or  
Parallel DBMS  
process



Images source – telerik.com – Public Domain

New fields are added to database and populated using Analytics in the Map Reduce or Parallel DBMS process/methods

# Using Big Data analytics to ready Big Data for release

**Information Governance is the key to effective information release automation.**

Once the compliance vocabularies and taxonomies have been described and harmonized into Master Data, services oriented architecture can drive optimization opportunities.

Compatibility with the Cloud vendor allows tight coupling of your ABAC (Attribute Based Access Control) information management and release strategy.

Federation of enterprise infrastructure into the Cloud vendor IaaS solution space allows optimized release.



# Recap

'Big Data' and 'Cloud Computing' drive tremendous opportunity.

Trade Control Compliance is very challenging and requires comprehensive release management.

Computing Architecture centered around SOA (Services Oriented Architecture) and META enablement of content through information governance can simplify the entitlement process.

Understanding of these complexities and sensitivity to the Trade Control use case is critical on the part of the Cloud vendor.

Leveraging 'Big Data' analytics can ready your data by adding the META information you need to automate release.

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# QUESTIONS AND DISCUSSION



# Citations and Reference Material

Health Care (very similar use-case) – Information Management and release control for Health Care information –

<http://semanticweb.com/tag/yosemite-project>

Big Data Primer – from McKinsey Global Institute hosted at NIST.gov

[http://bigdatawg.nist.gov/MGI\\_big\\_data\\_full\\_report.pdf](http://bigdatawg.nist.gov/MGI_big_data_full_report.pdf)

Definition of Cloud Computing from NIST –

<http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf>

Cloud Standards Customer Council –

<http://www.cloud-council.org/>

# Thank you

David Harris  
Global IT Trade Control Focal  
Global IT Trade Control Requirements Focal  
IT Compliance Export  
Boeing Engineering Operations and Technology  
(253) 906-4210 – Cell

