

**Accelerate Adoption of Innovation to Enhance Public Services**

# **Improving Government Financial Services with Data Analytics**

**Alan Lee @ OGCIO 14 Dec 2021**

Q4 2021

**RISKSIS**  
Your Trusted Partner

# Demo & Presentation Agenda

Partner in Data Intelligence

## Contents

About RISKSIS	1
Improving Government Financial Services with Analytics	2
Blockchain and its Potential with Government	3

## Use Cases:

### AI Analytics for Public Services Workflow

- ✓ Public Services Document Workflow Automation
- ✓ Application Document Form Reading
- ✓ Verification and Checking across document
- ✓ Document (Form/PDF) Information Retrieval
- ✓ Reading Comprehension
- ✓ Knowledge Management AI

**MAERSK LINE**  
RFC GHE092502HK5

**BILL OF LANDING FOR PORT TO PORT SHIPMENT**

Shopper (Complete Name And Address)  
Shenzhen Shidong Trade Co., Ltd.  
Phoenix Road, Luohu district, Guangdong  
Shenzhen city, China  
Telephone and fax: 086-755-36923875

Packing List No.: 219618043-1

Freight And Charges Payable By:  
Shipper  
at shen zhen /Guangdong

Bill of Lading No.:  
SSOF090406718

Terms Of Sale:  
FOB (2010)

Consignee (Complete Name And Address)  
Aljejad FC S.A.S - Aptdo Postal 20659  
Carrera 100 S-39 - Cali - Valle - Colombia  
Telephone and email: 059-032-4491451 -  
aljejad@aljejad.com

Number of Original Bill of Lading Issued: **Three (3)**

Place and date of issue: **15 - August - 2018**  
**Shen zhen / China**

For Release Of Shipment, Please Contact:

Buyer ABC promised to pay Seller DEF with an amount of HKD\$ 3000 on 2 March, 2019. The invoice number is 32408329.

Field	Value
Buyer	Buyer ABC
Seller	Seller DEF
Amount	3000
Date	2 March, 2019
Invoice #	32408329

Instead of inserting the whole string to database, we retrieve field-level keywords into database for more accurate processing.

## Use Case 2:

### Blockchain Authentication for E-Licensing

- ✓ E-Licensing / Public Services Workflow
- ✓ Allow Mobility ; Ease to Use ; Highly Secure
- ✓ Identity Verification before Transaction; Audit History
- ✓ Act as Key Step in Workflow Process in Outdoor Environment; E-Document Exchange



# Improving Government Financial Services with Data Analytics

# Client References

## Financial Institutions

### AI - Entity Recognition Engine (Paper-to-Electronic Module)

#### Methodology:

Deep Learning – Big Data + Artificial Intelligence

#### Objective:

- Big Variety of Document format cause rule-based OCR recognition difficult
- AI is used to OCR, recognize paper text and automate the data entry

**Document Entity Recognition AI**

- Paperless World
- Reduce Your Operational Cost
- Faster
- Digitize your trade flow

**DEMO DATA**

MAERSK LINE  
RFC GHE092502HKS

Document Type: Bill of Lading

Num...	Field Name	Field Value	Confidence	Action
1	Shipper	Ailisheng Trade	90%	<input checked="" type="checkbox"/> <input type="checkbox"/>
2	Vessel	3	90%	<input checked="" type="checkbox"/> <input type="checkbox"/>

MAERSK

Shipper (Complete Name And Address)  
Shenzhen Ailisheng Trade Co., Ltd.  
Ailisheng Road, Luohu district, Guangdong  
Shenzhen city, China  
Phone and fax: 086-755-36922075

Shipper (Complete Name And Address)  
S.A.S - Aptdo Postal 28059  
Calle 100 5-39 - Cali - Valle - Colombia  
Phone and email: 059-032-4491451 -  
jsrad@hotmail.com

Notify Party (Complete Name And Address)  
as consignee

Place of Receipt:  
Shen Zhen / China

Port Of Loading:  
Shanghai / China

Place of Delivery:  
Buenaventura / Colombia

Port Of Discharge:  
Buenaventura / Colombia

Total No. Of Containers/Package Received By The Carrier: 1 / 0

For Transshipment  
To: Maersk Line

Vessel/Voyage:  
CSCL LE HAVRE / 0029W

Marks And Numbers	No. of PKGS	Description of Packages And Goods	Gross Weight	Measurement
steel Dry Cargo	500 packages	500 units of 15.6 inch laptop with core i7 8GB RAM, in 6 pallets	1650 Kg	100 %

- Image Recognition
- Textual Analytics
- Document Classification
- NLP

銀行業  
文件自動化AI項目

節省90%工作時間

# Challenge: Automation of Public Services Document I

## Public Services AI Analytic Strategy

Alan Lee

alan.lee@risksis.com

Tel: 60516869

### Document Strategy Outlines

#### Objective – Automation of Public Services Document Reading

In public services, after document submission, processing involves a lot of data entries.

#### Form Conversion - OCR

Handwritten Form Recognition

Document Classification

Email Classification

Information Retrieval

Free Text Q & A

Similar Text Matching

Textual Summarization

Sentiment Analysis

Knowledge Graph Analysis

High Speed Textual Searching

Robotic Process Automation

Business Intelligence

Reading Envelop Text

Email Outlook/Exchange Integration

Table 5. Financial position as at 31 December 2016 (all funds)  
(in thousands of CAD)

	2016	2015
<b>ASSETS</b>		
<b>CURRENT ASSETS</b>		
Cash and cash equivalents	392 172	379 436
Assessed contributions receivable from Member States	3 992	6 822
Receivables and advances	19 858	21 065
Inventories	513	753
Others	1 747	2 111
<b>SUB-TOTAL</b>	<b>418 282</b>	<b>410 187</b>
<b>NON-CURRENT ASSETS</b>		
Assessed contributions receivable from Member States	4 551	5 022
Receivables and advances	280	354
Property, plant and equipment	3 017	2 438
Intangible assets	793	866
	8 641	8 680
<b>TOTAL ASSETS</b>	<b>426 923</b>	<b>418 867</b>
<b>LIABILITIES</b>		
<b>CURRENT LIABILITIES</b>		
Advanced receipts	312 594	320 324
Accounts payable and accrued liabilities	29 646	27 871
Employee benefits	8 301	7 227
Credits to contracting/servicing governments	1 465	1 674
<b>SUB-TOTAL</b>	<b>352 006</b>	<b>357 096</b>
<b>NON-CURRENT LIABILITIES</b>		
Employee benefits	142 395	149 102
	142 395	149 102
<b>TOTAL LIABILITIES</b>	<b>494 401</b>	<b>506 198</b>
<b>NET ASSETS</b>		
Accumulated deficit	(52 759)	(56 544)
Reserves	(14 719)	(30 787)
<b>NET ASSETS (Net accumulated deficit)</b>	<b>(67 478)</b>	<b>(87 331)</b>
<b>TOTAL LIABILITIES AND NET ASSETS</b>	<b>426 923</b>	<b>418 867</b>

Financial Statement

2014-2015  
Proof of Other Income Form

This form is used to provide information about other income received by you or your spouse or common-law partner during the tax year.

Other Income: \$

Other Income Description: \_\_\_\_\_

Other Income Date: \_\_\_\_\_

Other Income Amount: \_\_\_\_\_

Other Income Frequency: \_\_\_\_\_

Other Income Source: \_\_\_\_\_

Other Income Contact Information: \_\_\_\_\_

Income Proof

Government Application Form

Application Number: \_\_\_\_\_

Applicant Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_

Province: \_\_\_\_\_

Postal Code: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Sex: \_\_\_\_\_

Marital Status: \_\_\_\_\_

Education: \_\_\_\_\_

Occupation: \_\_\_\_\_

Annual Income: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Government Application Form

MAERSK  
BILL OF LADING  
FOR SHIPMENT

Shipment Details: \_\_\_\_\_

Consignee: \_\_\_\_\_

Place of Receipt: \_\_\_\_\_

Place of Delivery: \_\_\_\_\_

Number of Packages: \_\_\_\_\_

Weight: \_\_\_\_\_

Volume: \_\_\_\_\_

Value: \_\_\_\_\_

Incoterms: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Bill of Lading

DELIVERY NOTE

Customer Reference: \_\_\_\_\_

Delivery Address: \_\_\_\_\_

Delivery Date: \_\_\_\_\_

Number of Packages: \_\_\_\_\_

Weight: \_\_\_\_\_

Volume: \_\_\_\_\_

Value: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Delivery Note

# Solution: Document Form Reading

## Public Services AI Analytic Strategy

Alan Lee

alan.lee@risksis.com

Tel: 60516869

### Objective

Read textual data from paper or image format

### How it works

**Step 1:** We can use scanner paper form to electronic image

**Step 2:** We can use AI OCR to retrieve the textual data from the image

**Step 3:** Export to CSV. Or Import to Database

Data can be retrieved successfully from the form.

Field	Value
Shipper	ShenYang Ali Trade Co. Ltd. Phoneis Road, Loubu District, GuangDong
Consignee	Carrarea E100 5-39, Cali – Valle – Columbia Telephone and Email: 059-032-4491451
Packing List No.	219618043-1
Place and Date of Issue	13 – August, 2010

MAERSK LINE  
RFC GHE092502HKS

BILL OF LADING  
FOR PORT TO PORT  
SHIPMENT

Shipper (Complete Name And Address) ShenYang Ali Trade Co. Ltd. Phoenix Road, Luobu district, Guangdong Shenzhen city, China Telephone and Fax: 086-755-36923075	Packing List No.: 219618043-1	Bill of Lading No.: SSOF090406718
Consignee (Complete Name And Address) Alejeand Pc S.A.S - Aptdo Postal 28059 Carrera 100 5-39 – Cali - Valle - Colombia Telephone and email: 059-032-4491451 - alejeand@alejeand.com	Freight And Charges Payable By Shipper at shen zhen /Guangdong	Terms Of Sale: FOB (2010)
	Number of Original Bill of Lading Issued: Three (3)	
	Place and date of issue: 13 – August – 2010 Shen zhen / China	
	For Release Of Shipment, Please Contact:	

Sentiment Analysis  
Knowledge Graph Analysis  
High Speed Textual Searching  
Robotic Process Automation  
Business Intelligence  
Reading Envelop Text  
Email Outlook/Exchange Integration

# Solution: Automatic Document Classification

## Public Services AI Analytic Strategy

Alan Lee

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### Document Strategy Outlines

Form Conversion - OCR

Handwritten Form Recognition

#### Document Classification

Email Classification

Information Retrieval

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### Objective

**Classify documents based on content** (such as “Government Permit Application Form”, “Income Proof”, “Bill of Lading”, “Sales & Purchase Agreement”, “Lease Agreement”, “Invoice”, and more )

### Client Example

**Our clients are using our technology to classify documents based on textual content.**



Bill of Lading



Lease Agreement



S&P Agreement



Certificate of Origin



LC Form



Mortgage Application

	Average Balance	Interest Expense	Wtd Avg Rate
<b>Starting Assets</b>			
Federal Public Debt and Securities	\$148,378	\$1,277	0.86%
Fixed Income Securities	\$148,281	\$1,473	1.00%
Cash	\$52,474	\$1,524	2.90%
Commercial	\$113,514	\$1,752	1.54%
Other	\$122,571	\$1,362	1.11%
Total Starting Assets	\$485,218	\$6,388	1.32%
Total Ending Assets	\$381,731	\$712	0.19%
Total Assets	\$866,949	\$6,700	0.77%
<b>Investment Holdings</b>			
Corporate	\$38,247	\$39	0.10%
Govt and Money Market	\$21,114	\$147	0.69%
CDs and Other Deposits	\$127,188	\$1,321	1.04%
Total Investment Holdings	\$186,549	\$1,507	0.80%
Federal Public Debt and Securities	\$133,818	\$880	0.66%
Fixed Income Securities	\$133,818	\$880	0.66%
Cash	\$133,818	\$880	0.66%
Commercial	\$133,818	\$880	0.66%
Other	\$133,818	\$880	0.66%
Total Ending Assets	\$381,731	\$712	0.19%
Total Assets	\$866,949	\$6,700	0.77%

Financial Statement

Invoice

# Solution: Automatic Information Retrieval

## Public Services AI Analytic Strategy

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### Document Strategy Outlines

- Form Conversion - OCR
- Handwritten Form Recognition
- Document Classification
- Email Classification
- Information Retrieval**
- Free Text Q & A
- Similar Text Matching
- Textual Summarization
- Sentiment Analysis
- Knowledge Graph Analysis
- High Speed Textual Searching
- Robotic Process Automation
- Business Intelligence
- Reading Envelop Text
- Email Outlook/Exchange Integration

### Objective

Retrieve Target Keywords from the free Text in the field

### Client Example

A Government department retrieves key information from a free text field

Buyer ABC promised to pay Seller DEF with an amount of HKD\$ 3000 on 2 March, 2019. The invoice number is 32408329.

Field	Value
Buyer	Buyer ABC
Seller	Seller DEF
Amount	3000
Date	2 March, 2019
Invoice #	32408329

**Instead of inserting the whole string to database, we retrieve field-level keywords into database for more accurate processing.**

# Challenge: Knowledge Management

## AI Q&A – Reading Comprehension

Alan Lee  
alan.lee@risksis.com  
Tel: 60516869

### Document Strategy Outlines

- Form Conversion - OCR
- Handwritten Form Recognition
- Document Classification
- Email Classification
- Information Retrieval

### Objective

User can ask AI question in Free-Text Question. The AI shall highlight and return the answer.

### Client Example

Public Utilities use this AI Q&A techniques to create a Knowledge Management System.

## Advanced AI NLP Techniques

Free Text Q & A  
Similar Text Matching



### Train routes at incident location

The normal routes of passenger trains passing through turnouts<sup>4</sup> P5116, P5114, P5111 and P5109 and turnouts P5116, P5114, P5112 and P5108 before entering Platform 1 and Platform 4 of Hung Hom Station of EAL, respectively, are shown in **Figure 3**. The incident train derailed just before entering Platform 1 at turnout P5116, which is located at a sharp curved track section on EAL. The speed limit of this section is 40 km/h. Each turnout consists of a point machine<sup>5</sup>, switch rails<sup>6</sup>, crossing<sup>7</sup> and two check rails<sup>8</sup>. The layout of a typical turnout is shown in **Figure 4**.

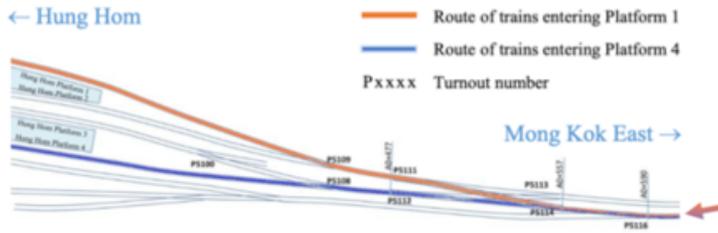


Figure 3 : Routes of trains entering Platform 1 and 4 of Hung Hom Station

Passage

The normal routes of passenger trains passing through turnouts 4 P5116, P5114, P5111 and P5109 and turnouts P5116, P5114, P5112 and P5108 before entering Platform 1 and Platform 4 of Hung Hom Station of EAL, respectively, are shown in Figure 3. The incident train derailed just before

Question

when did it derail?

Run >

Answer

just before entering Platform 1 at turnout P5116

Passage Context

The normal routes of passenger trains passing through turnouts 4 P5116, P5114, P5111 and P5109 and turnouts P5116, P5114, P5112 and P5108 before entering Platform 1 and Platform 4 of Hung Hom Station of EAL, respectively, are shown in Figure 3. The incident train derailed just before entering Platform 1 at turnout P5116, which is located at a sharp curved track section on EAL. The speed limit of this section is 40 km/h. Each turnout consists of a point machine<sup>5</sup>, switch rails<sup>6</sup>, crossing<sup>7</sup> and two check rails<sup>8</sup>. The layout of a typical turnout is shown in Figure 4.

# Solution: Knowledge Management System

## AI Q&A – Reading Comprehension

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### Document Strategy Outlines

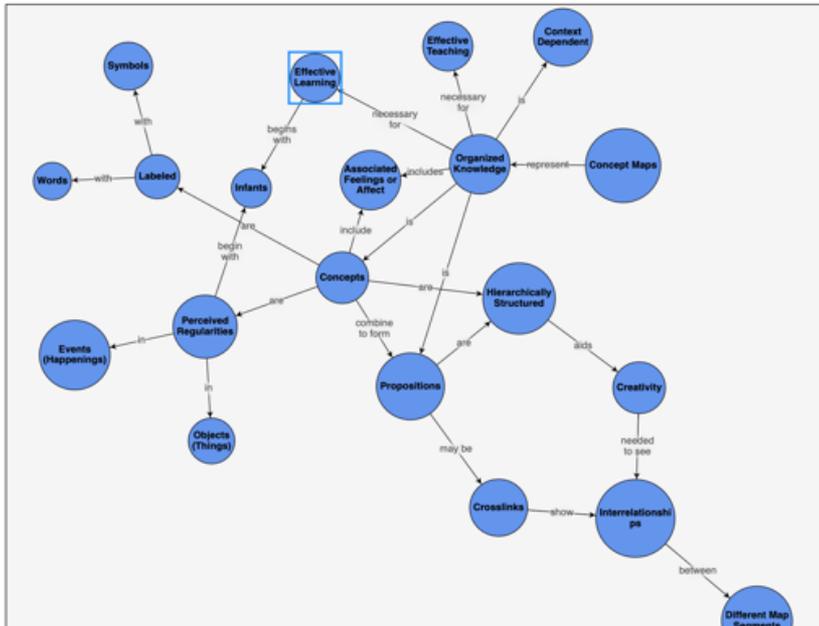
#### Objective

Finding similar events with similar attributes

Generation of correlation knowledge graph analysis

#### Client Example

A financial institutions (providing Account Receivables / Invoice Financing) use our services in corporate credit credit analysis, we generate root cause analysis and credit valuation. We generate knowledge graph analysis showing relationships between entities.



Form Conversion - OCR

Handwritten Form Recognition

Document Classification

Email Classification

Information Retrieval

Free Text Q & A

Similar Text/Content Matching

Textual Summarization

Sentiment Analysis

**Knowledge Graph Analysis**

High Speed Textual Searching

Robotic Process Automation

Business Intelligence

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# Blockchain and its Potential in the Government

# Advantage: E-License with Different Workflow

## Better than current paper workflow



**Blockchain Smart Contract server**

- ✓ Validate E-License Holder
- ✓ View All Transactions Related



**Block-chain Web in  
Government Server**



**E-License Holder**



Allow Different Workflow

- (1) Validate E-License  
(2) View Details



**Inspector**



**Blockchain Smart Contract server**

- ❖ Verify Invalid license
- ❖ Decline Public Service Operation



**Block-chain Web in  
Government Server**



**E-License Holder**



License Revoked  
/ Cancelled

- (1) Validate E-License



**Inspector**



# Advantage: Prevent Unauthorized Buyer to buy from dealer

## Better than current paper workflow



Blockchain Smart Contract server validates that: Buyer **has** valid license to buy Class I Item



Block-chain Web in Government Server



Restricted Item Buyer



**Permit Info:**

- Allow to buy Item Class I
- Not allow to buy Item Class II

Submit  
"Buy Class I Item"



Restricted Item Dealer



Blockchain Smart Contract server validates that: Buyer **do not** have valid license to buy Class II Item



Block-chain Web in Government Server



Restricted Item Buyer



**Permit Info:**

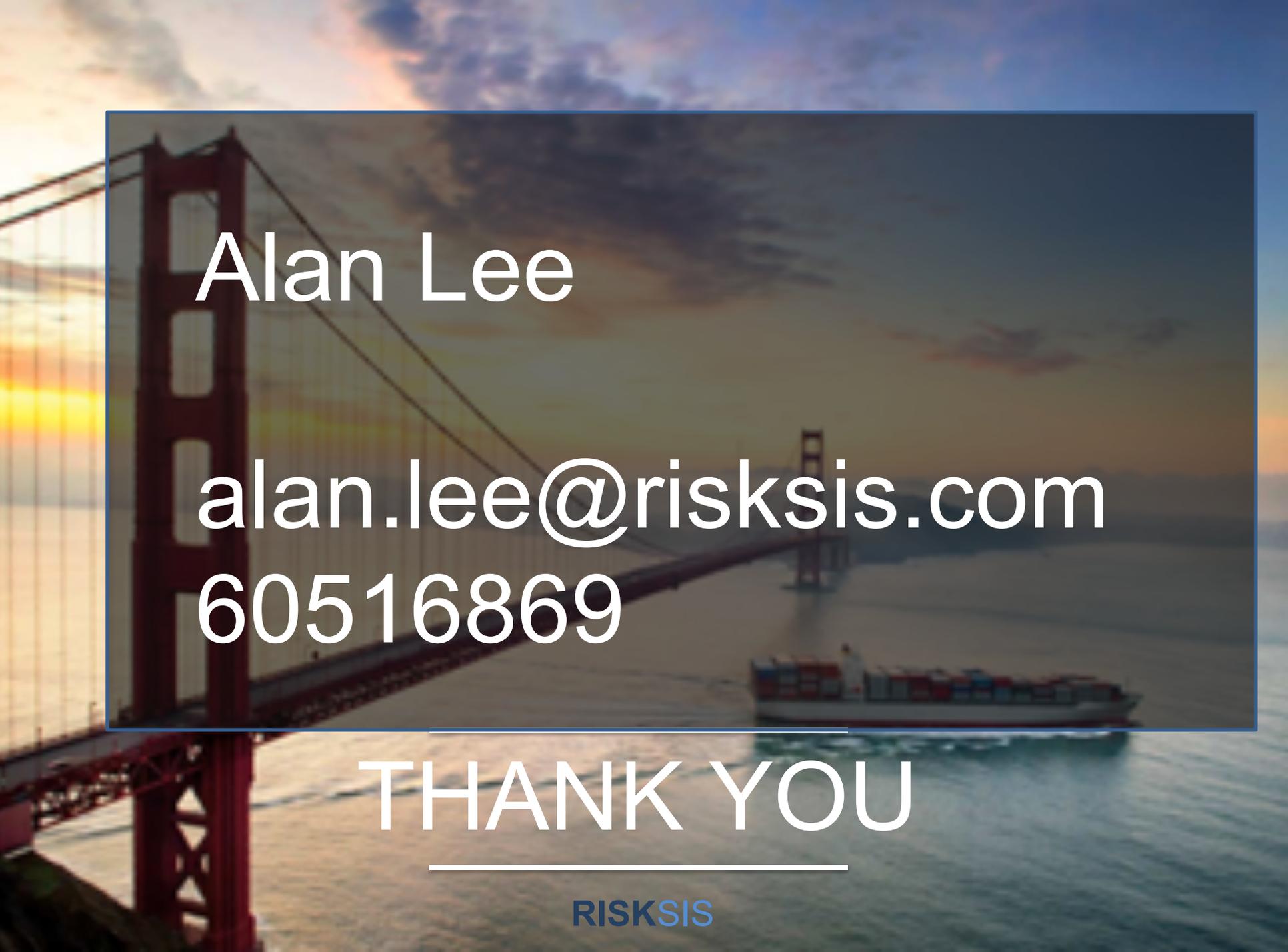
- Allow to buy Item Class I
- Not allow to buy Item Class II

Submit  
"Buy Class II Item"



Restricted Item Dealer



A photograph of the Golden Gate Bridge in San Francisco, California, taken during sunset. The bridge's red-orange towers and suspension cables are silhouetted against a sky with soft, colorful clouds in shades of orange, yellow, and blue. The water of the bay is visible in the foreground, with a large cargo ship sailing across it.

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THANK YOU

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RISKSIS