



**BlackBridge**  
Delivering the World

# BLACKBRIDGE SATELLITE IMAGERY THROUGH CLOUD COMPUTING

- Jason Setzer | Cloud Product Manager

# THE RAPID EYE CONSTELLATION

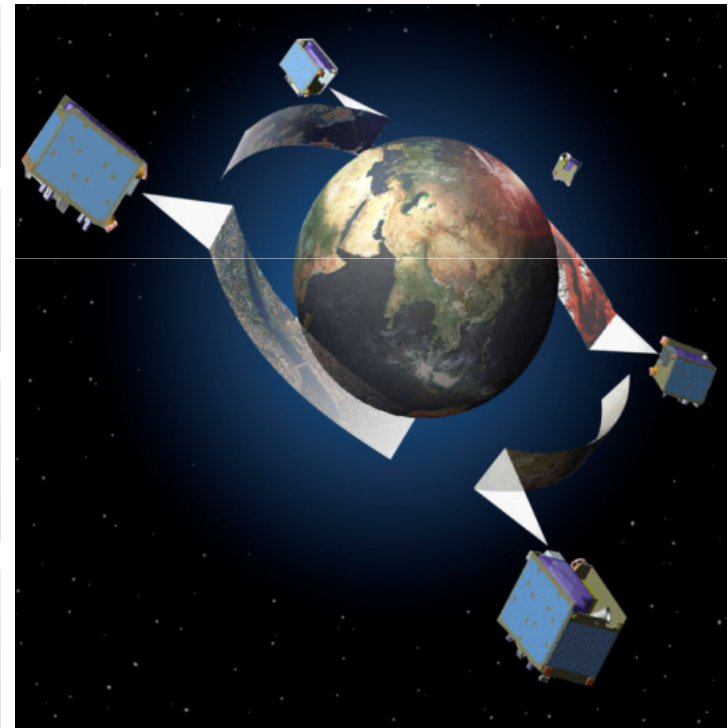


5 Identical Satellites in same orbit

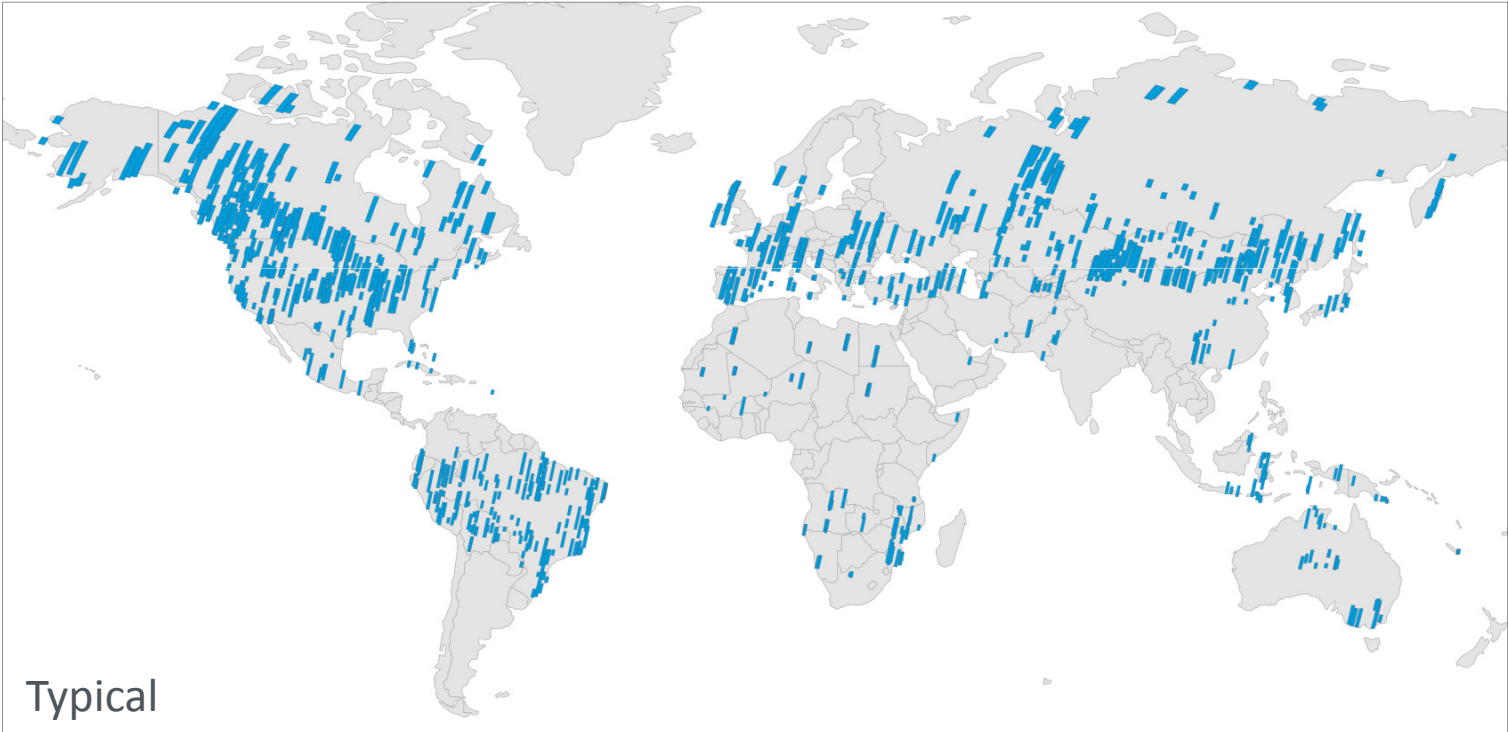
Up to 5 million km<sup>2</sup> collected daily

1 billion km<sup>2</sup> collected yearly

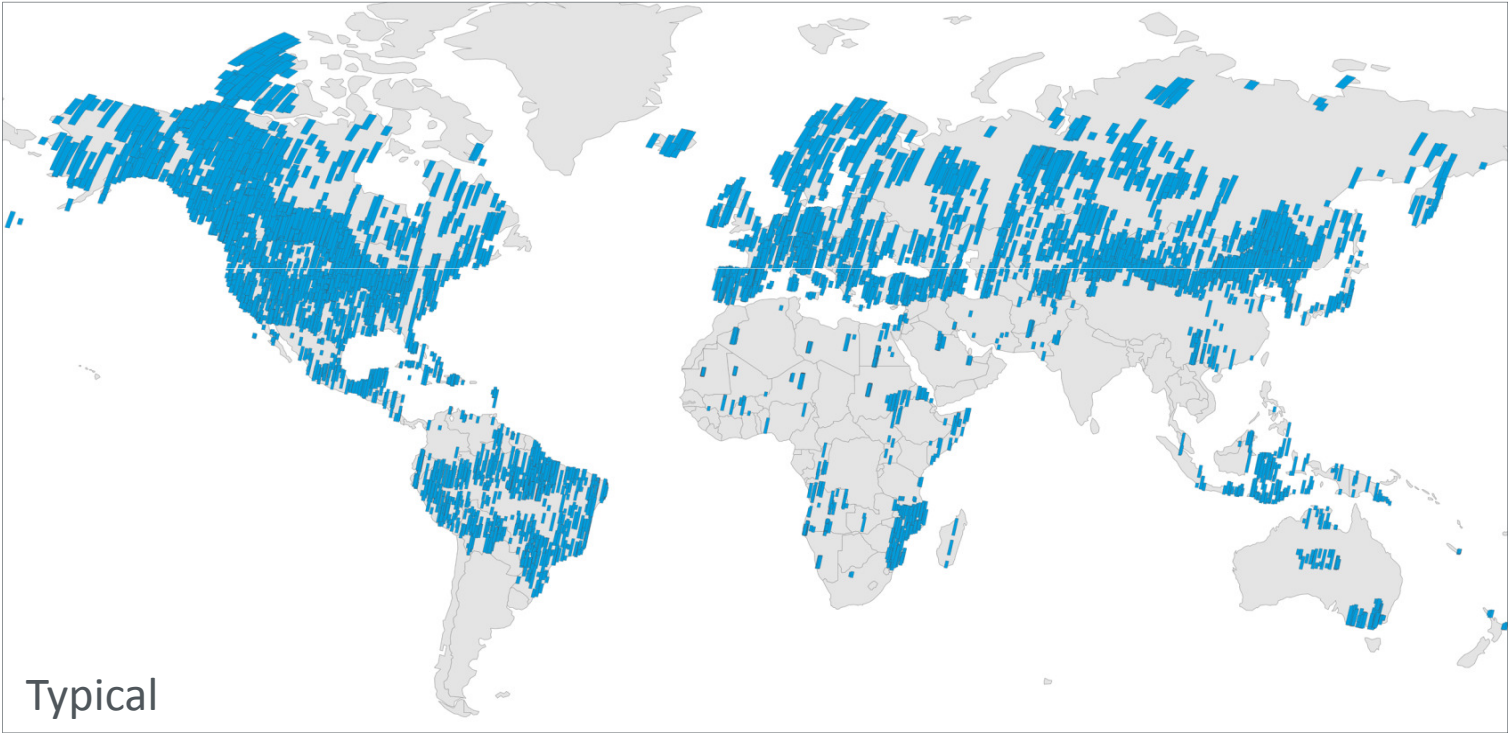
6 billion km<sup>2</sup> archived imagery



# WEEKLY ACQUISITION

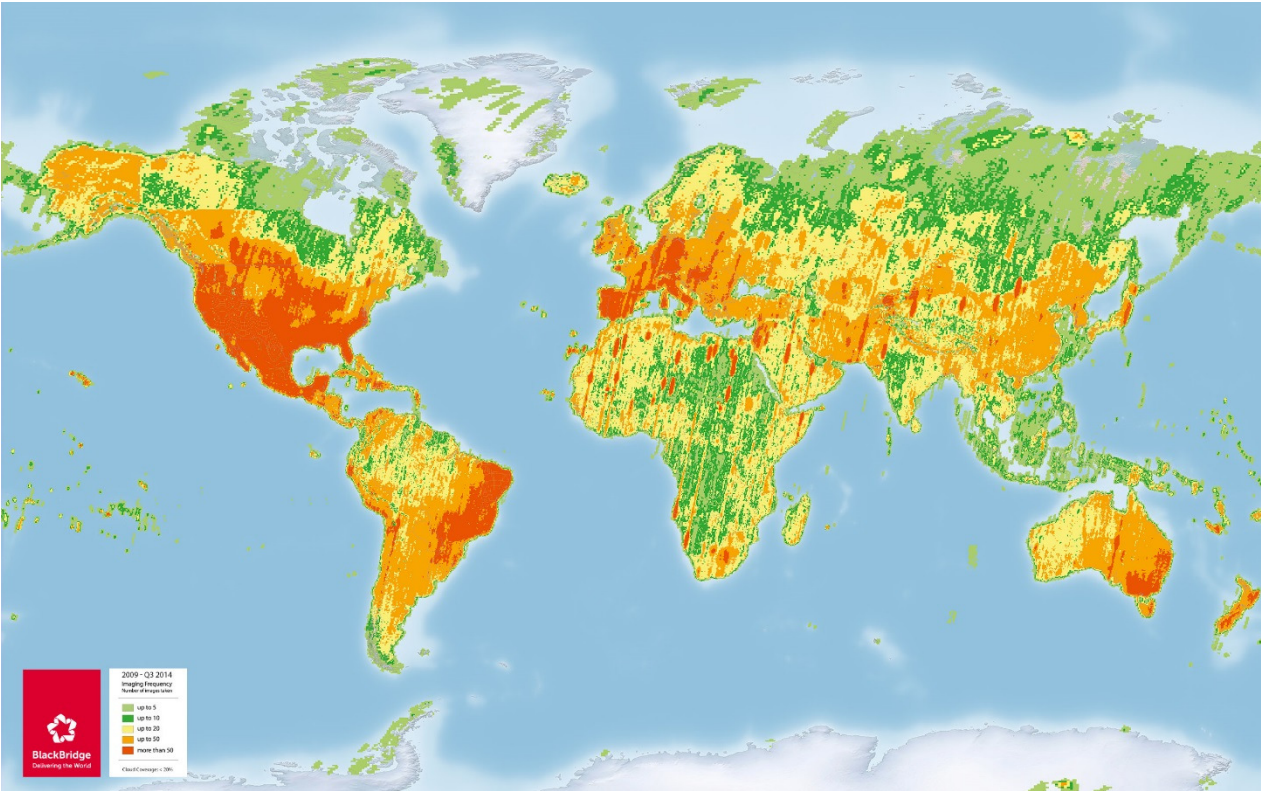


# MONTHLY ACQUISITION

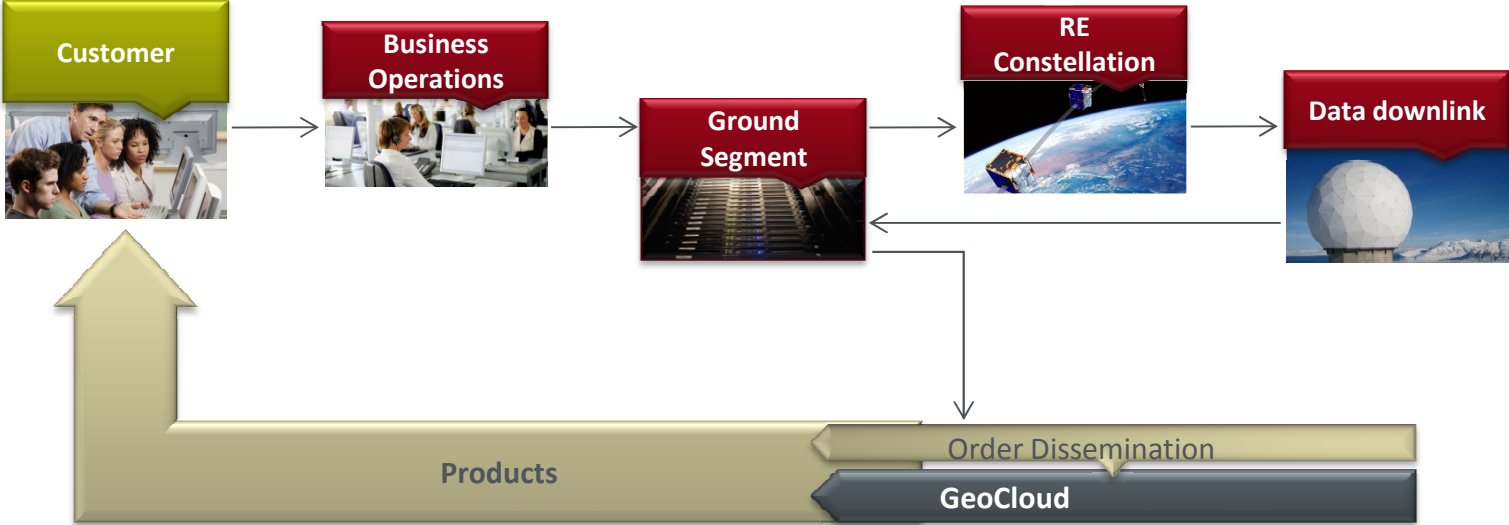


Typical

# IMAGING FREQUENCY



# GEOCLOUD



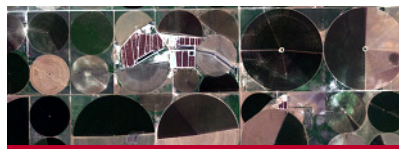
What is the GeoCloud? It is a product distribution system

# MONITORING PROGRAM FEATURES



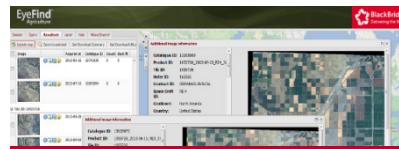
## IMAGE COLLECTION

- + Target Area (AOI)
- + Critical Times (TOI)
- + Archive Images
  - + 2013
  - + 2012
  - + 2011
  - + ...



## ORTHO PRODUCT

- + 5 Spectral Bands
- + 5 m Pixel Size
- + <10 m RMSE



## CATALOG & DELIVERY

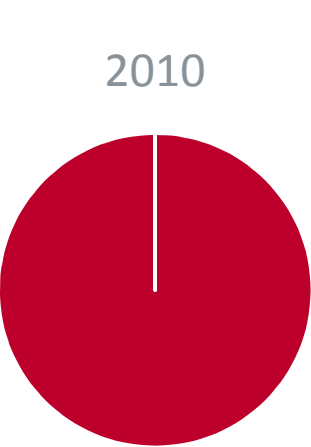
- + Cloud-based
- + Quick Delivery
- + EyeFind / API
- + 3<sup>rd</sup> Party Data
  - + Landsat-8



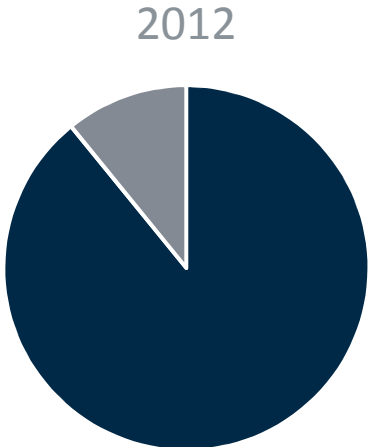
## BUSINESS MODEL

- + Subscription Options
- + Price Options
- + Customizable

# RAPIDEYE DATA DISTRIBUTION

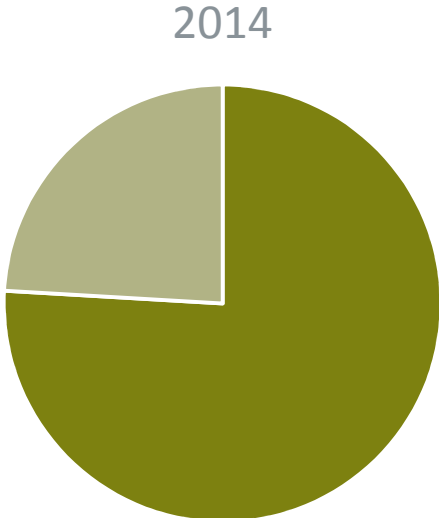


■ Local Storage



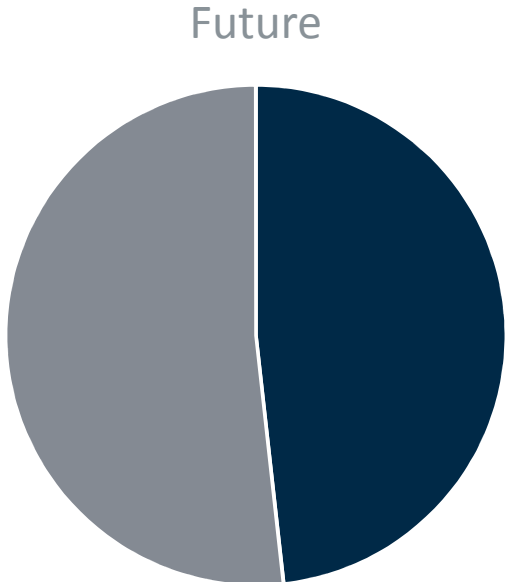
■ Local Storage

■ Cloud Storage



■ Local Storage

■ Cloud Storage



■ Local Storage

■ Cloud Storage



# RAPIDEYE DATA DISTRIBUTION



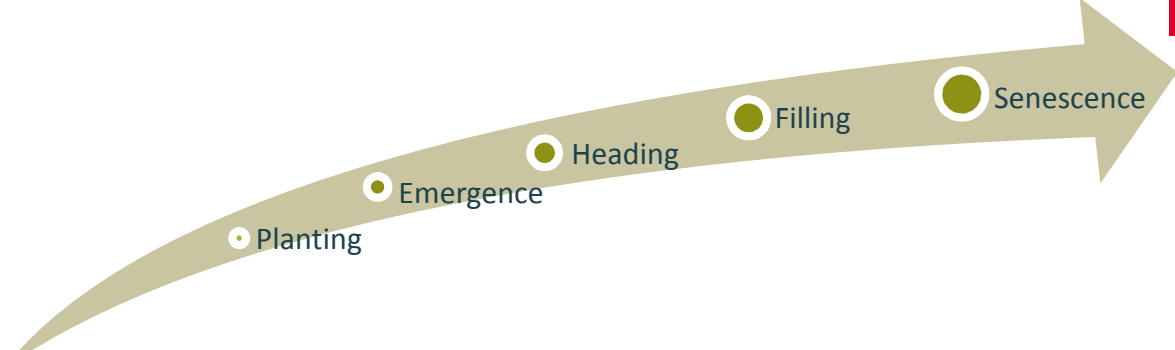
VS



# EXAMPLE: MONITORING PROGRAM FOR AGRICULTURE



Crop Stages



Field-Level Analytics Required



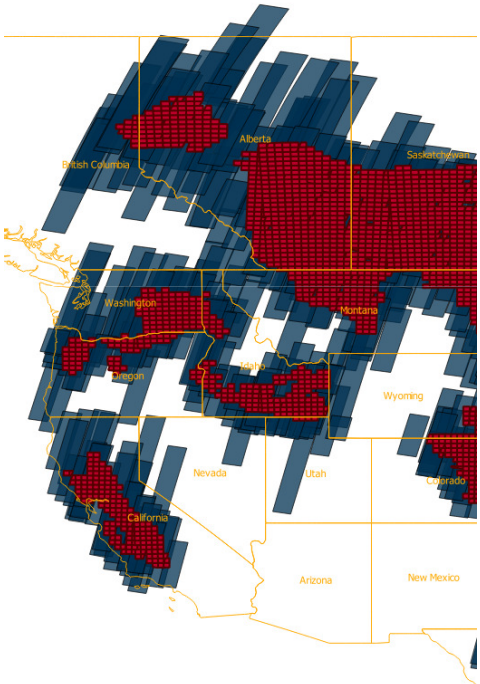
Management Activities



# EXAMPLE: MONITORING PROGRAM NORTH AMERICA 2014



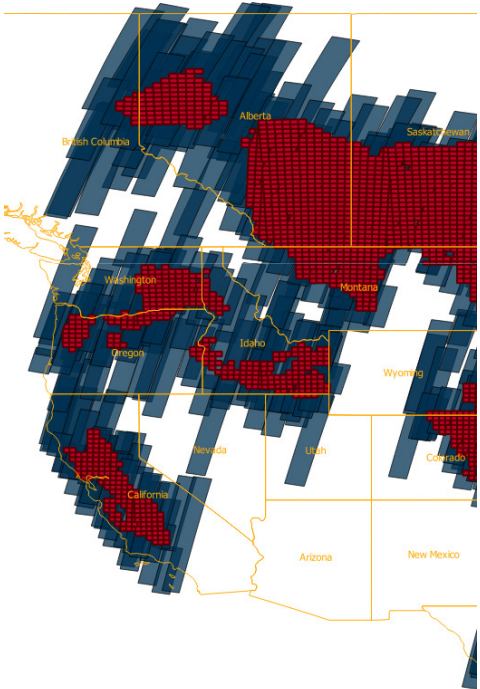
- 3.4 million km<sup>2</sup> AOI
- 2014 – Jul - acquired
- 2014 – Jul - delivered
- Monthly collection window
- Specification: 20% clouds or less



# EXAMPLE: MONITORING PROGRAM NORTH AMERICA 2014



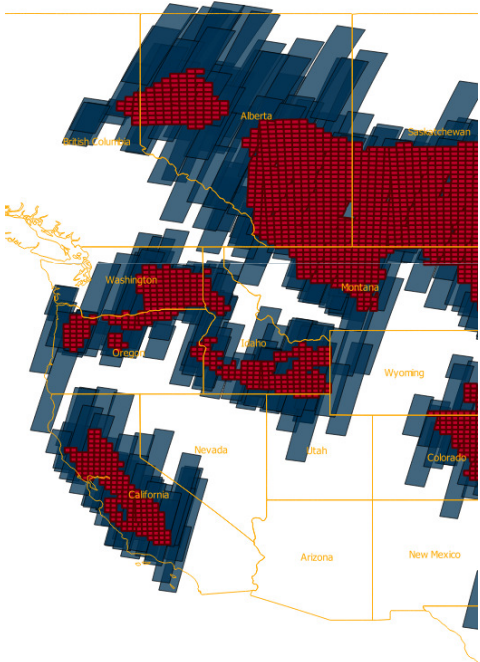
3.4 million km <sup>2</sup> AOI	2014 - Jul - acquired
	2014 - Jul - delivered
Monthly collection window	2014 - Aug - acquired
	2014 - Aug - delivered
Specification: 20% clouds or less	



# EXAMPLE: MONITORING PROGRAM NORTH AMERICA 2014



3.4 million km <sup>2</sup> AOI	2014 - Jul - acquired
	2014 - Jul - delivered
Monthly collection window	2014 - Aug - acquired
	2014 - Aug - delivered
Specification: 20% clouds or less	2014 - Sep - acquired
	2014 - Sep - delivered



# EXAMPLE: MONITORING PROGRAM NORTH AMERICA 2014



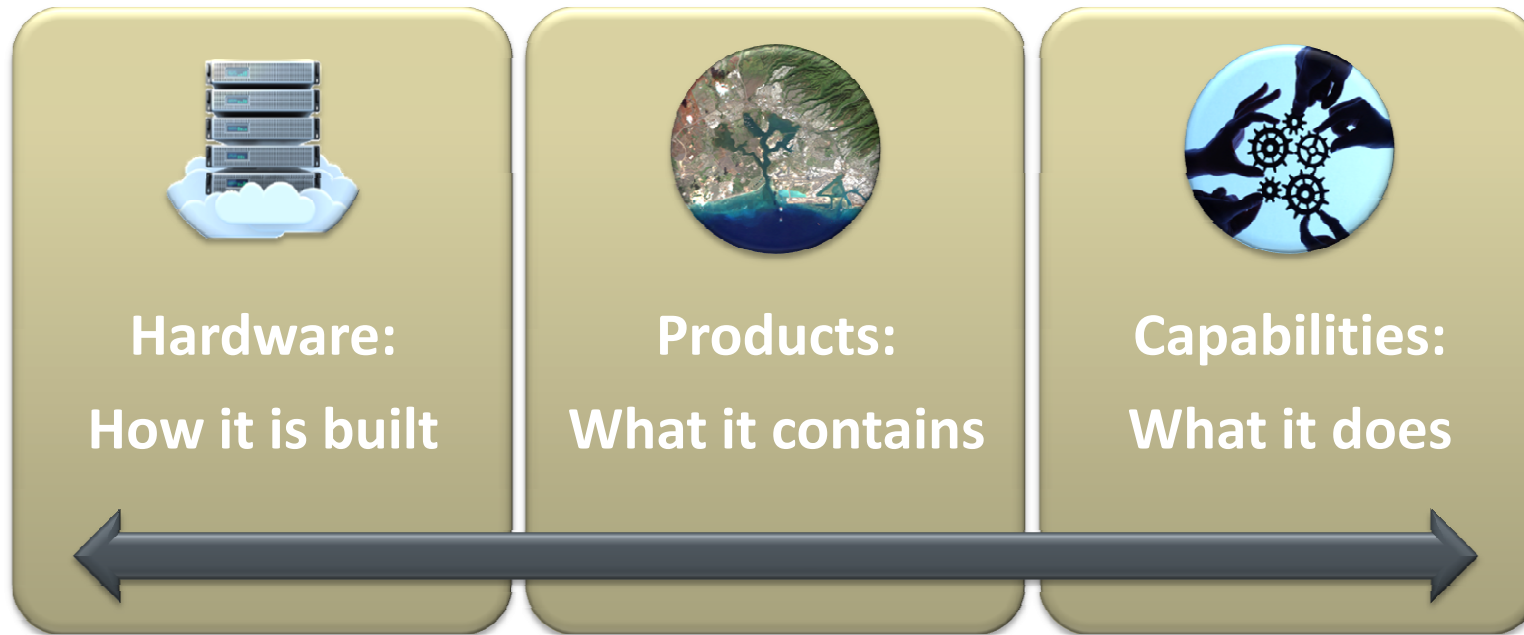
- 25 x 25 km L3A tile footprint
- Monthly coverage
- Additional coverage
- Specification: 20% clouds or less



# WHAT IS THE GEOCLOUD?



The GeoCloud product distribution system consists of:



# BLACKBRIDGE NETWORKS DATA CENTER



**REPLICATION & BACKUP**

**ENTERPRISE CLOUD**



**Purpose Built Secure Facility**



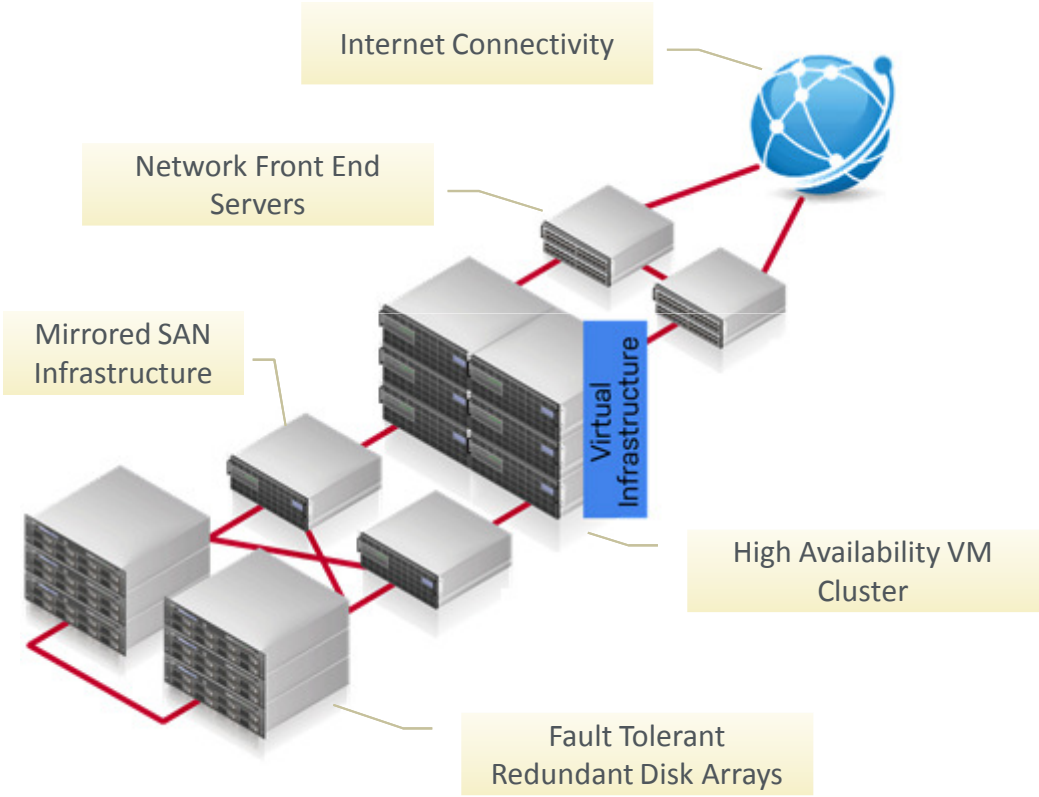
**COLOCATION**

**NETWORK**





# GEOCLOUD HARDWARE



Hardware	Profile
Virtual Machines	> 40 VM Cluster
CPU	~200 Cores
RAM	~300Gb
Network	200 Mbps shared

...and growing!

# GEOCLOUD IMAGERY PRODUCTS



The GeoCloud is a digital product distribution system: What Products?



## ORTHO PRODUCT 3A

- + **Monitoring Programs**
- + 5 m pixel size
- + 5 spectral bands
- + 25 x 25 km tile size
- + **GeoTiff Download**



## BASIC PRODUCT 1B

- + **RESA Program**
- + 6.5 m pixel size
- + 5 spectral bands
- + **GeoTiff Download**



## RAPIDEYE MOSAICS 3M

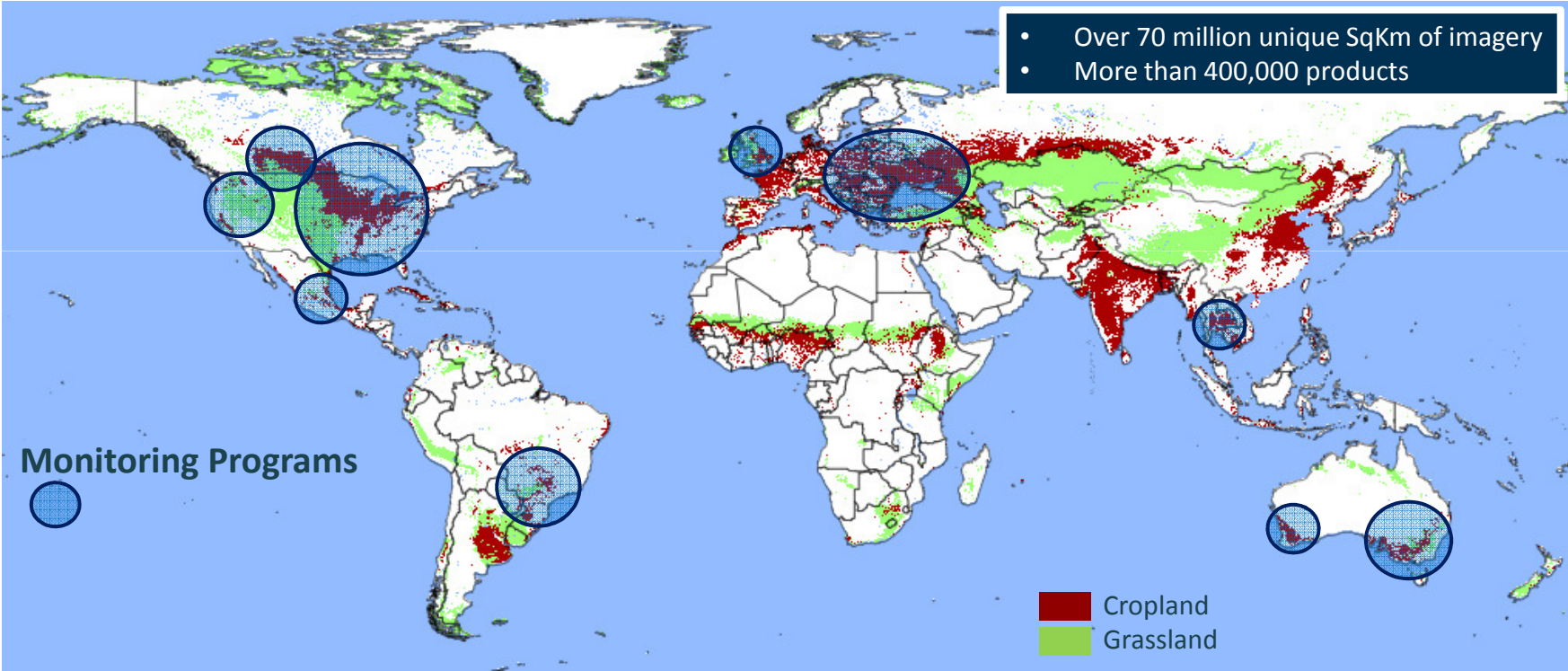
- + RGB true natural colors
- + 5m Resolution
- + ~25 Countries
- + Virtually cloud free
- + **WMS Stream**



## LANDSAT8 LT1 CO-REG\*

- + 30 m MS Bands
- + 15 m Pan Bands
- + TIRS
- + In AG Program AOIs
- + Co-registered w/ RE\*
- + **GeoTiff Download**

# RAPIDEYE MONITORING PROGRAMS

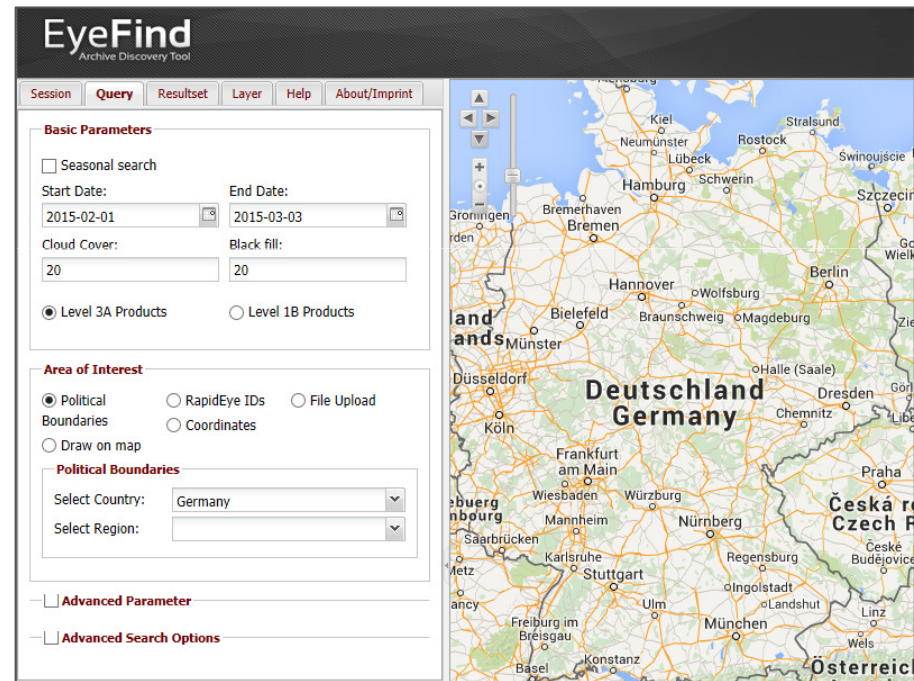


# GEOCLOUD CAPABILITIES



## Catalog Search

- EyeFind User Interface
- Catalog REST API
  - Search the full RapidEye archive
  - Preview images
  - Numerous search parameters
  - Use KML, KMZ or shapefiles

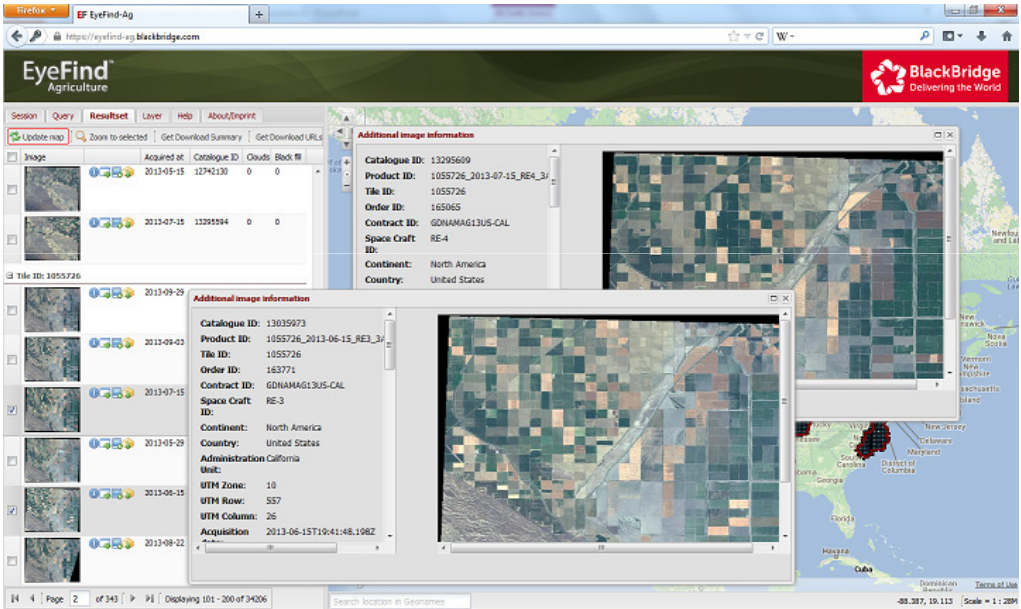


# GEOCLOUD CAPABILITIES



## Subscription Search

- EyeFind AG User Interface
- Catalog REST API
  - Search YOUR subscribed products
  - Self-serve product downloads
  - Anytime Access
  - New data every day



# GEOCLOUD CAPABILITIES



**Search  
API**

Programmatic  
query and retrieval  
of imagery

Search the full  
RapidEye catalog

Search and  
download  
subscribed  
products.

To download a zipped image product directly:

```
>>> import requests
>>> import cgi
>>> s = requests.Session()
>>> r =
s.get('https://geocloud.blackbridge.com/gcapi/getProduct?imgtype=re_3a&catid=1
streaming=True')
>>> if r.status_code == 200:
...     if r.headers.get('content-type') == 'application/zip':
...         _params = cgi.parse_header(r.headers.get('content-disposition'))
...         filename = params.get('filename')
...         with open(filename, 'wb') as f:
...             f.write(r.content)
...     else:
...         print r.text
... else:
...     print r.text
```

Query:

[https://eyefind-ag.blackbridge.com/rest/v1?  
toiStart=2012-07-01&  
toiEnd=2012-08-01&  
aoiType=pol&  
country=United States&  
admin=South Dakota&  
cc=5&  
imgType=itt](https://eyefind-ag.blackbridge.com/rest/v1?toiStart=2012-07-01&toiEnd=2012-08-01&aoiType=pol&country=United States&admin=South Dakota&cc=5&imgType=itt)

# GEOCLOUD USAGE



L3A Products	Traditional Pre-GeoCloud	Current Generation	Future Capabilities
Manual Communication	✓		
FTP Download or Media	✓		
Self Serve Access		✓	✓
UI Search and Download		✓	✓
API Search and Download		✓	✓
IaaS Co-location		✓	✓
Streaming Access			✓
Processing Platform			✓



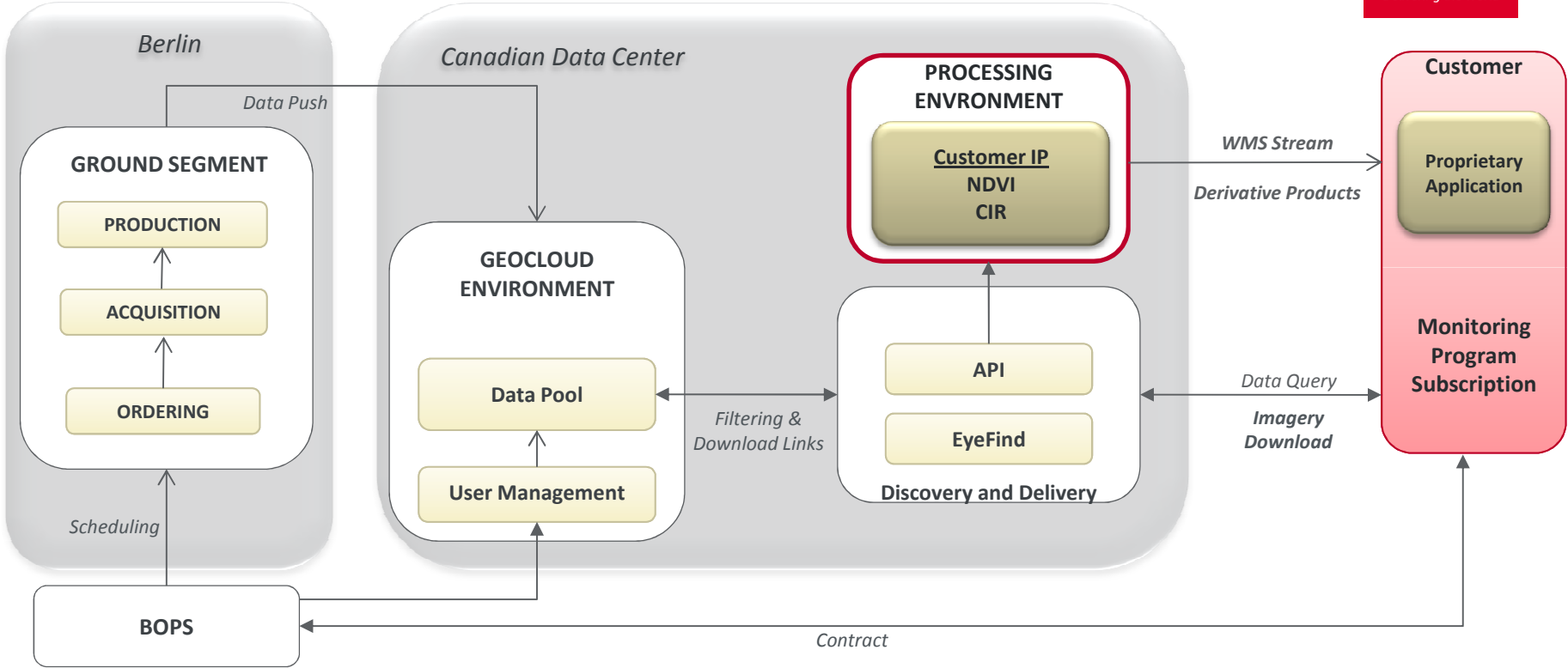
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# THANK YOU

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# GEOCLOUD IAAS USAGE



# GEOCLOUD ACCESS COMPARISON



Product Count (200mb ea.)	Manual Download Scenario (parallel)	Distribution over internet via REST API (concurrent)	Distribution to BlackBridge IaaS via REST API (concurrent)
10	50 minutes	6 minutes	7 seconds
100	8.3 hours	1 hour	7 minutes
1000	3.5 days	10 hours	70 minutes
10,000	34.7 days	4.1 days	11.6 hours
100,000	347 days	42 days	4.8 days

# GEOCLOUD SIGNIFICANCE

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Why is it important, where does it fit in?

It is a sales enabler:

- Access to vast quantities of imagery products
- On-demand access for customer work flows
- New business models

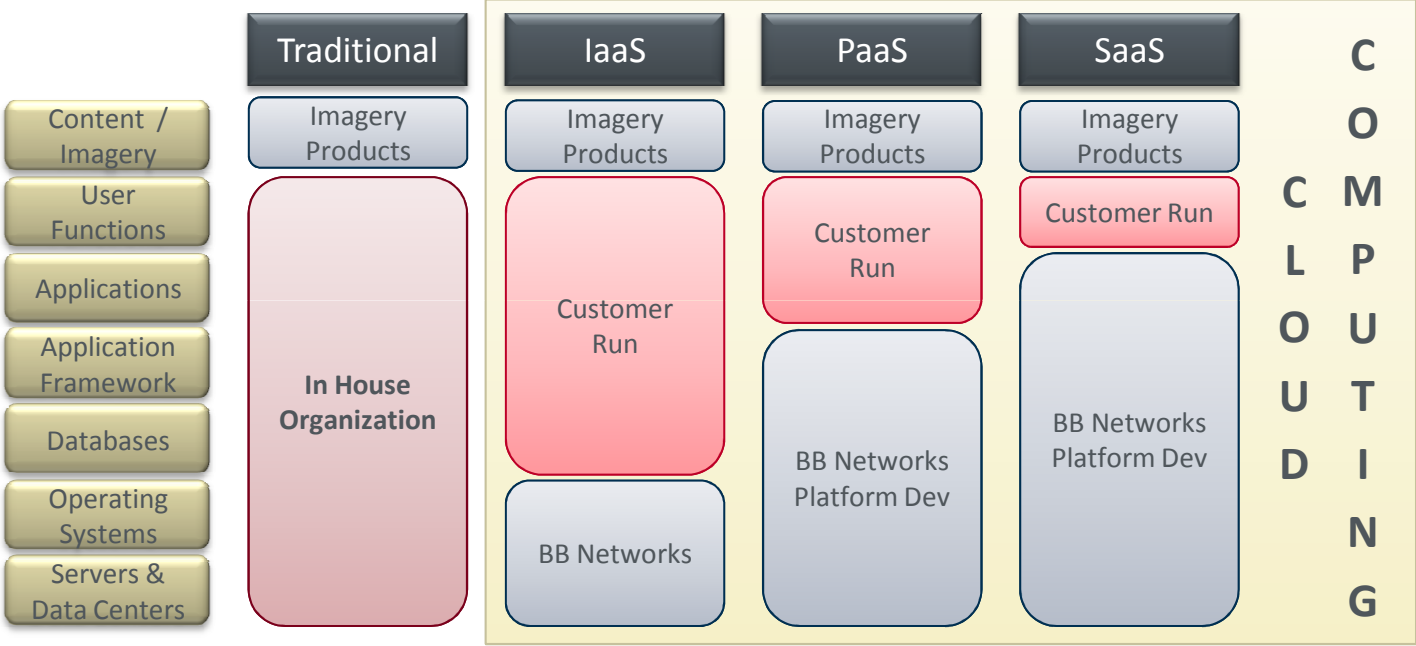
# VALUE PITCH

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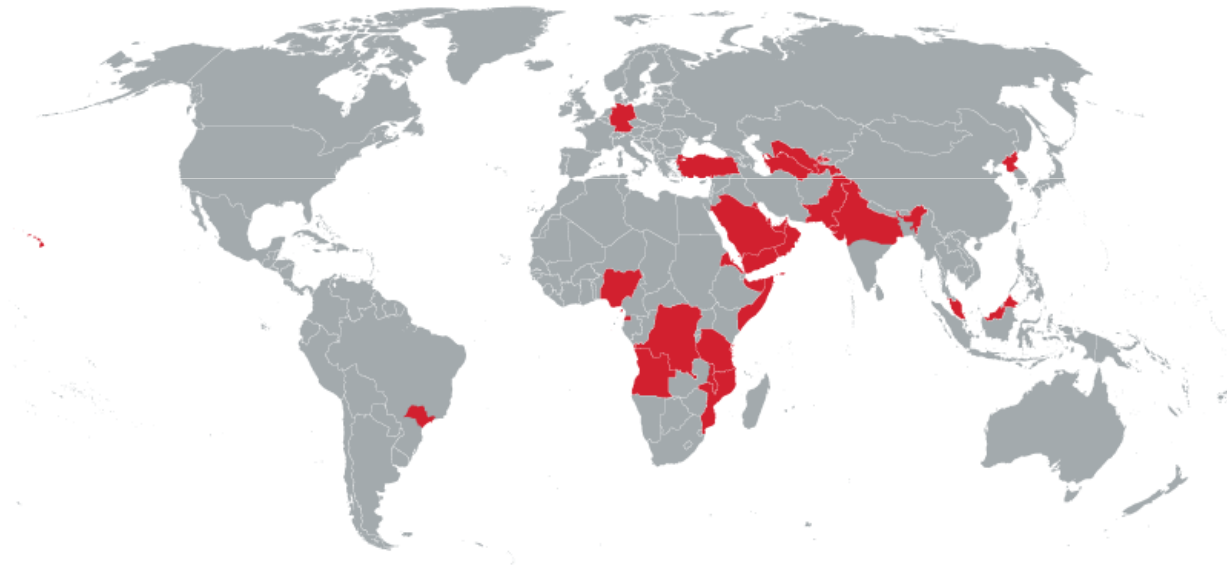
- Satellite imagery is big data. Data acquisition, storage, management, and distribution for large imagery collections is non-trivial.
- Technology limitations, budgetary constraints, and staffing are challenges in most organizations.
- A cloud based approach can overcome these obstacles, which have traditionally kept organizations from making optimal use of geospatial data. It allows customers to budget small expenses as opposed to large expenditures to build or maintain a similar system.
- BlackBridge has a core expertise in operating this type of infrastructure. You can focus on your core expertise: data and applications.

# BLACKBRIDGE GEOCLOUD



- IaaS Offerings
- API Access
- EyeFind+

# RAPIDEYE MOSAICS



 Angola »	 Bangladesh »
 Brazil, São Paulo State »	 Cameroon »
 Congo, DR »	 Equatorial Guinea »
 Eritrea »	 India, 22 states »
 Germany »	 Malawi »
 Malaysia »	 Mozambique »
 Nigeria »	 North Korea »
 Oman »	 Pakistan »
 Somalia »	 Tajikistan »
 Tanzania »	 Turkmenistan »
 Turkey »	 USA - Hawaii »
 Uzbekistan »	 Yemen »

# WHAT IS THE GEOCLOUD?



The GeoCloud product distribution system



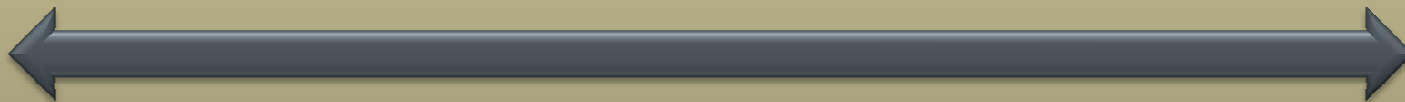
# WHAT IS THE GEOCLOUD?



The GeoCloud product distribution system



**Products:**  
**What it contains**





# WHAT IS THE GEOCLOUD?



The GeoCloud product distribution system

**Capabilities:  
What it does**