



# EDGE COMPUTING FOR HARSH & HAZARDOUS ENVIRONMENTS

Gautam Guin, December 2019

# WE ADDRESS TWO GAPS

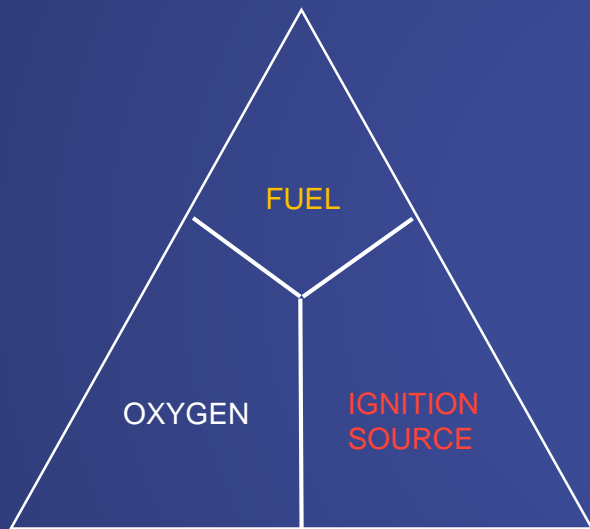
## CLOUD-NATIVE ADVANTAGE

Enabling companies to benefit from best of breed  
disruptive technologies and harness cloud and  
application lifecycles

## EDGE COMPUTING

Providing server-grade processing  
up to hazardous environments

# WHAT ARE HARSH & HAZARDOUS ENVIRONMENTS?



**Fire Triangle:** The presence of these three elements may cause an explosion

**Hazardous areas are defined as “any place in which an explosive atmosphere may occur”**

Atmosphere contains/may contain enough quantity of:

- Flammable or explosive gases
- Dusts
- Vapours
- Fibres or Flyings

## HAZARDOUS AREA CLASSIFICATION SYSTEMS:

- IEC ( International Electrotechnical Commission ) – Zone System
- NEC (National Electrical Code) - Class/Division System

# TYPICAL HAZARDOUS AREA INDUSTRIES

GASES & VAPORS	DUST
<ul style="list-style-type: none"><li>• Refineries</li><li>• Petrochemicals</li><li>• Wastewater (sewerage treatment)</li><li>• Pipelines &amp; distribution</li><li>• LNG plants</li><li>• Pharmaceuticals</li><li>• Chemicals</li><li>• Ore processing</li><li>• Industrial gases</li></ul>	<ul style="list-style-type: none"><li>• Food manufacturing</li><li>• Grain handling &amp; storage</li><li>• Chemicals/fertilizer</li><li>• Plastics</li><li>• Wood/pulp/paper</li><li>• Milk powder</li><li>• Flour mills</li><li>• Pharmaceuticals</li><li>• Metal processing</li><li>• Recycling operations</li><li>• Fiberglass manufacturing</li><li>• Explosive factories</li><li>• Mining</li></ul>

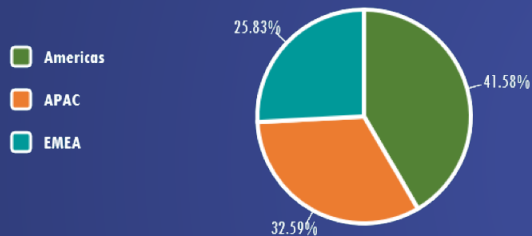


# **RUGGED SERVERS**

# APAC RUGGED SERVER MARKET

Significant and growing opportunities

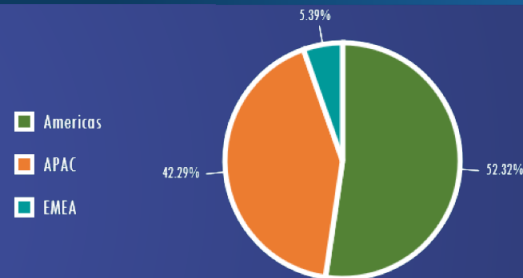
Market share by region 2017



4.38%

CAGR (2017-2022)

Contribution to growth by region (2017-2022)



Region	CAGR (2017-2022)	Opportunities (\$ mn)	
Americas	5.40%	821.78	1,068.70
		2017	2022
APAC	5.55%	644.10	843.70
		2017	2022
EMEA	0.98%	510.50	535.94
		2017	2022



# NEW OPPORTUNITIES ARE EMERGING AT THE EDGE

From industrial server  
as plant data  
collector/aggregator  
with connectivity challenges to...

Powerful Server at the Edge:

- ❖ Removes the two-tier architecture of data collection to data analysis
- ❖ Provides ability to analyze data real time at the edge with proximity to the source
- ❖ Removes bottleneck of multiple points of compute failure
- ❖ Through edge application reduces data volume transported and communication cost and complexity
- ❖ Provides scalability
- ❖ ML/Analytics develops smarter predictive maintenance



# EDGE SERVER USE CASES



## SMART PLANTATION

Managing environmental data and using analytics at remote site to help intelligent farming



## PLANT DIGITALISATION

Predictive smart maintenance and operation risk mitigation , defect inspection by analysing data gathered Real time through plant sensors.



## EMERGENCY RESPONSE

Using edge video analytics to provide rapid emergency response in smart cities



## EFFICIENT ENERGY

Wind farm using machine learning and edge analytics to drive wind turbine efficiency management in remote locations with no connectivity



## OPEN PROCESS AUTOMATION

Removing control function from legacy proprietary automation system to running control function software on general purpose servers



## POSITIONING SOLUTION

Workers' productivity and efficiency with behavioural edge analysis in harsh and hazardous environments



# HARSHPRO™ SERVER

Powerful ruggedized server for harsh environments



IP66  
Sealing



FCC/CE



Humidity/dust/  
corrosion resistant



Wideband temperature  
support up to 50°C+



Remote management  
ready



DC or AC  
power options



Storage/option  
flexibility



GPU/A.I. Core Cards  
for M.L./A.I.



- Intel® Xeon® processor-based server
- Servers can be placed in Rugged, IP-rated conditions with no IT admin required to be on site
- Mini Data Centre at the edge with unparalleled Memory and Storage to process data
- Edge Analytics and ML/AI engine with AI/GPU core
- Optimized for cloud-native, localized cloud functionality and application containerization

# EDGE SERVER TARGET MARKETS



## TELCO

- Edge Computing
- Mini Data Centre
- Emergency Response In City (Vehicle Informatics)



## ENERGY

- Wind Farms (Wind Turbine)
- Pipelines & field assets



## MARINE

- Fleet onboard applications



## O&G UPSTREAM

- Machine Learning
- Prescriptive Analytics
- Schlumberger
- Haliburton



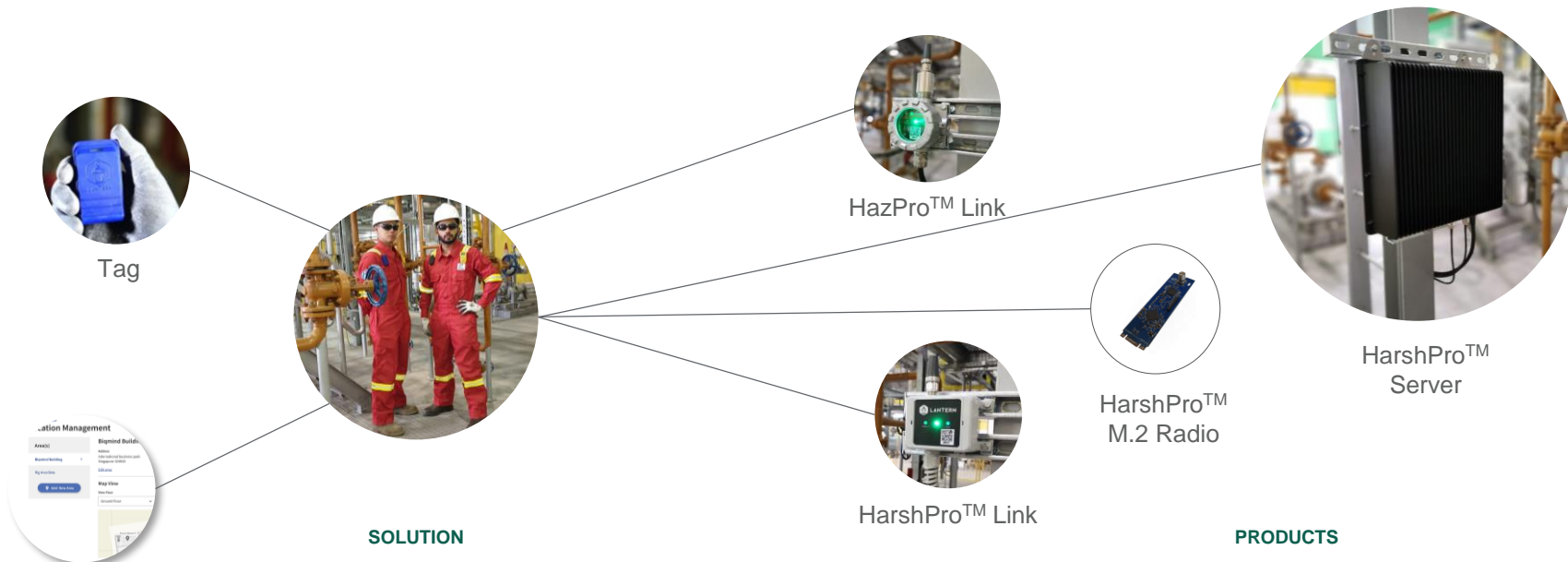
## INDUSTRIAL IIOT & AUTOMATION

- Siemens Mind Sphere
- Honeywell
- Schneider
- Emerson



# OVERVIEW

# LANTERNEGE PRODUCTS



Software



**LANTERN**

Safety & productivity solution  
for workers in harsh &  
hazardous environments



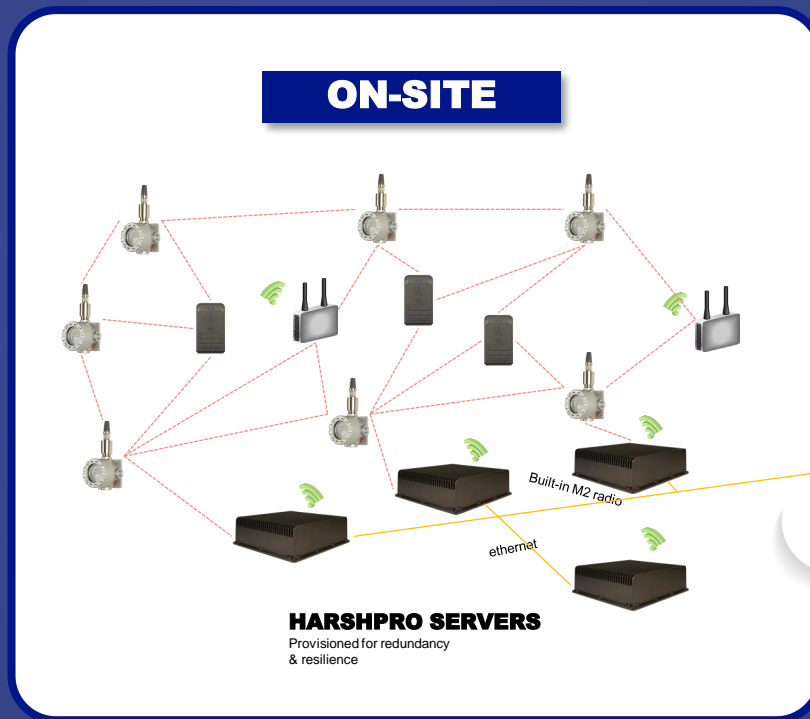
**HARSHPRO**



**HAZPRO**

Rugged enterprise grade  
hardware to support  
containerization, inference, or  
enterprise workloads in harsh  
environments on the edge

# LANTERN MESH NETWORK





# SOLUTION BUILDING BLOCKS



## HARSHPRO SERVER

- Ruggedized: weatherproof and wide operating temperature range with IP66 sealing
- Passive cooling design – fanless, no moving parts
- Data center-level hardware without the associated cooling infrastructure
- Enterprise grade Intel Xeon D processor with GPU accelerator options available
- KVM-over-IP, IPMI or Redfish for remote management
- Multiple connectivity options



## LANTERN LINK

- Certification target: flameproof enclosure with intrinsically safe RF output
- Flexible power options: external battery, Ex rated solar, DC supply
- Temporary, standalone, permanent installations with no cabling
- LED indicators to indicate errors and events like low battery status
- Over-the-air firmware updates



## LANTERN TAG

- Certification target: IECEx Zone 0. Ex 'ia' Intrinsically Safe
- Internal, rechargeable battery with up to 30-day operating life
- Wireless charging
- LED indicators to indicate errors and events like low battery status
- Over-the-air firmware updates



# LANTERN POSITION SOLUTION: ADDRESSING SAFETY & PRODUCTIVITY



## Increased Safety

- Accurate safety mustering drills
- Improve site situational awareness
- Identify last known position in emergencies
- Speed up emergency response times
- Measure and minimize risky behaviour with geofencing



## Improved Productivity

- Reduce plant down time with automatic head count during safety mustering
- Ensure right skilled workers are within designated sites
- Monitor working hours
- Accelerate compliance drills (muster / HOB)

# LANTERN BENEFITS



## ROBUST

- Increased redundancy with self-forming, healing mesh network
- Reduced installation time and cost, only power wiring required
- Tags have rechargeable batteries
- Tags and Links can be updated over the air for new or custom functionality
- The reliability of cloud based software is extended to remote locations, no internet connection required



## FLEXIBLE

- Links offer flexible power options - DC, battery, solar
- Antennas can be reconfigured depending on site conditions or requirements
- System designed for permanent or temporary installation
- Temporary installation perfect for turn-arounds, short-term projects, emergencies



## SCALABLE

- Support for multiple radio protocols built in to hardware
- Software support for standalone networks
- Support for customization built in to software

# MESH NETWORK OPPORTUNITIES

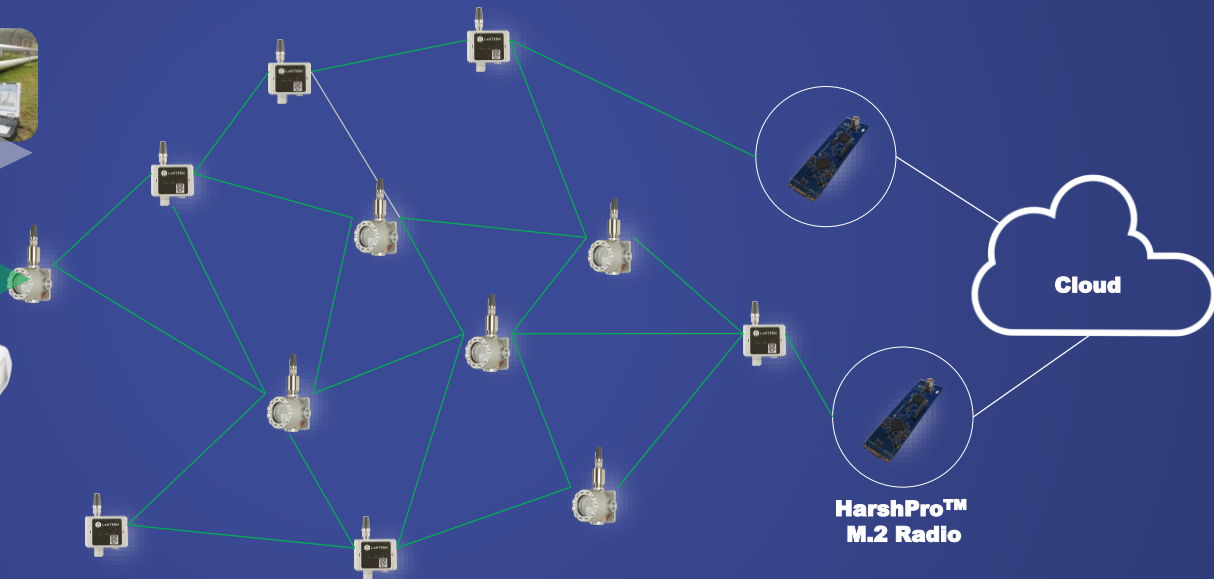
**New  
Applications**



**Lantern  
Software**



**Device  
Hardware**



**Wireless Mesh Network**

# LANTERN BUSINESS MODEL

## SYSTEM COMPONENTS

- **Hardware:**  
Tags, links, gateways, servers, charging stations, cloud infrastructure
- **Software:**  
Positioning software
- **Support:**  
L1 to L3 onsite and off-site support and warranty

### AS A SUBSCRIPTION

Installation/Configuration  
+  
per User per Month

*USD\$1-3 per Tag/per day*

OR

### AS A SYSTEM

Upfront for Hardware/Software  
+  
Installation/Configuration  
+  
Support

*USD\$150-450 per Tag/3 years*

# LANTERN TARGET MARKETS



## OIL & GAS

- Exploration and Production
- Midstream (Storage and Distribution)



## PROCESS INDUSTRIES

- Chemicals
- Waste Water
- Pulp & Paper
- Refining
- Petrochemicals
- Pharmaceuticals



## MARINE

- Shipyard
- Port
- Docks
- Shipbuilders



## MINING

- Opencast\*
- Underground\*



## HEAVY ENGINEERING

- Automotive
- Industrial manufacturing plants

# SOFTWARE EXTENSIBILITY

Software allows users to extend solutions from emerging requirements:

- Compose new apps and services without development resources
- Custom map data sets – indoor & outdoor
- Facial recognition for tag to worker separation identification & Intruder detection
- Easily customize software features to meet your needs
- Integrate and utilize data from 3rd parties:



Facial  
Recognition



Weather  
APIs



Instruments/  
sensors



Fire & Gas  
systems



Process control  
or SIS systems



Security  
systems



# KEY TAKEAWAYS



## LANTERN POSITIONING SOLUTION

- Programmable intrinsically safe battery powered tags provide constant updates on worker position
- Harsh and Hazardous area rated Links create a self-forming and self-healing mesh network
- Fanless Intel® Xeon® D powered server communicates with private mesh network and hosts Lantern software
- Built in software framework powering IT & OT anywhere including proprietary mapping software and robust edge data computing platform for other usage models and applications



## INCREASE EFFICIENCY & OPTIMIZE SAFETY

- ✓ Improve incident prevention measures & Risk mitigation
- ✓ Achieve higher level of safety



## OPEN HYBRID PLATFORM

- ✓ No vendor or infrastructure technology lock-in
- ✓ Enables additional business solutions
- ✓ Multiprotocol support at hardware & software layers
- ✓ Site-specific and distributed cloud



# **BIQMIND CLOUD-NATIVE TOOLS**



Cluster

Backup

Restore

Manage Components

Account Settings

User Management

Biqmind Guide Log Out

## Cluster<sup>(5)</sup>

Search Cluster e.g. sandbox



Cluster Name	Provider		Backup
amazonec2	aws-ec2	3 Nodes asiapacific	No backups NA
amazoneks	aws-eks	3 Nodes asiapacific	No backups NA
azure	azure	NA singapore	No backups NA
azureaks	azure-aks	1 Nodes asiapacific	No backups NA
googlegke	google-gke	1 Nodes asia	No backups NA

# BIQMIND CAPE

Software to simplify container  
workload deployment across multiple  
Kubernetes' clusters

<https://vimeo.com/360804136>

# BIQMIND CAPE – BENEFITS



## Multi-cluster Deployment

UI-driven automation of multi-cluster application deployment dramatically reducing user workload



## Traffic Management

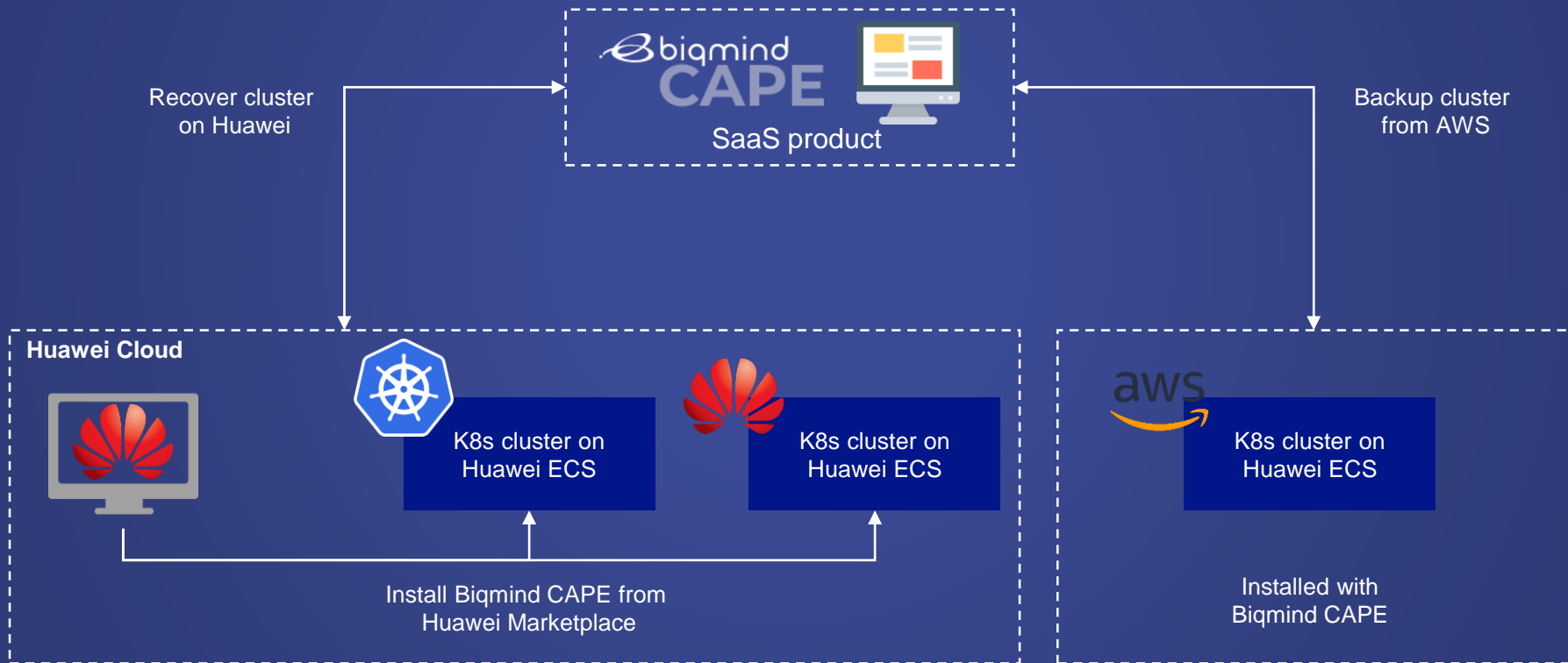
Intelligent DNS orchestration layer for cross-cluster traffic routing, geo load balancing and ratio routing



## Disaster Recovery

UI-driven configuration of standard disaster recovery operations for set up, backup and restore

# BIQMIND CAPE – DISASTER RECOVERY



# ABOUT US



Established in 2018  
and Headquartered  
in Singapore



Enable Use of  
Progressive Technologies  
/ Development Approaches



Accelerate  
Transformation through  
Our Solutions



Bridge Expertise  
and Resources  
Gap



# OUR PRODUCTS

Products to accelerate companies to cloud-native and solutions delivery at the edge



HARDWARE  
**SERVICES FOR  
HARSH &  
HAZARDOUS  
ENVIRONMENT**



SOLUTION  
**LANTERN  
POSITIONING**



SOFTWARE  
**BIQMIND  
CLOUD-NATIVE  
TOOLS**



SERVICES  
**BIQMIND  
SPECIALIST  
SERVICES**



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**THANK YOU**

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