Sensing and Responding

Knowledge Discovery
and Alerting
in the Information Age

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Experience

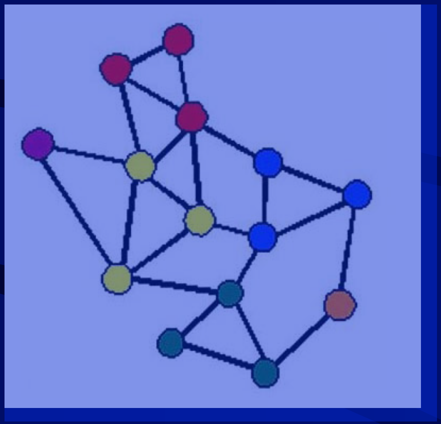
More than 35 years of experience in various aspects of information management and time-sensitive intelligence production activities, including:

- Access and collection
- Target analysis
- Data processing
- Content exploitation
- Encryption
- Software design and dev.

- Business process redesign
- Automation of Analysis
- Spiral development
- Operational prototyping
- Collaboration (technical)
- Systems analysis

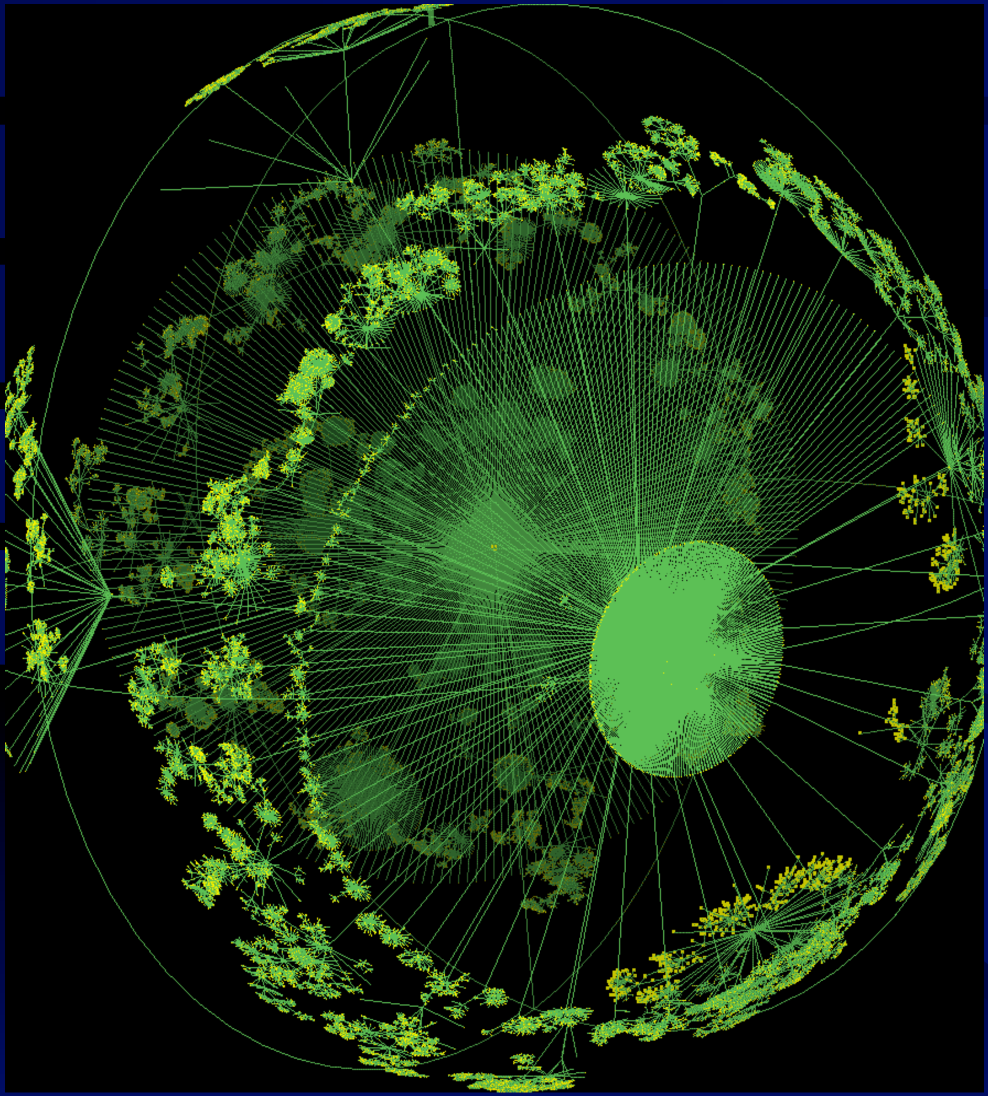
Entity Mapping Analysis Business Process (EMABP)

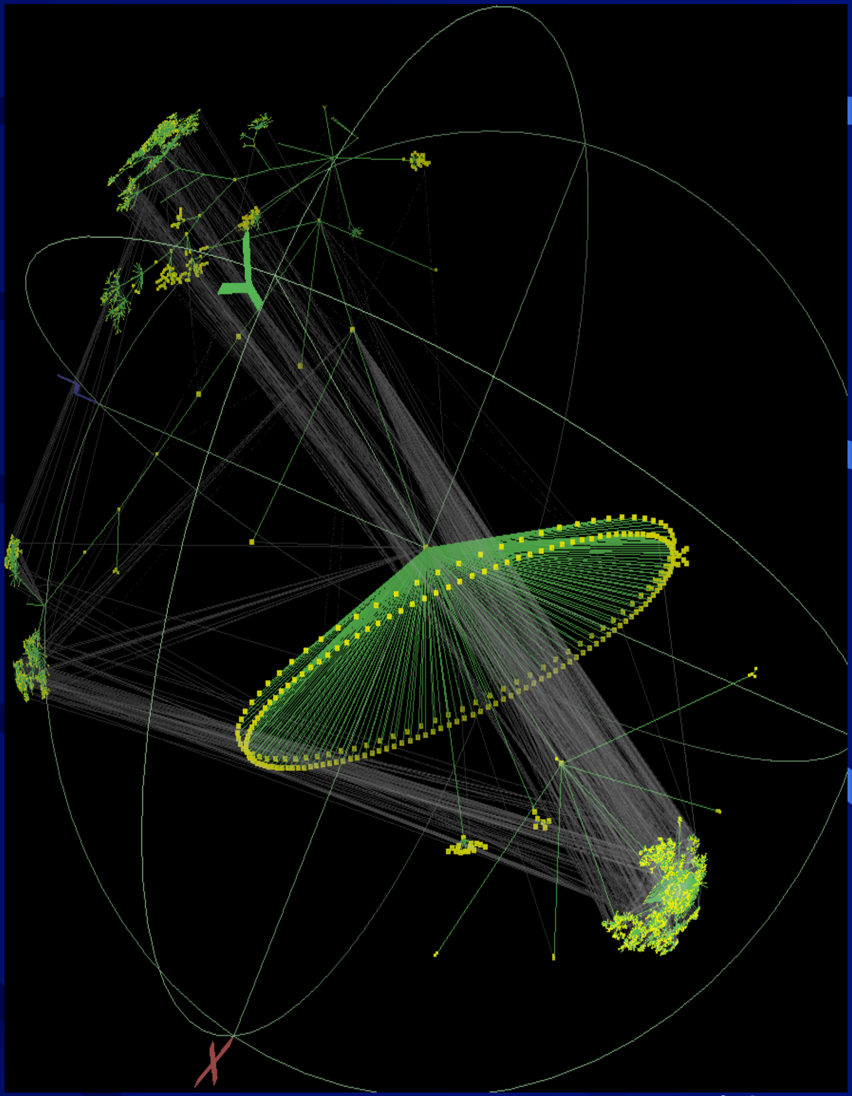
- An Enterprise Business Solution -



Producing Actionable Intelligence Within Massive Information Environments

The World-Wide Web: Challenge….and Opportunity

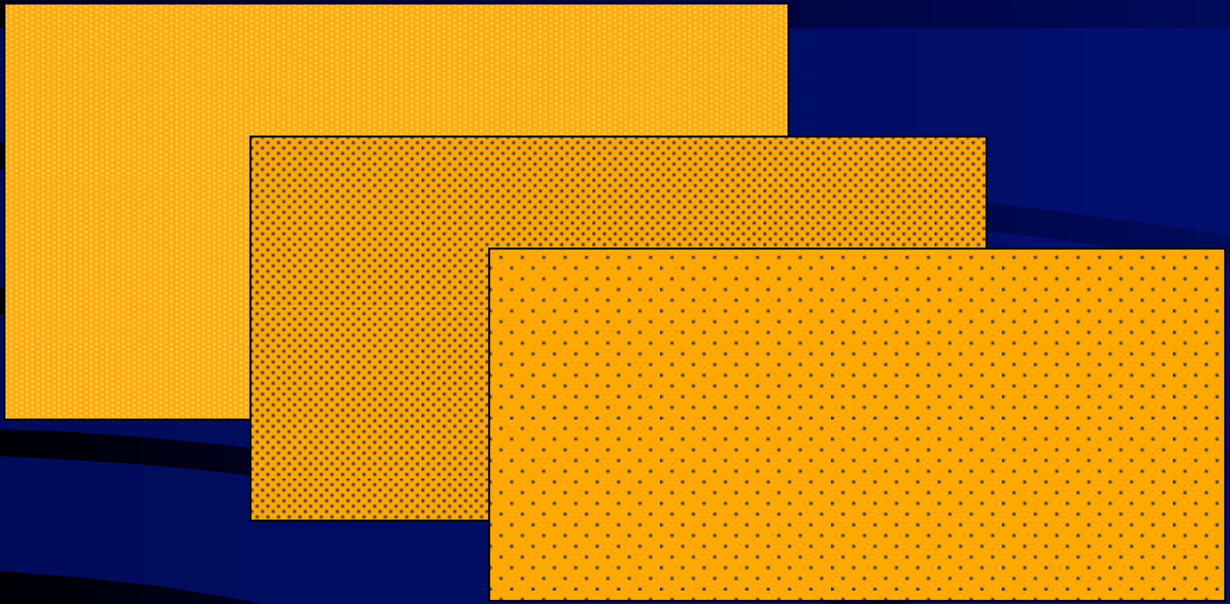




Intelligence from Data: Today’s Barriers

- Rapid knowledge discovery is virtually non-existent
- Lack of sharing and collaborative processes
- Massive information flows choke IT infrastructures
- Analysts waste time “prepping” information systems
- Inability to prioritize information
- Intelligence production is stove-piped and not seamless
- Data is typically corrupt or not ‘normalized’

Knowledge – Building in Massive Information Environments



Issue: Estimate 20 terabytes of unique multi-media information generated every minute world-wide

Challenge: Finding the ‘X’ Kb that answers the crucial question

Knowledge – Building in Massive Information Environments

From noise (data)…

To Significance…

…To Actionable Intelligence:

Terrorist group Alpha is shipping explosives from Yemen to New Orleans

Issue: Estimate 20 terabytes of unique multi-media information generated every minute world-wide

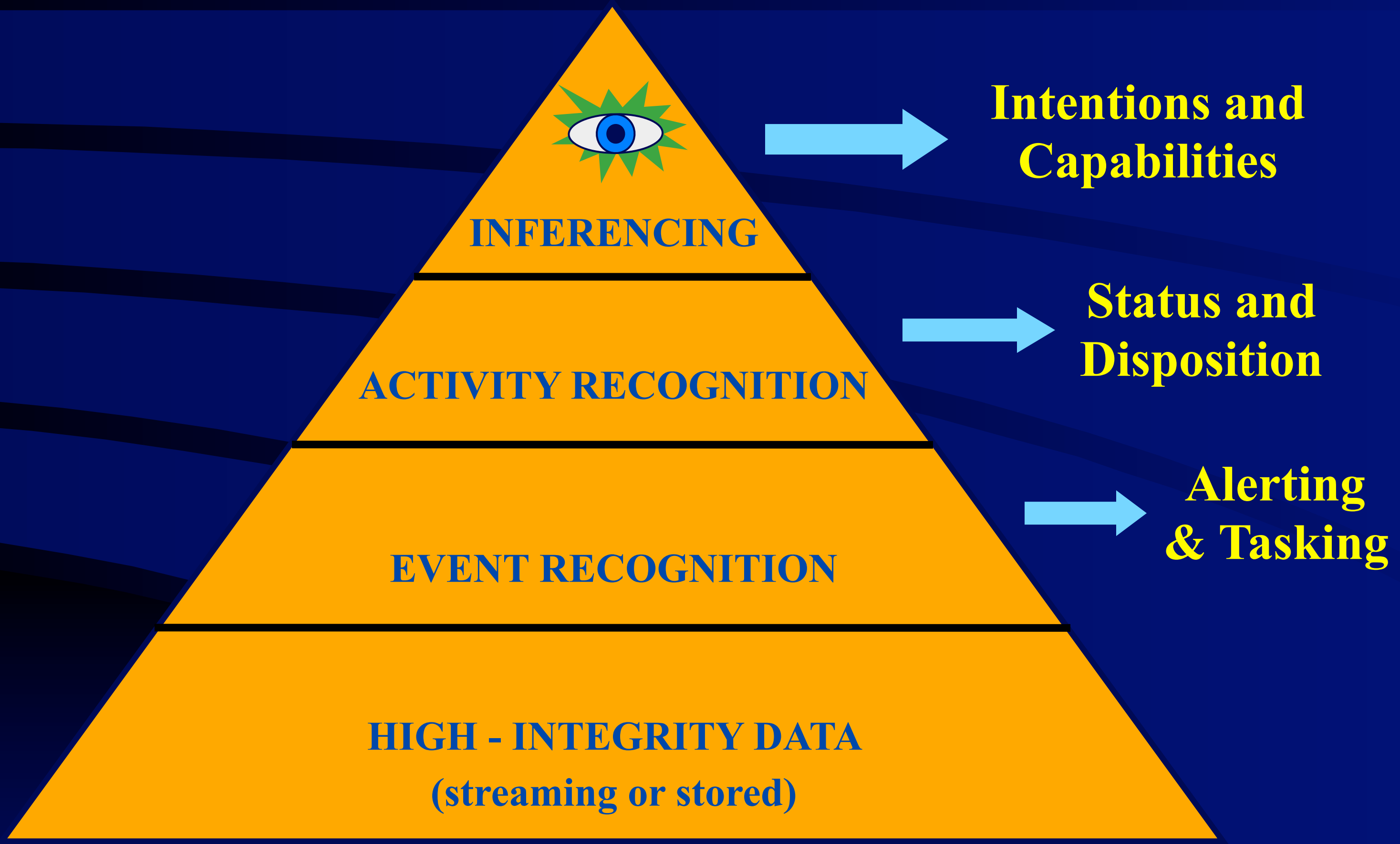
Challenge: Finding the ‘X’ Kb that answers the crucial question

Lessons Learned Long Ago…

It must be remembered that there is nothing more difficult to plan, more uncertain of success, nor more dangerous to manage than the creation of a new order of things. For the initiator has the enmity of all who would profit by the preservation of the old institutions, and merely lukewarm defenders in those who would gain by the new order.

—Machiavelli, *The Prince (1513)*

Knowledge Superiority



INFERENCING

ACTIVITY RECOGNITION

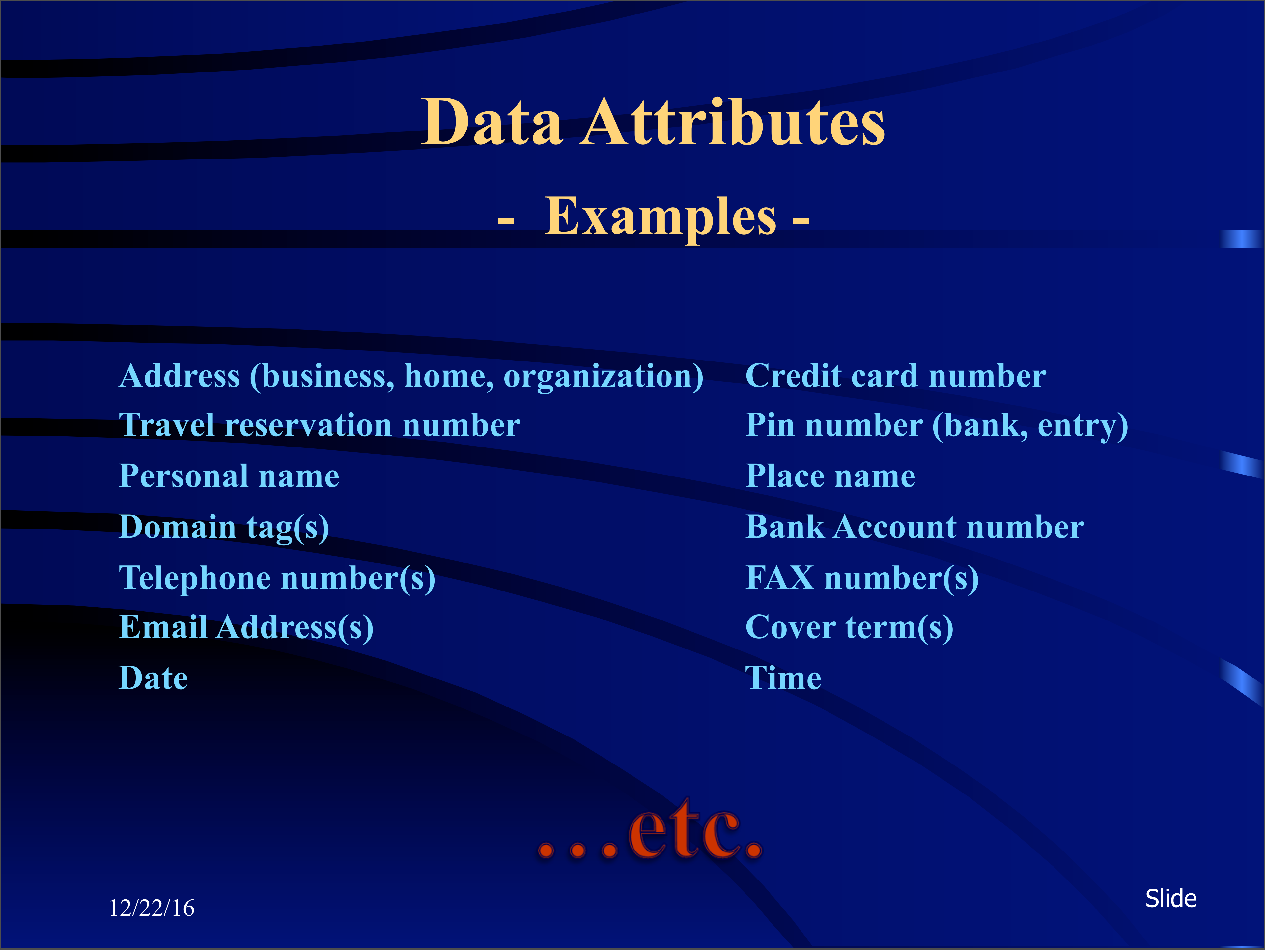
EVENT RECOGNITION

HIGH - INTEGRITY DATA (streaming or stored)

Intentions and Capabilities

Status and Disposition

Alerting & Tasking



Data Attributes

- Examples -

- Address (business, home, organization)
- Travel reservation number
- Personal name
- Domain tag(s)
- Telephone number(s)
- Email Address(s)
- Date
- Credit card number
- Pin number (bank, entry)
- Place name
- Bank Account number
- FAX number(s)
- Cover term(s)
- Time

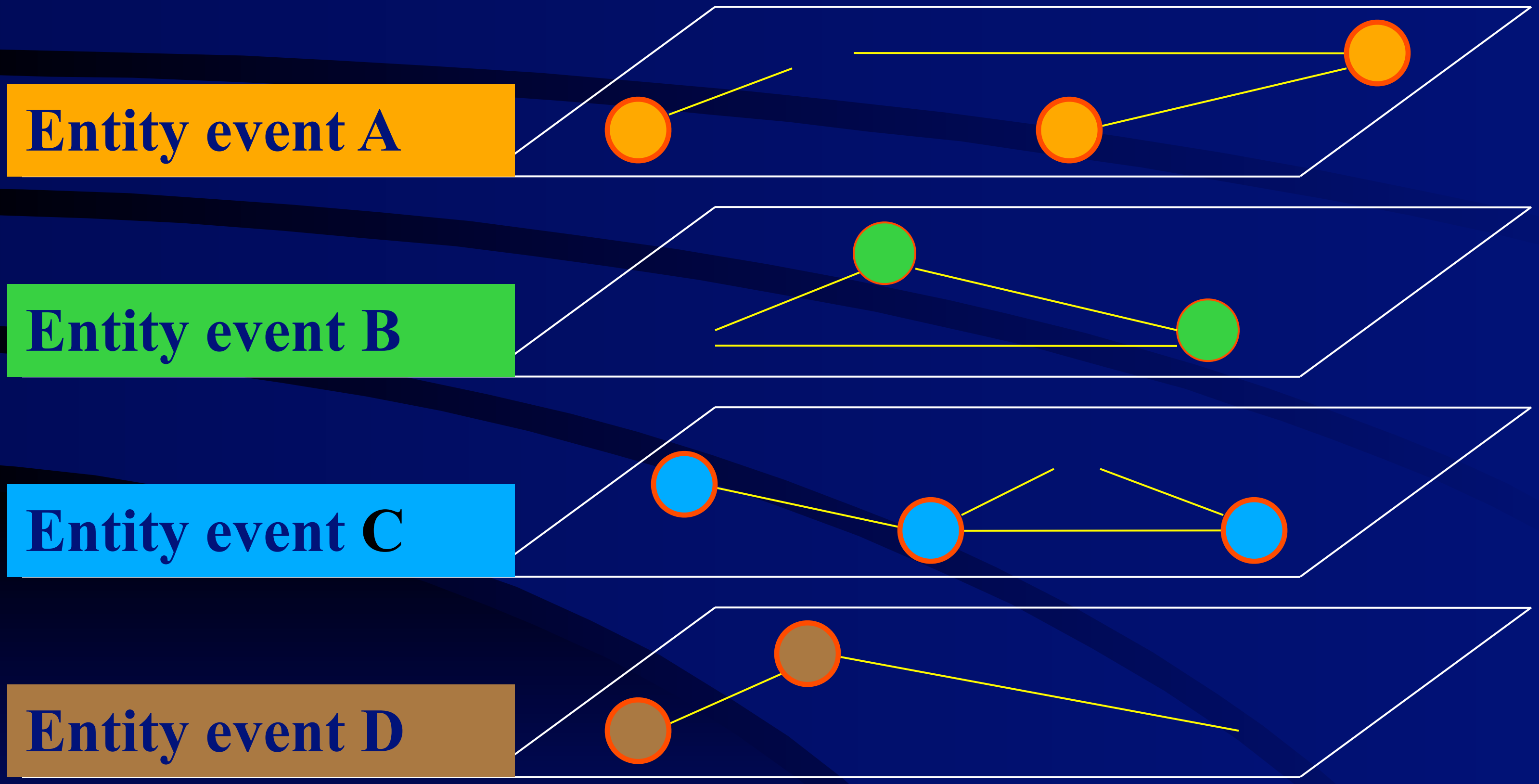
...etc.

Event Recognition

- Verify data (complete and accurate)
- Validate data (confirm relationship/entity)
- Identify entities (correlate to knowledge or by domain relationship such as time, proximity, etc.)

Activity Recognition

- Mapping Event Relationships -



Entity event A

Entity event B

Entity event C

Entity event D

Activity Recognition

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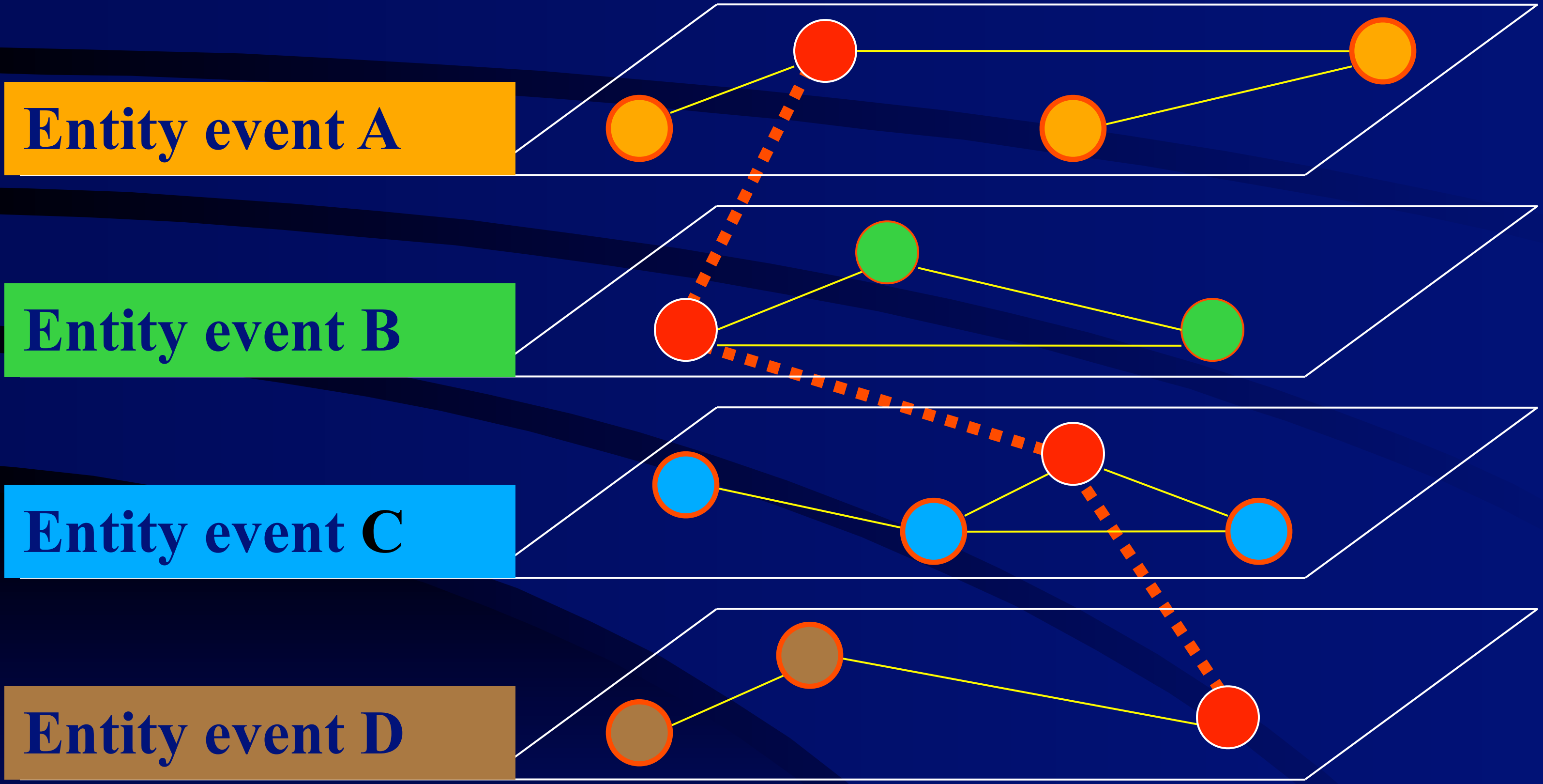

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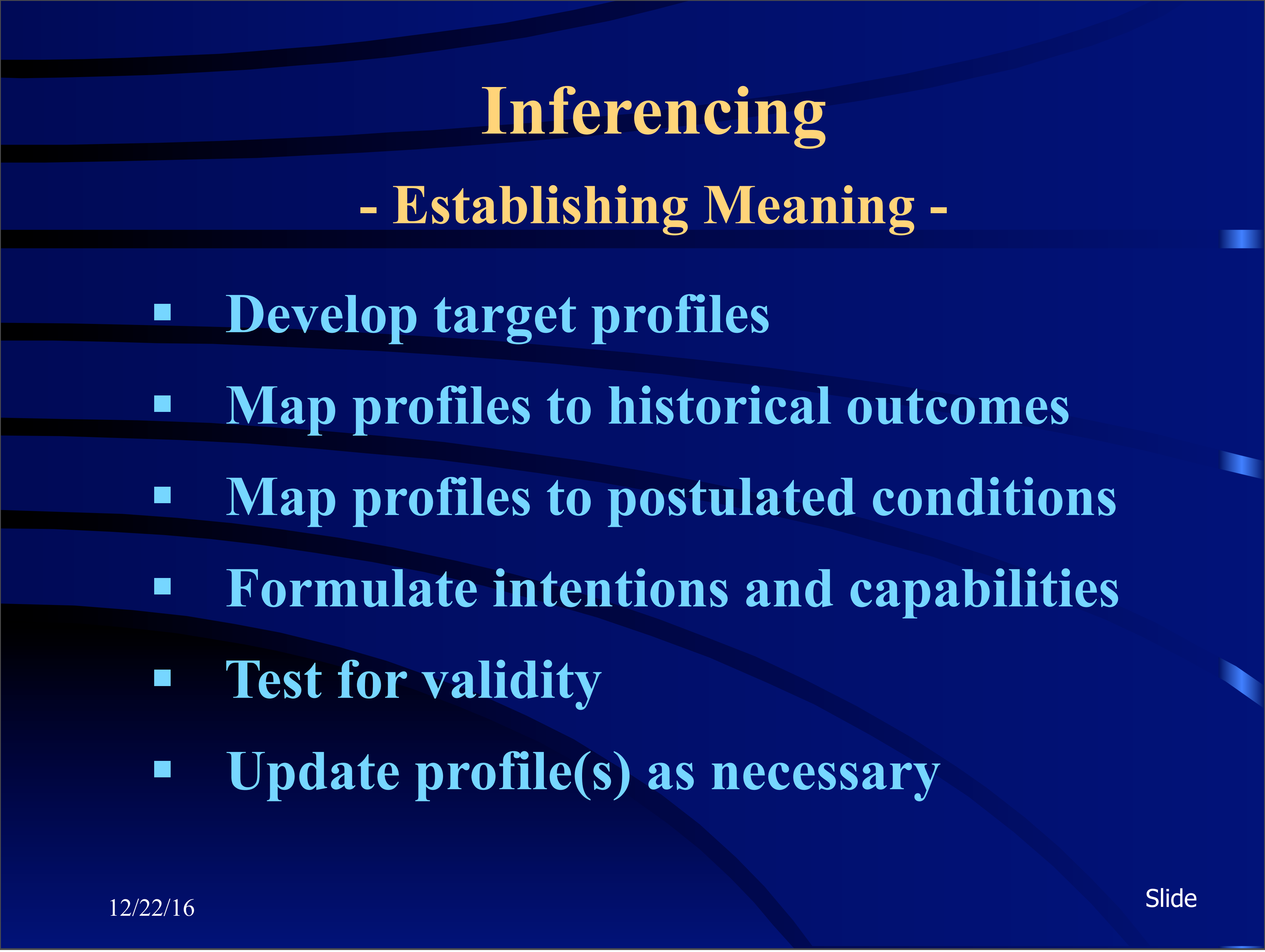
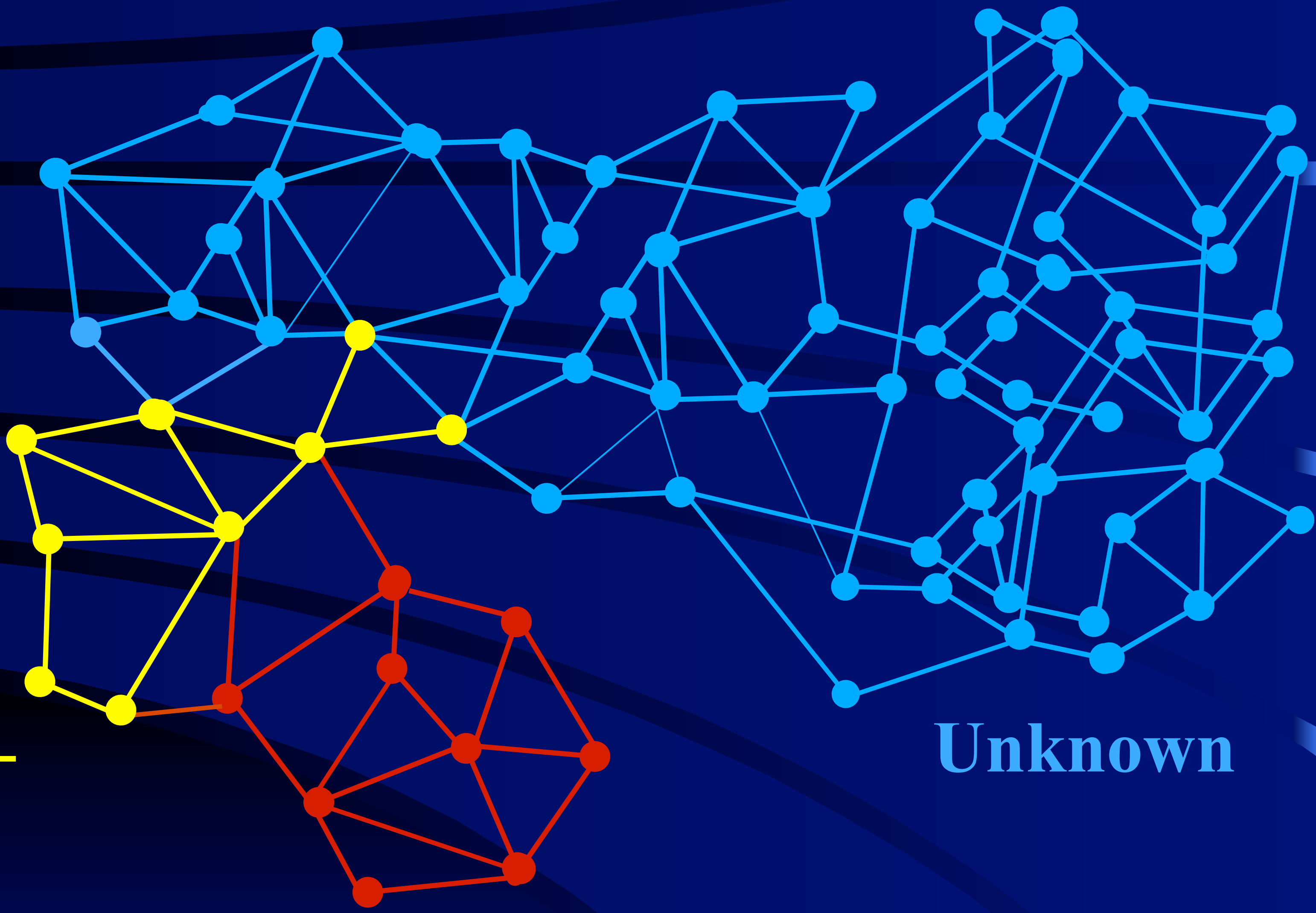


Inferencing

- Establishing Meaning -

- Develop target profiles
- Map profiles to historical outcomes
- Map profiles to postulated conditions
- Formulate intentions and capabilities
- Test for validity
- Update profile(s) as necessary

Target Development and Discovery



Suspect

Zone of “Suspects” - 2º of separation from “Knowns”

Unknown

Known

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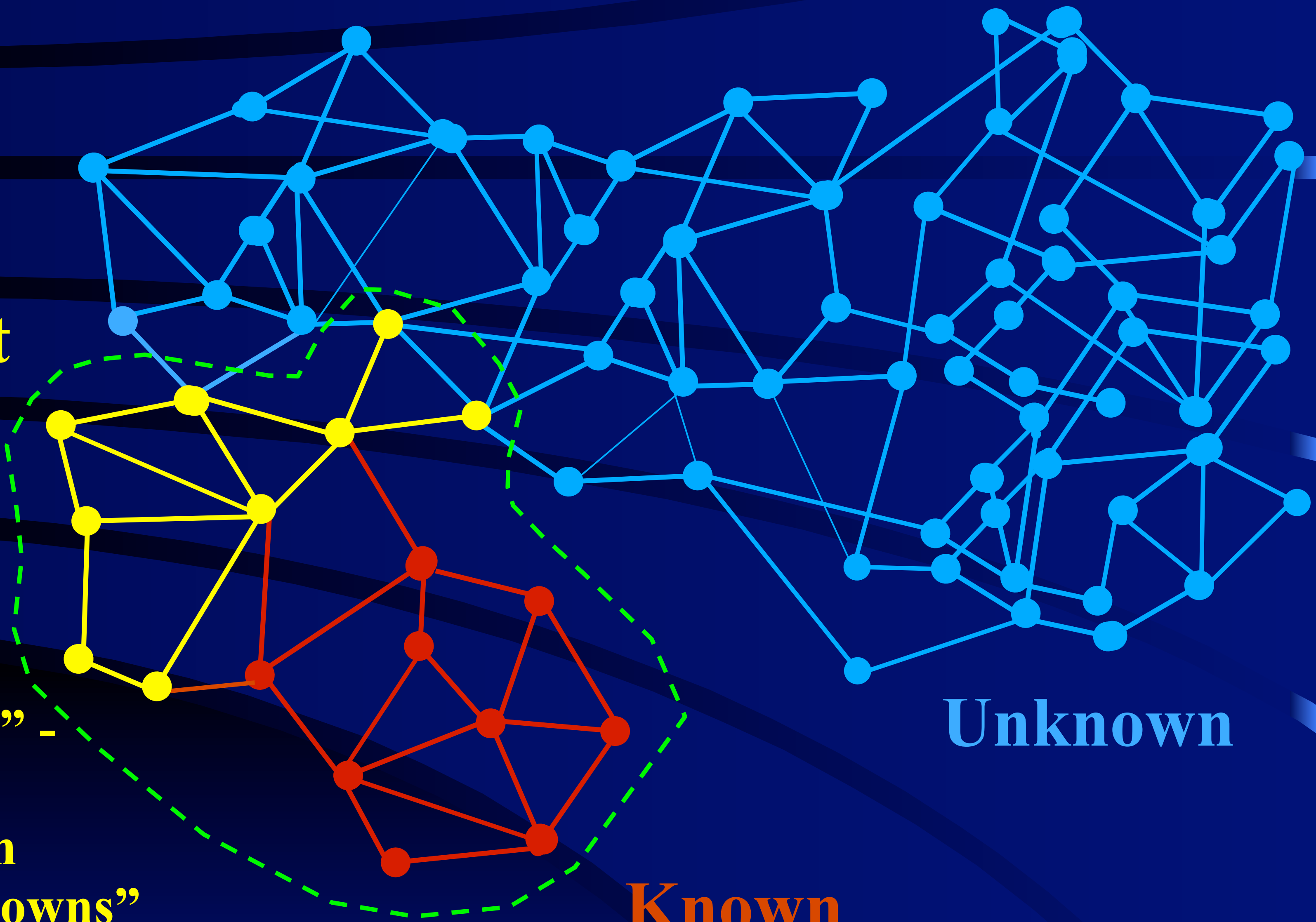
Target Development and Discovery



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Slide

Freitag, 23. Dezember 2016

Discovering and Protecting

- Guarding Privacy While Finding the Threat -

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San Diego, CA ◉

Khalid Almihdhar
San Diego, CA

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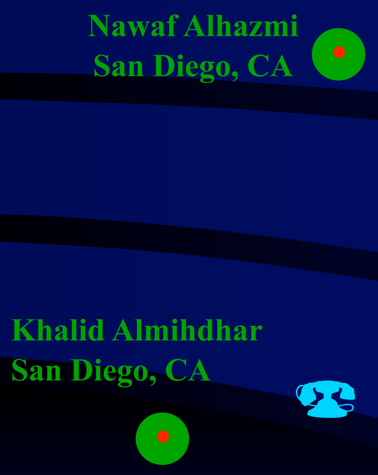

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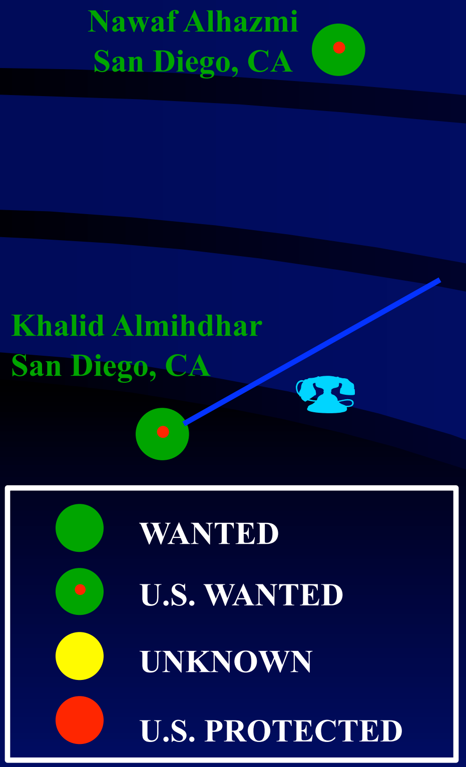

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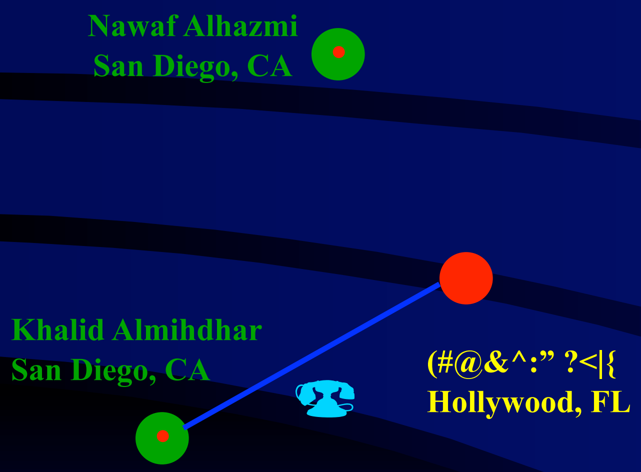

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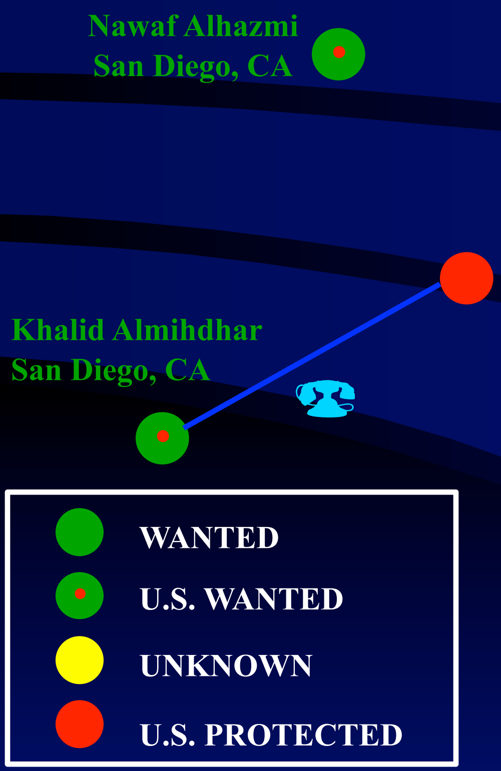

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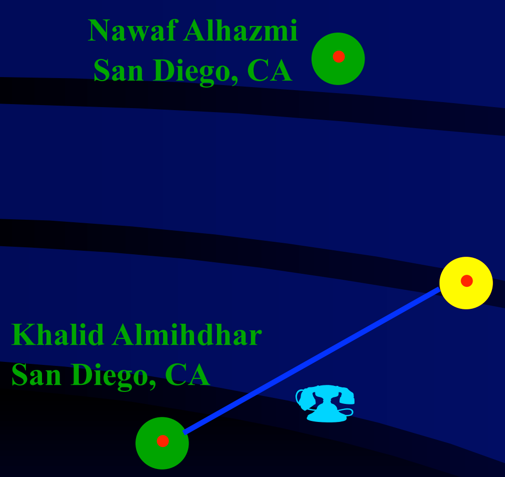

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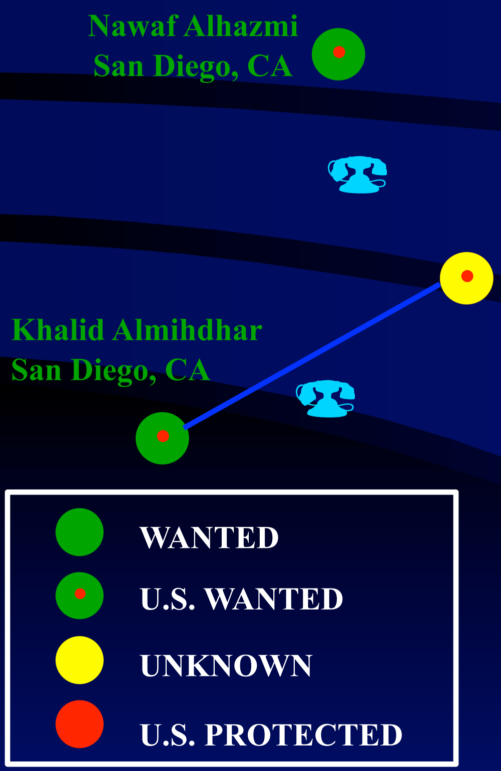

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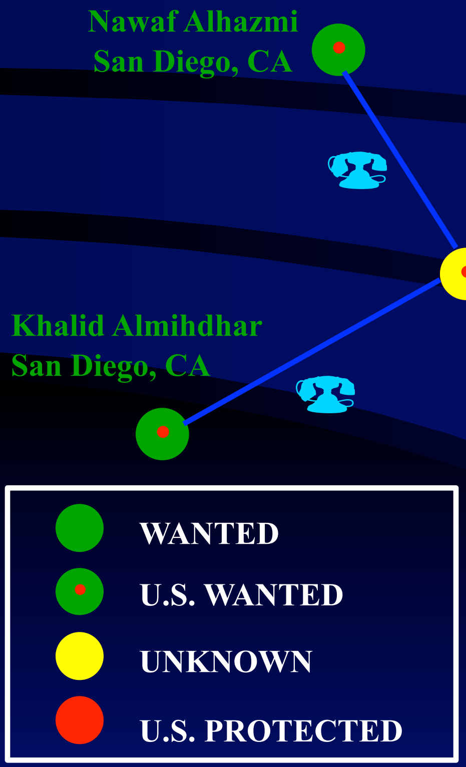

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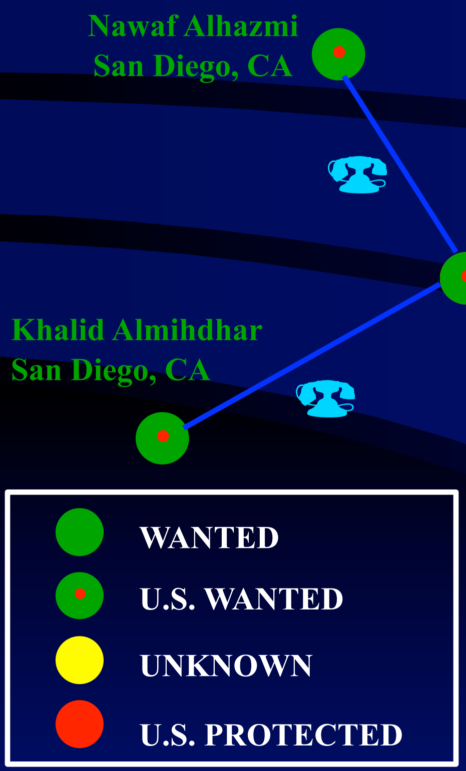

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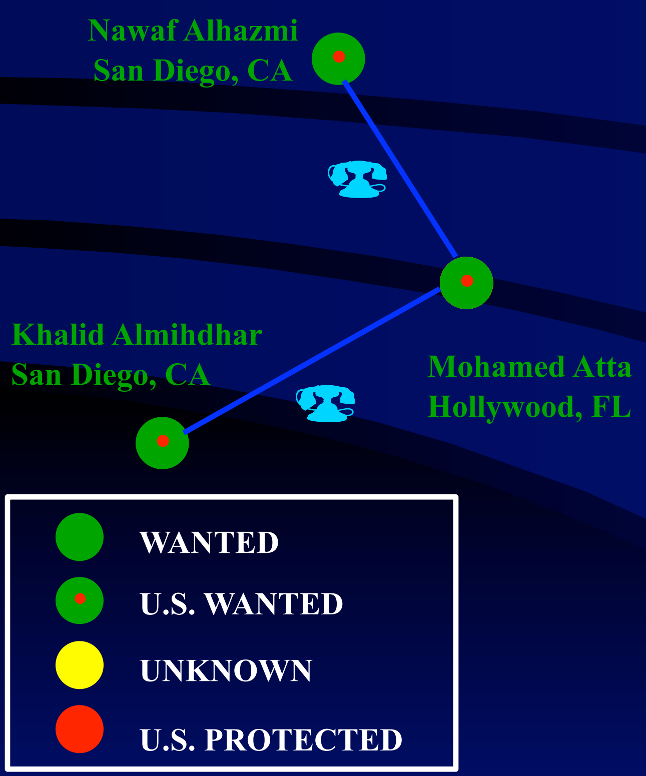

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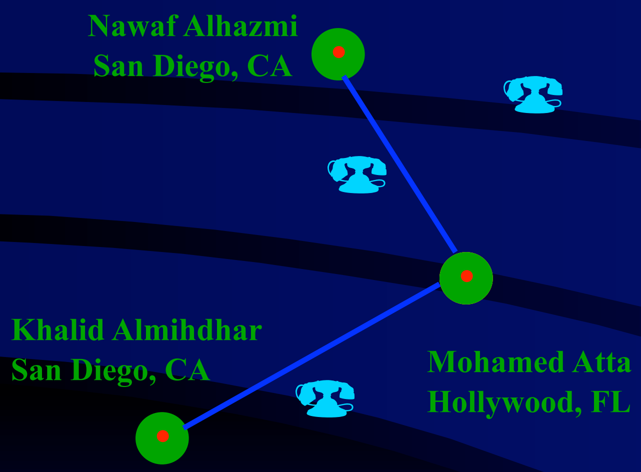

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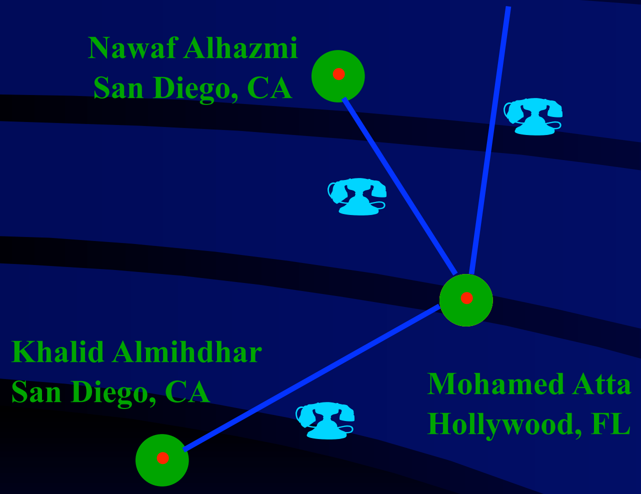

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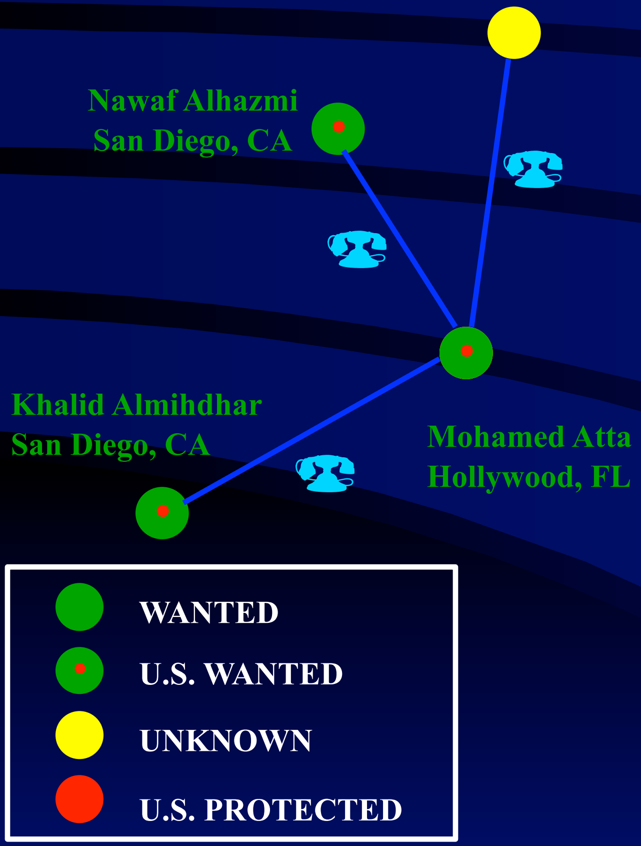

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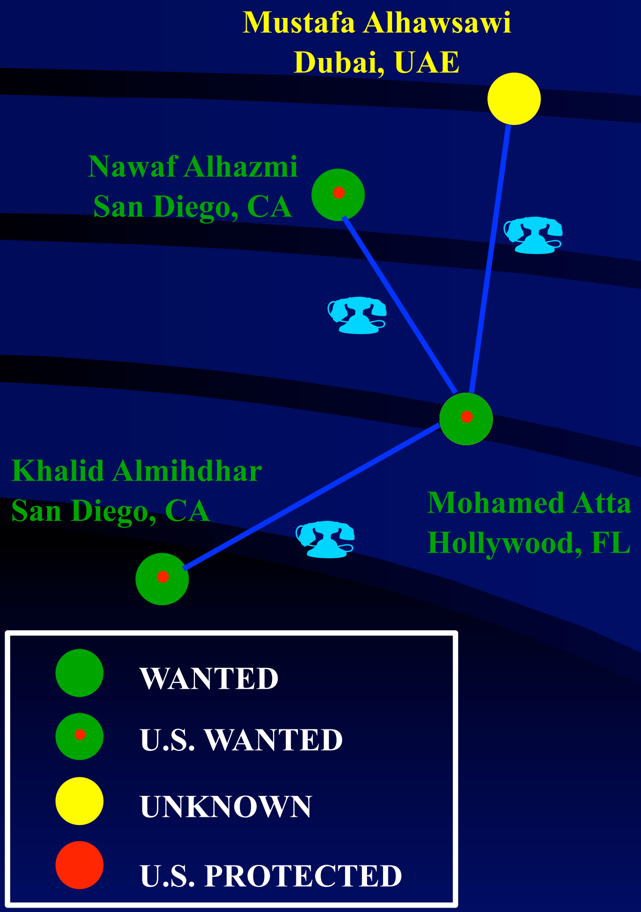

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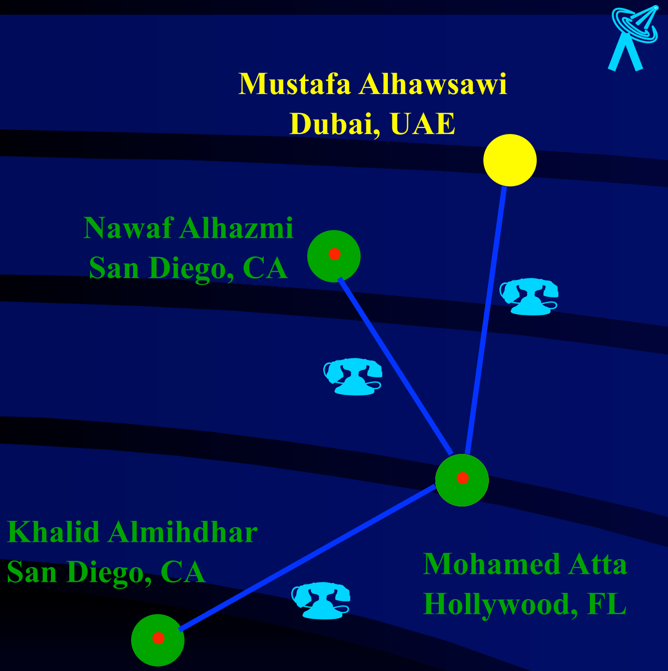

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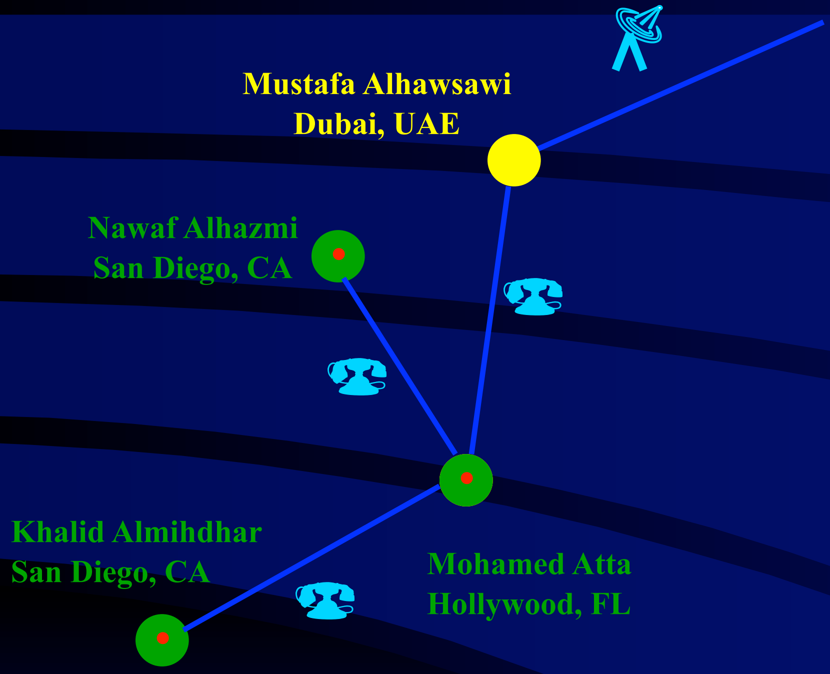

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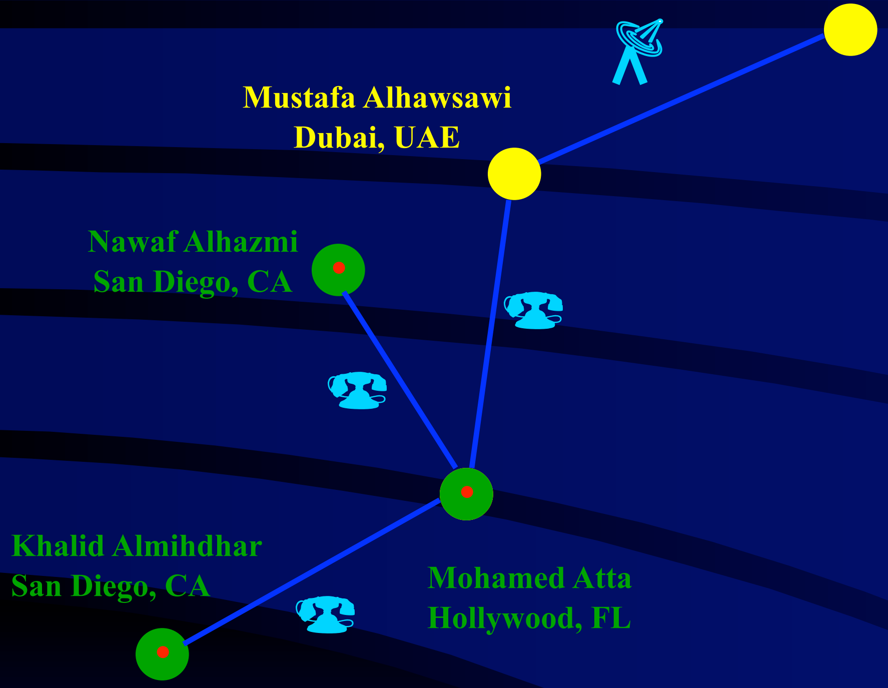

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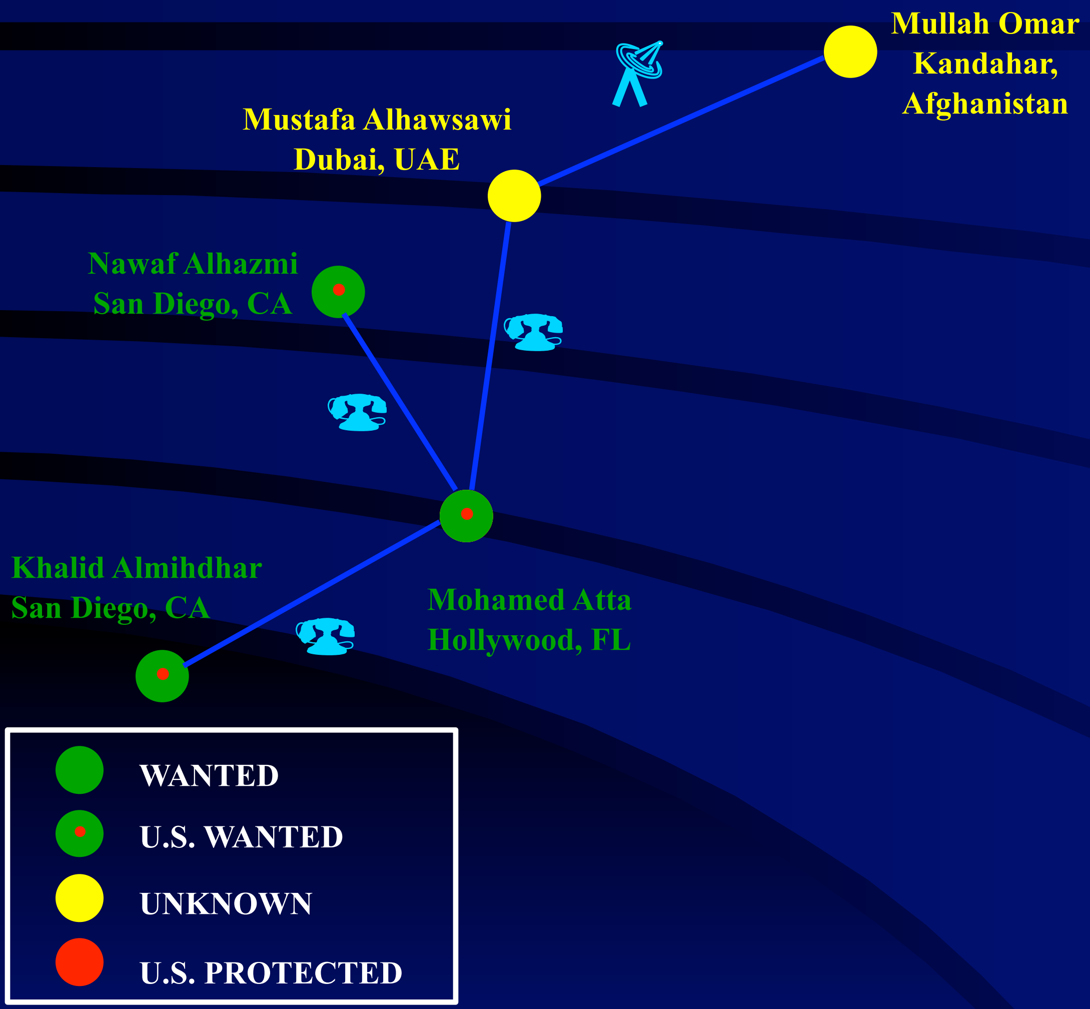

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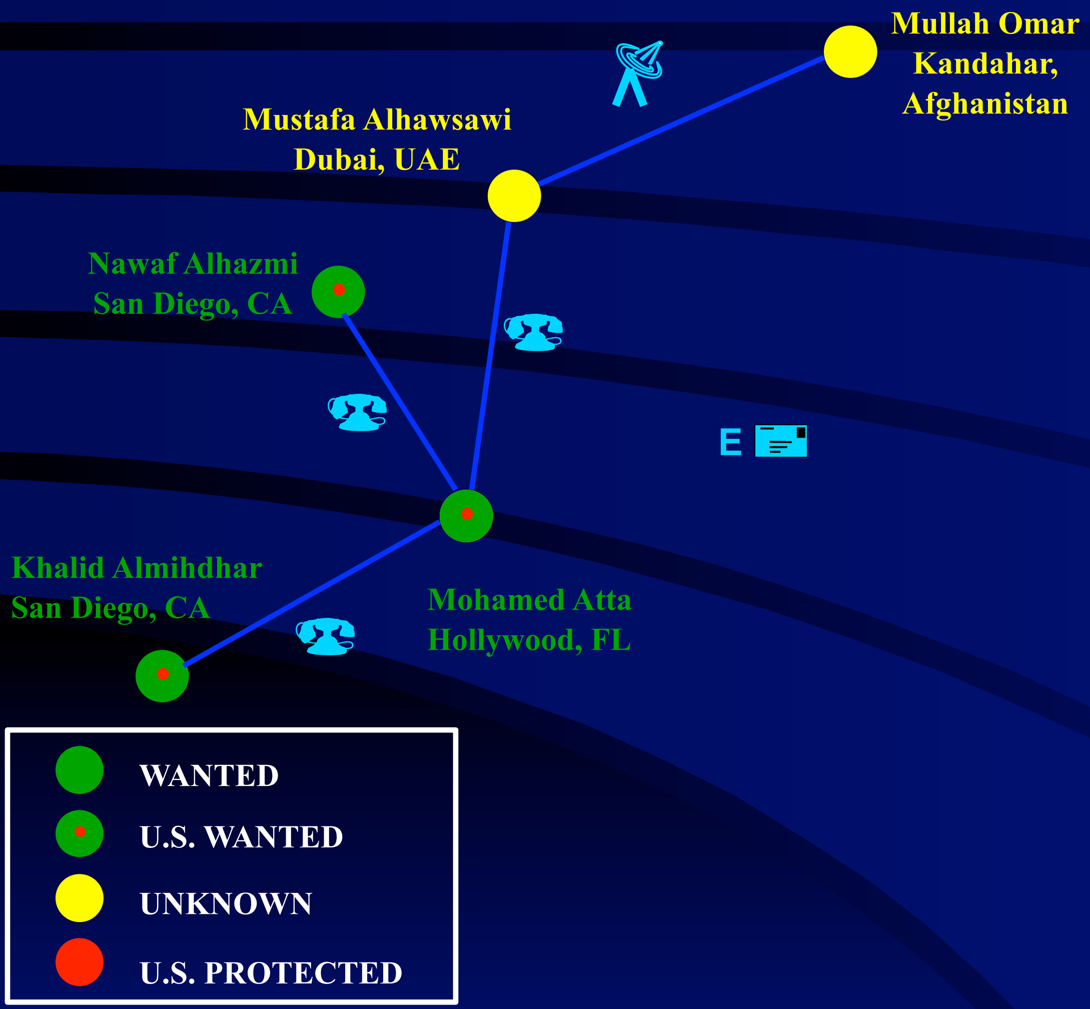

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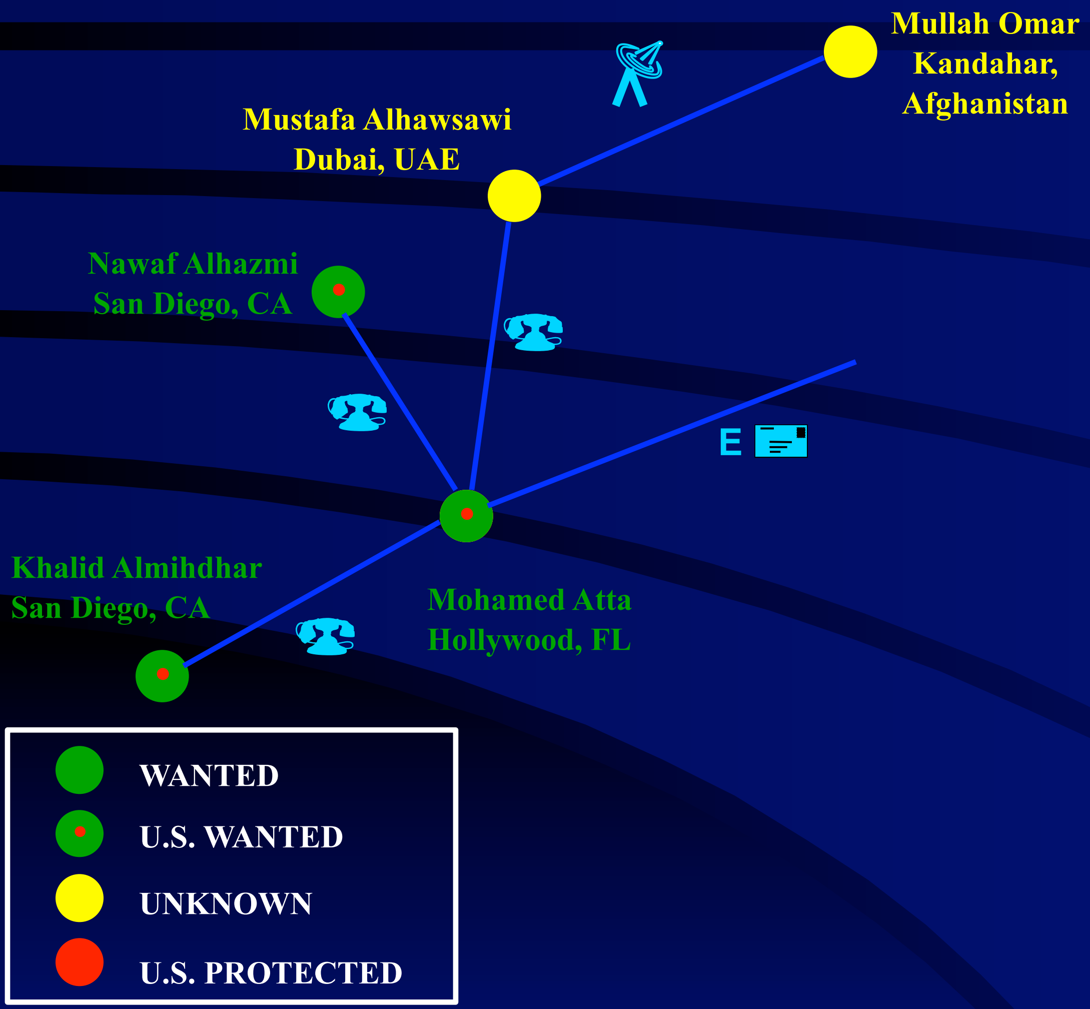

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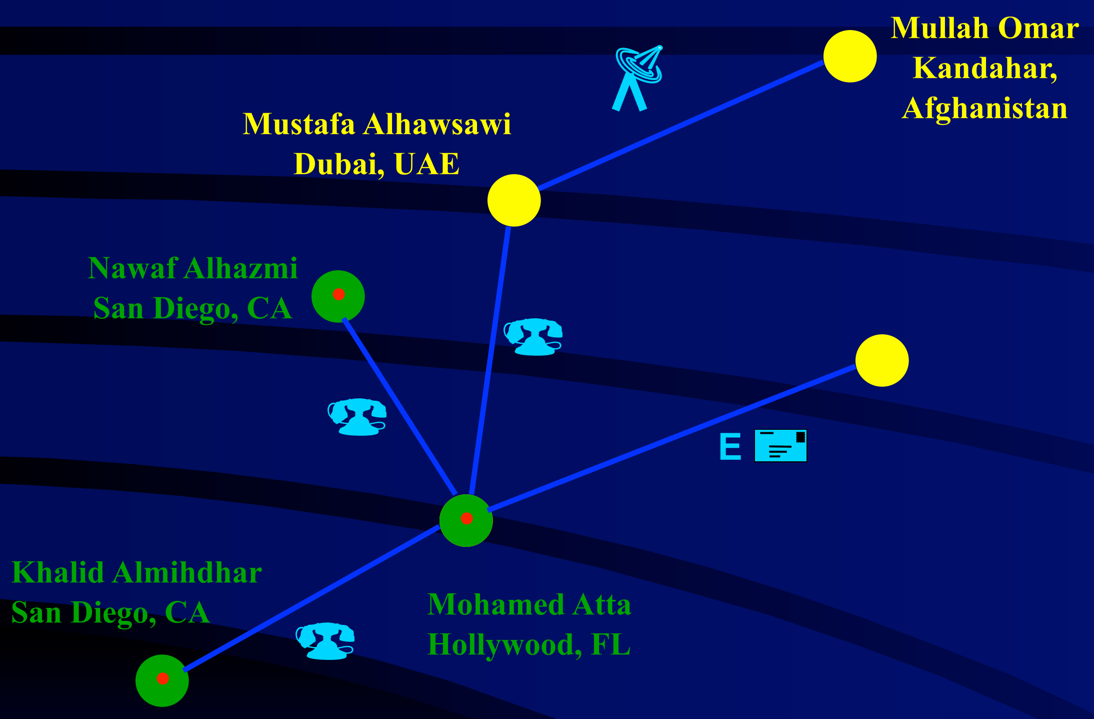

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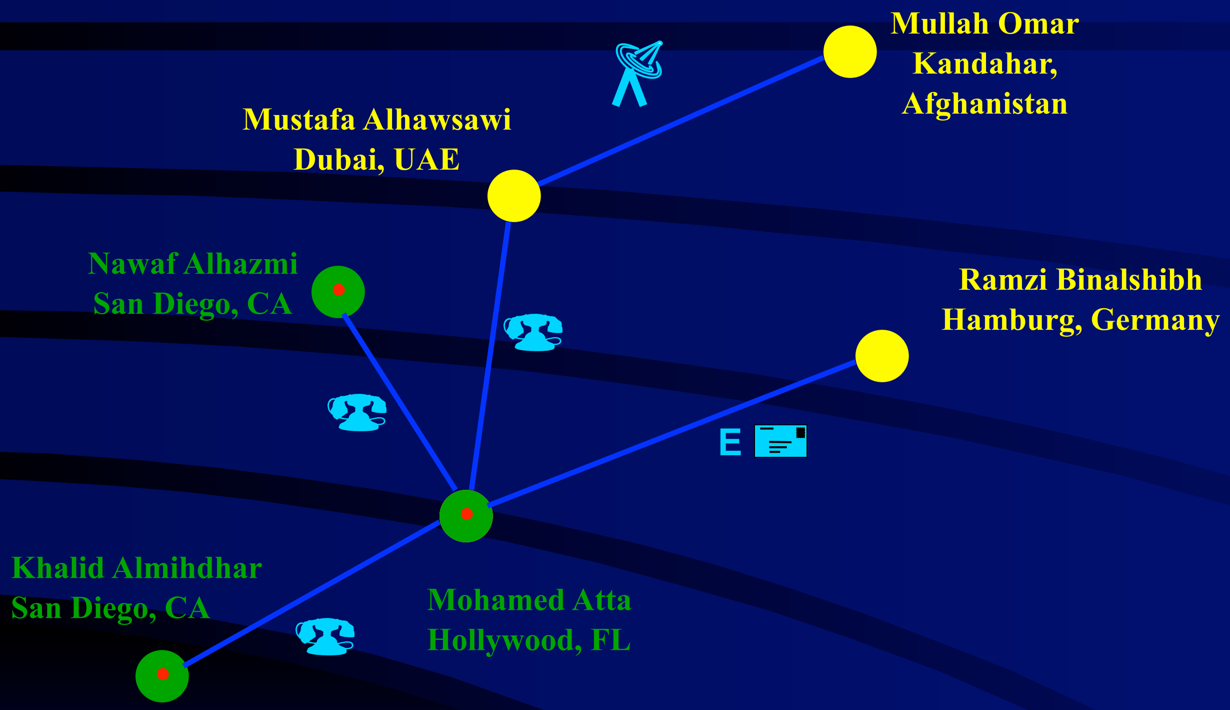

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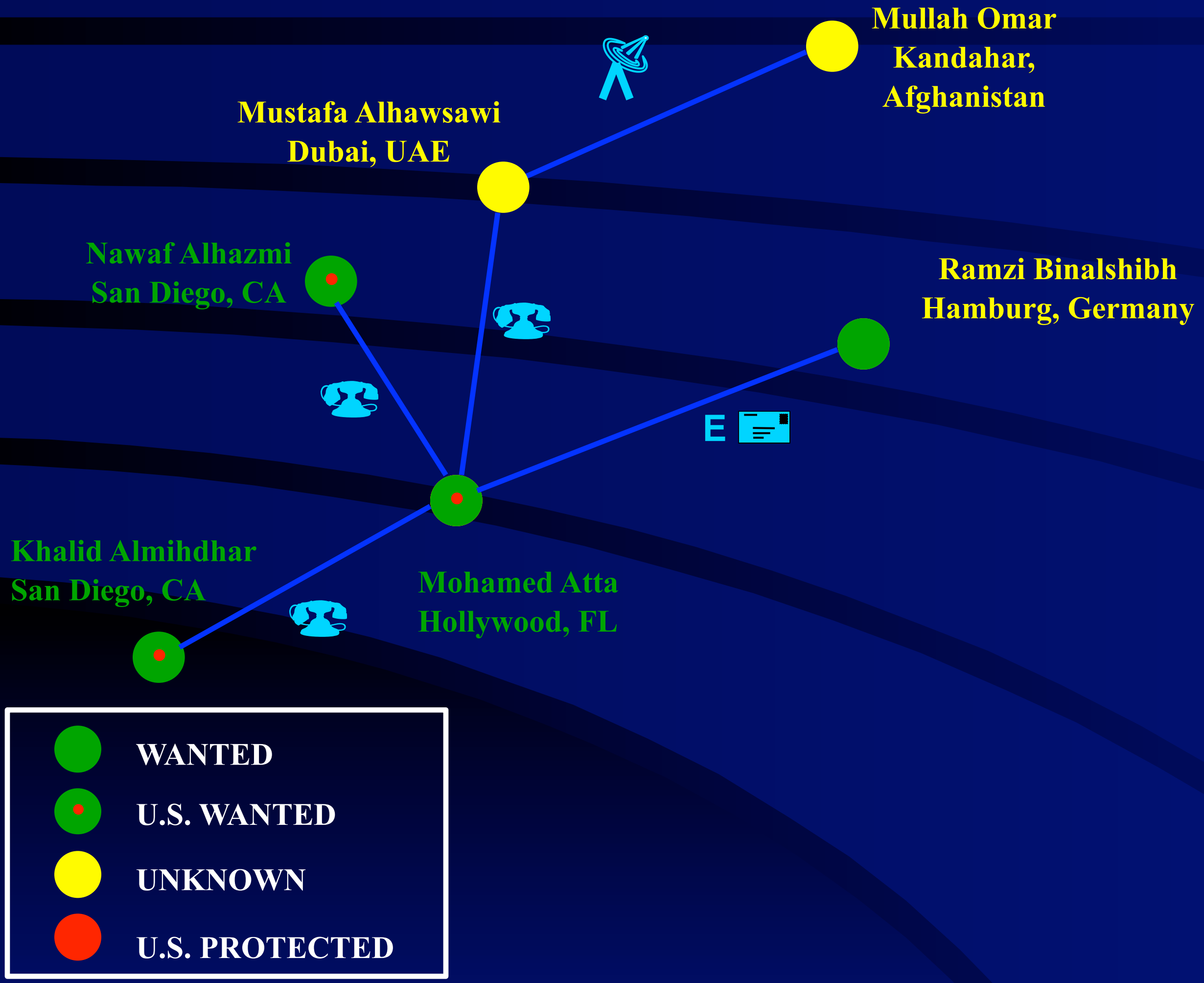

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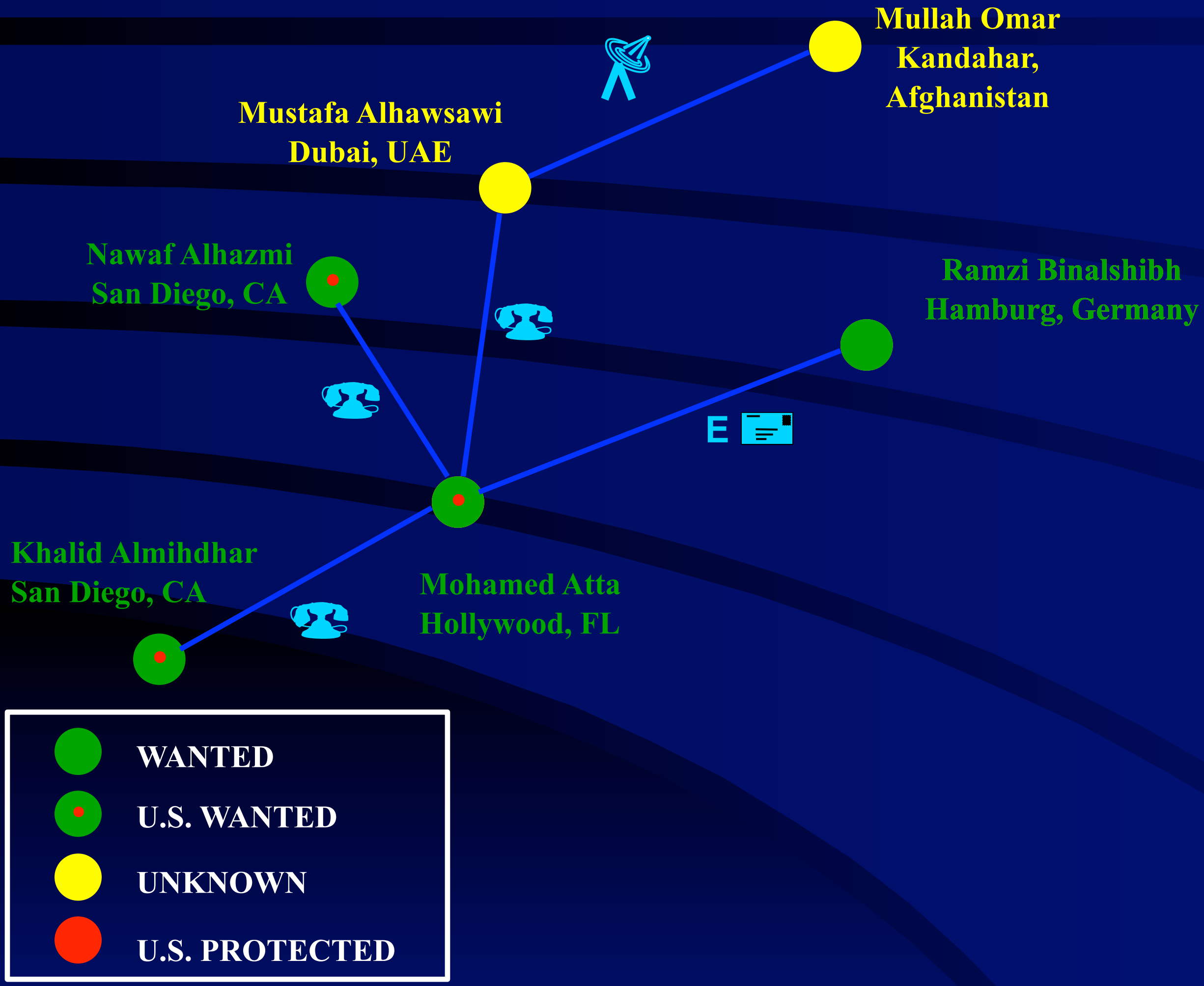

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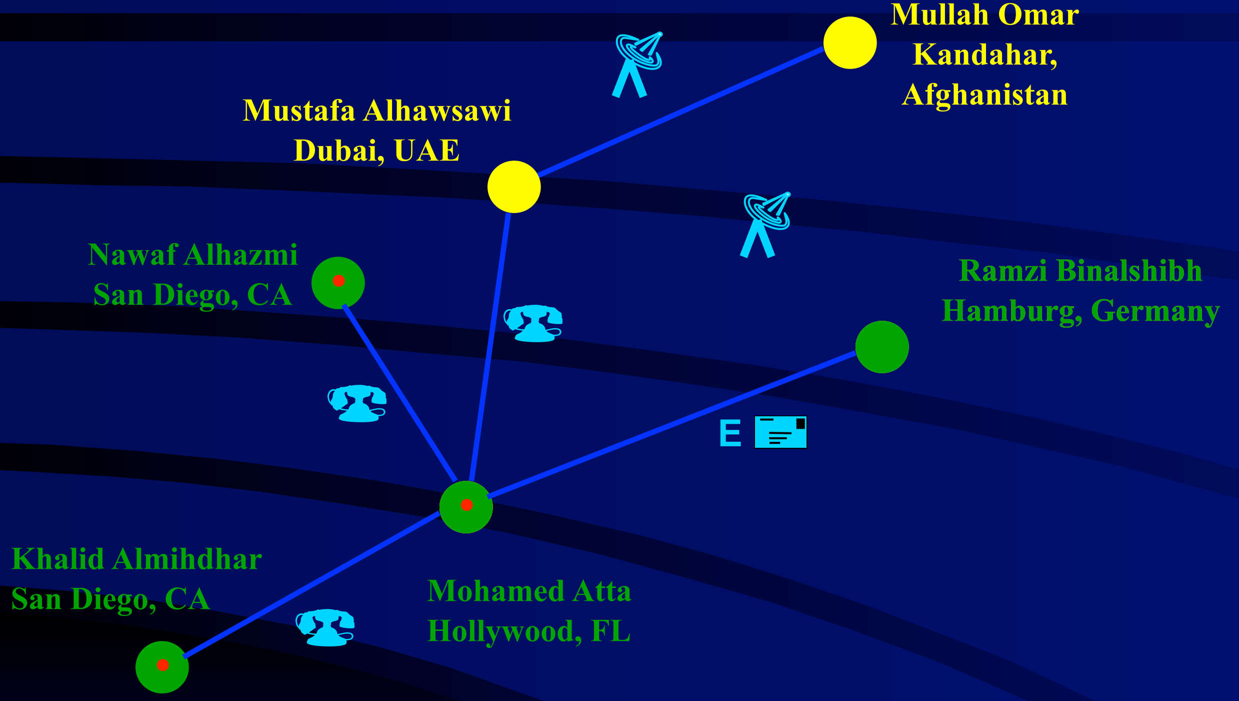

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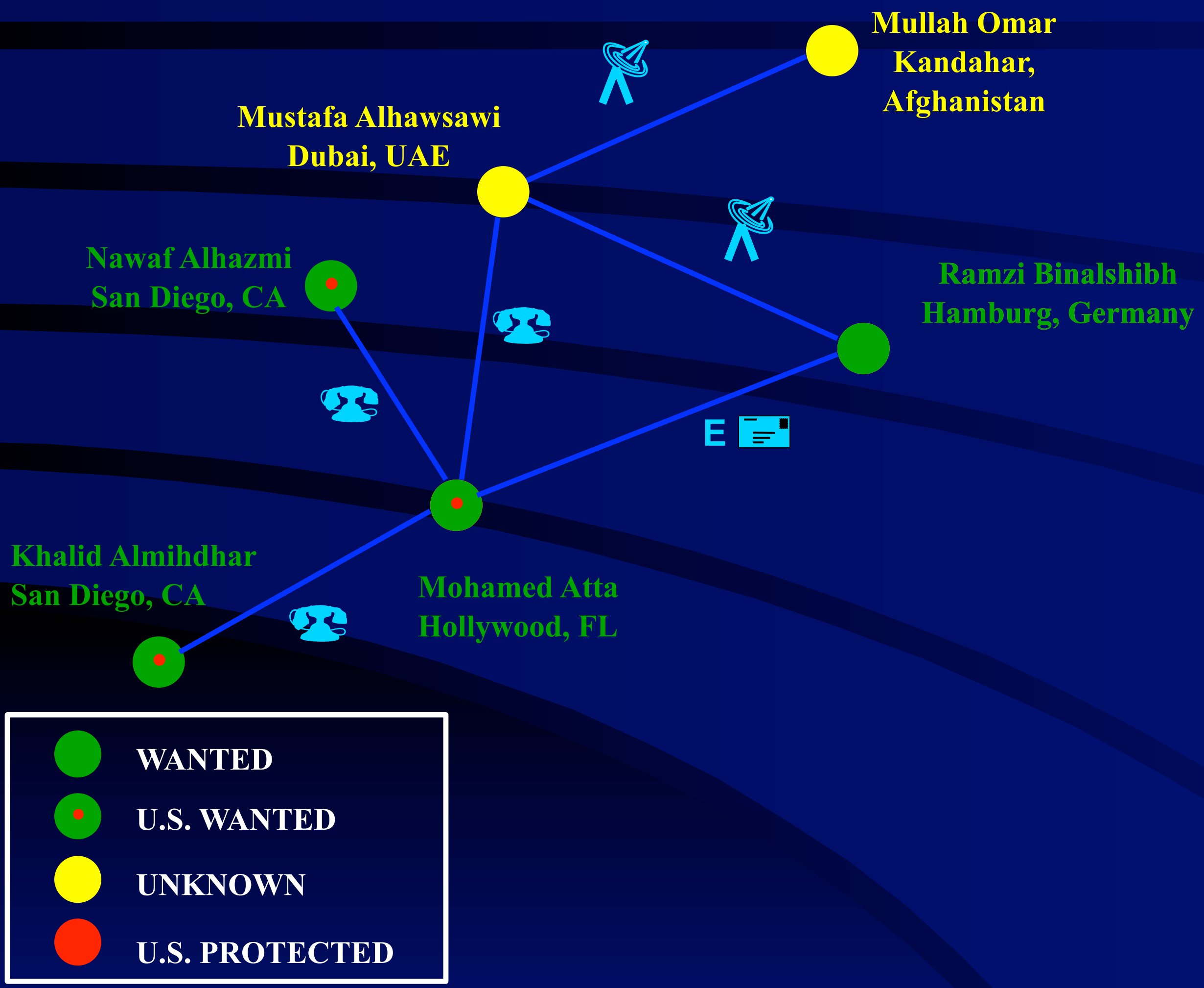

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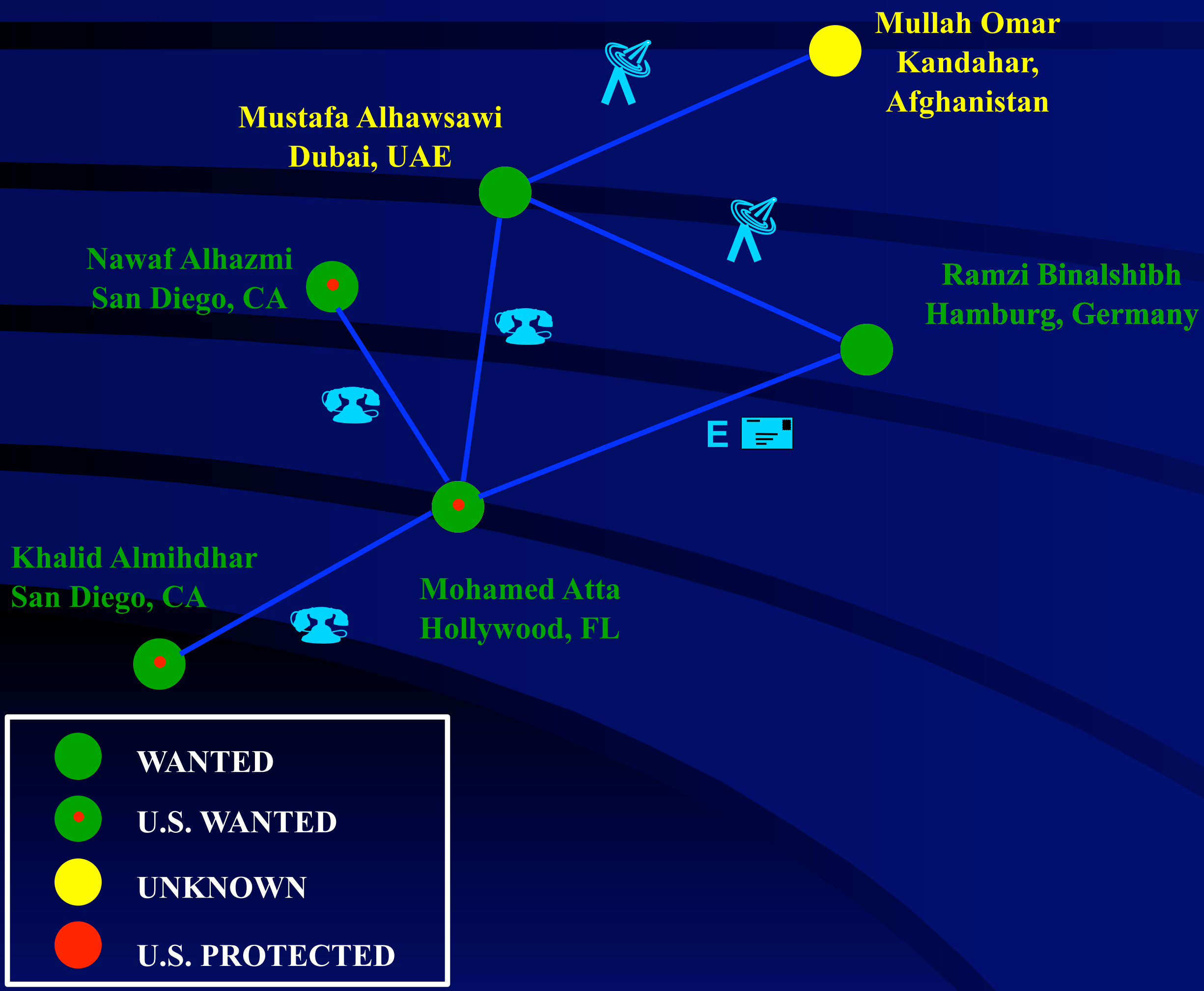

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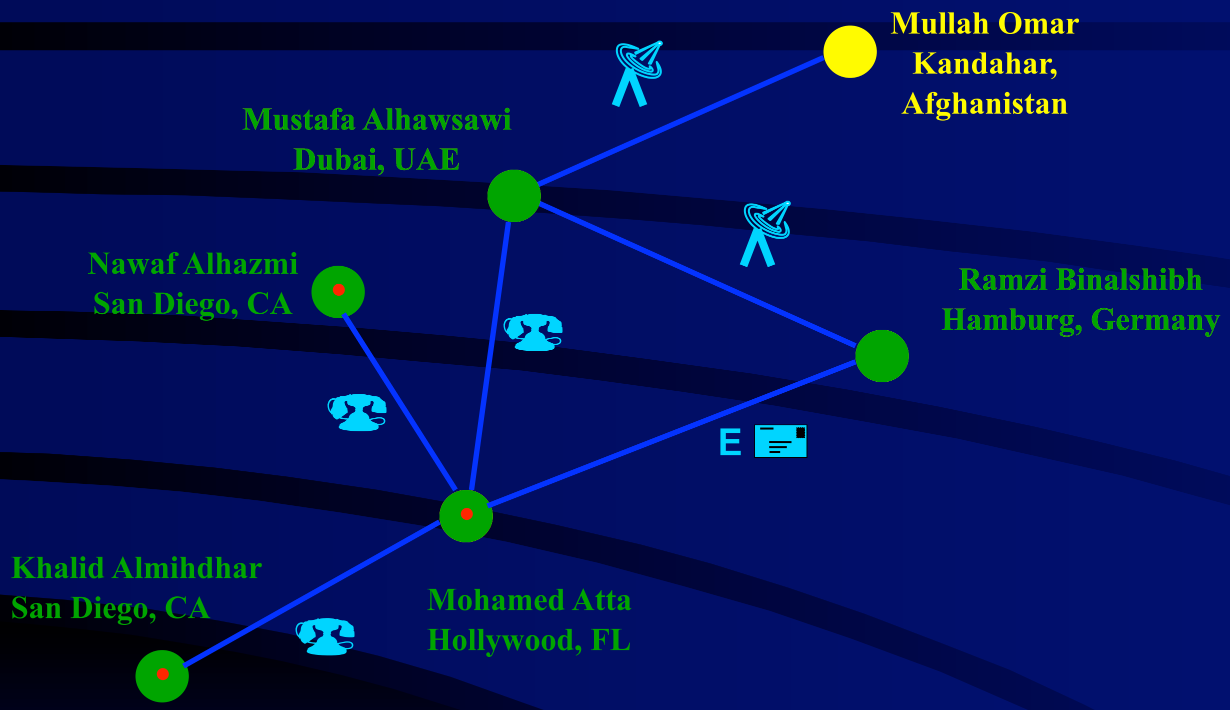

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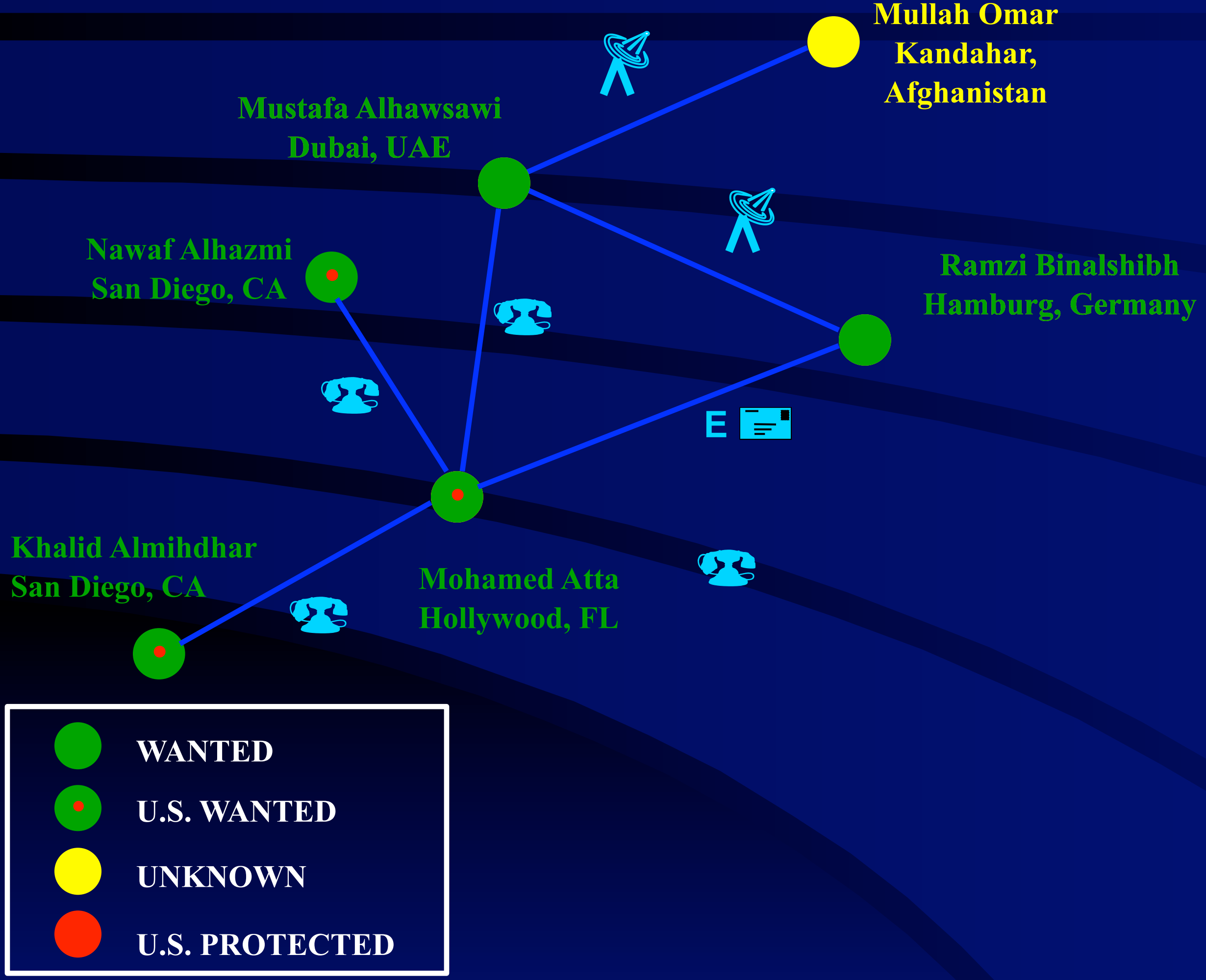

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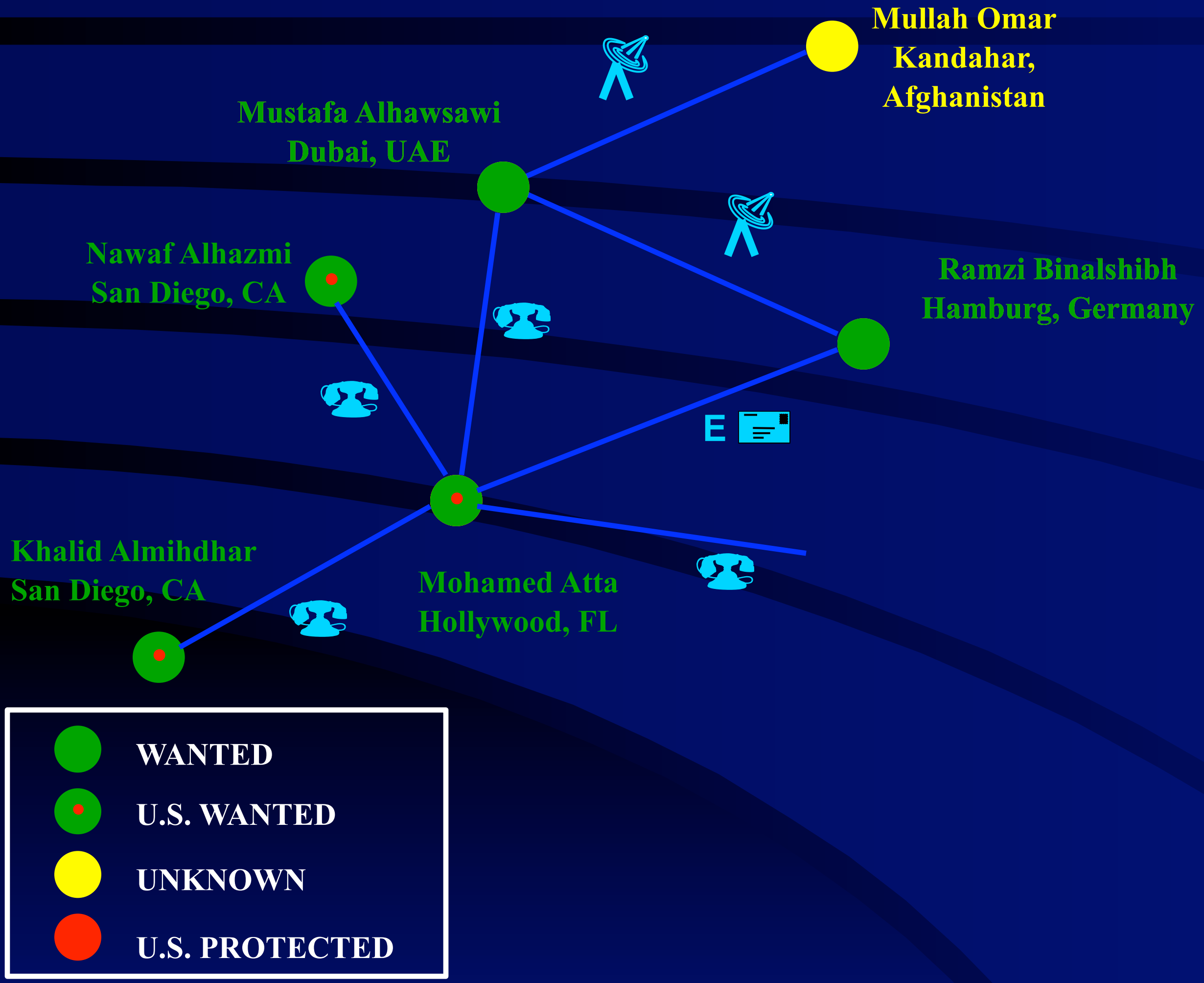
- Guarding Privacy While Finding the Threat -



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Khalid Almihdhar
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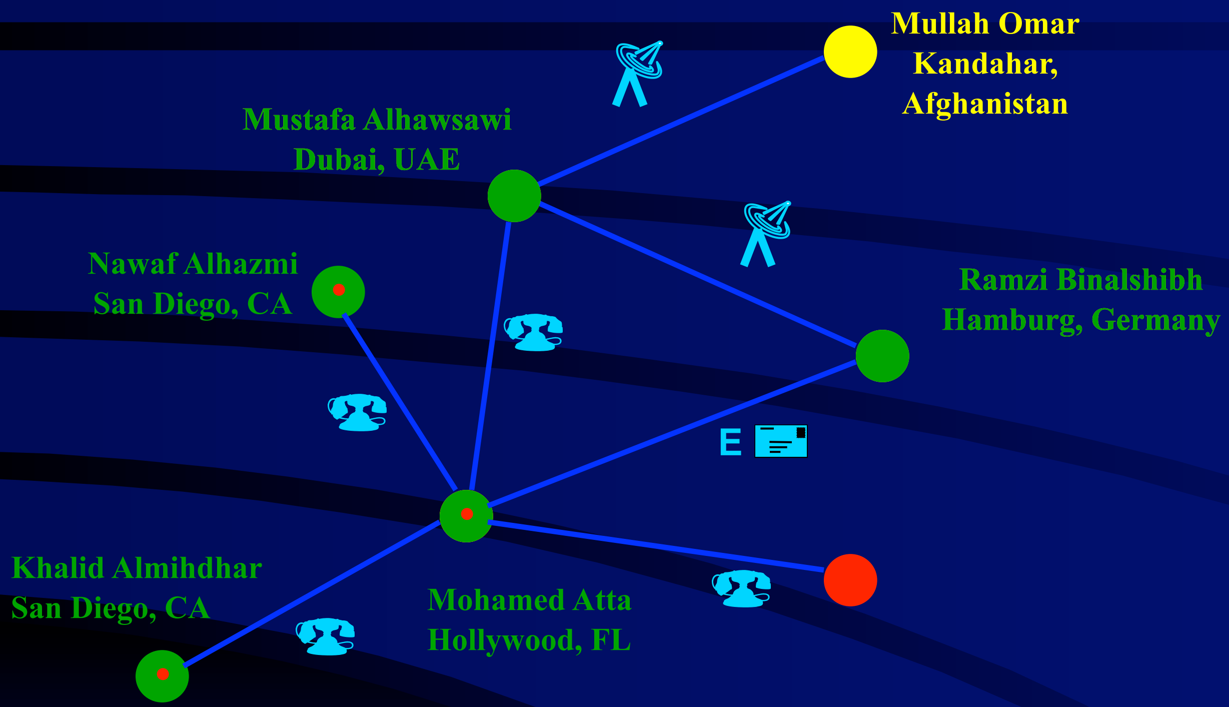

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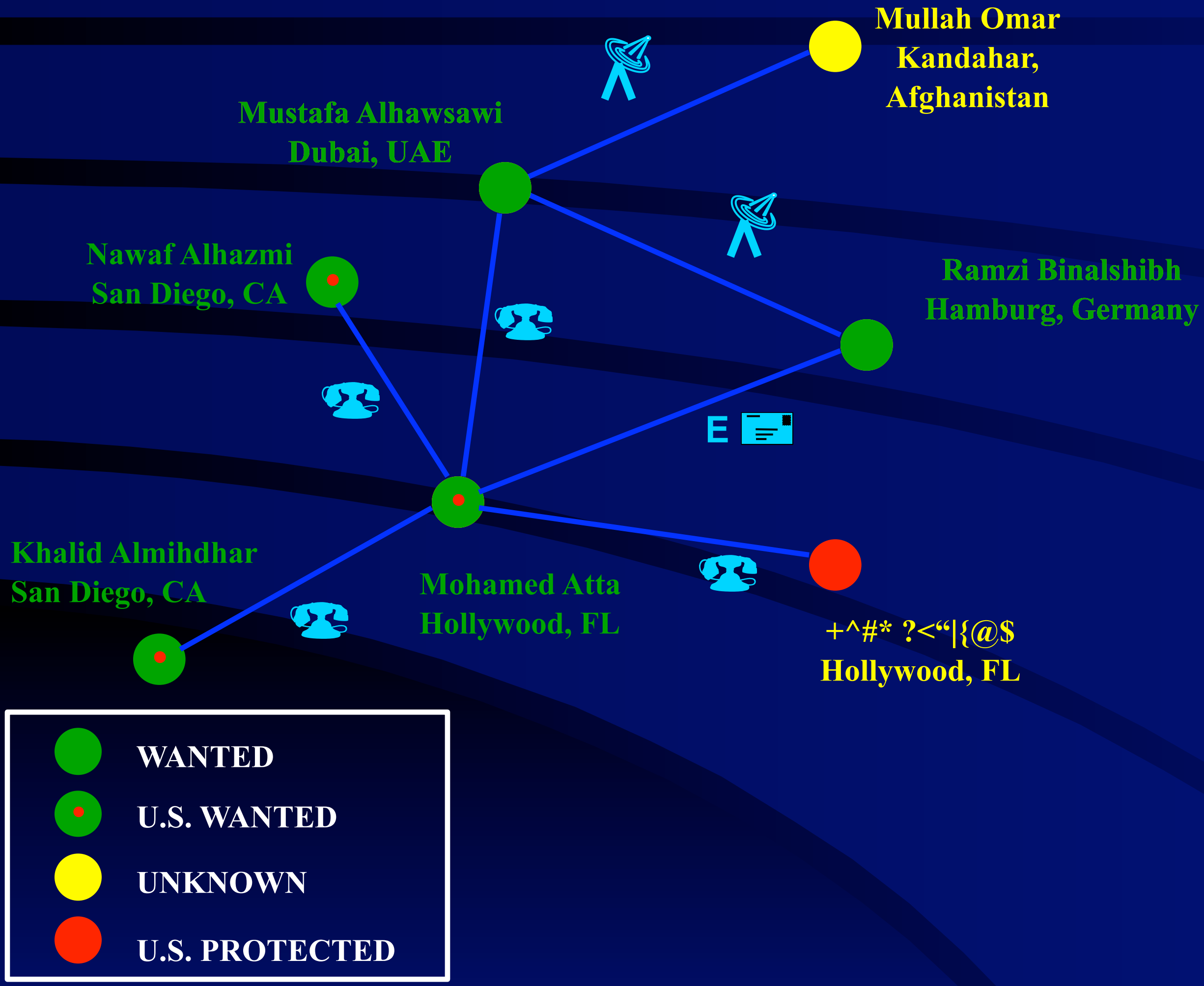

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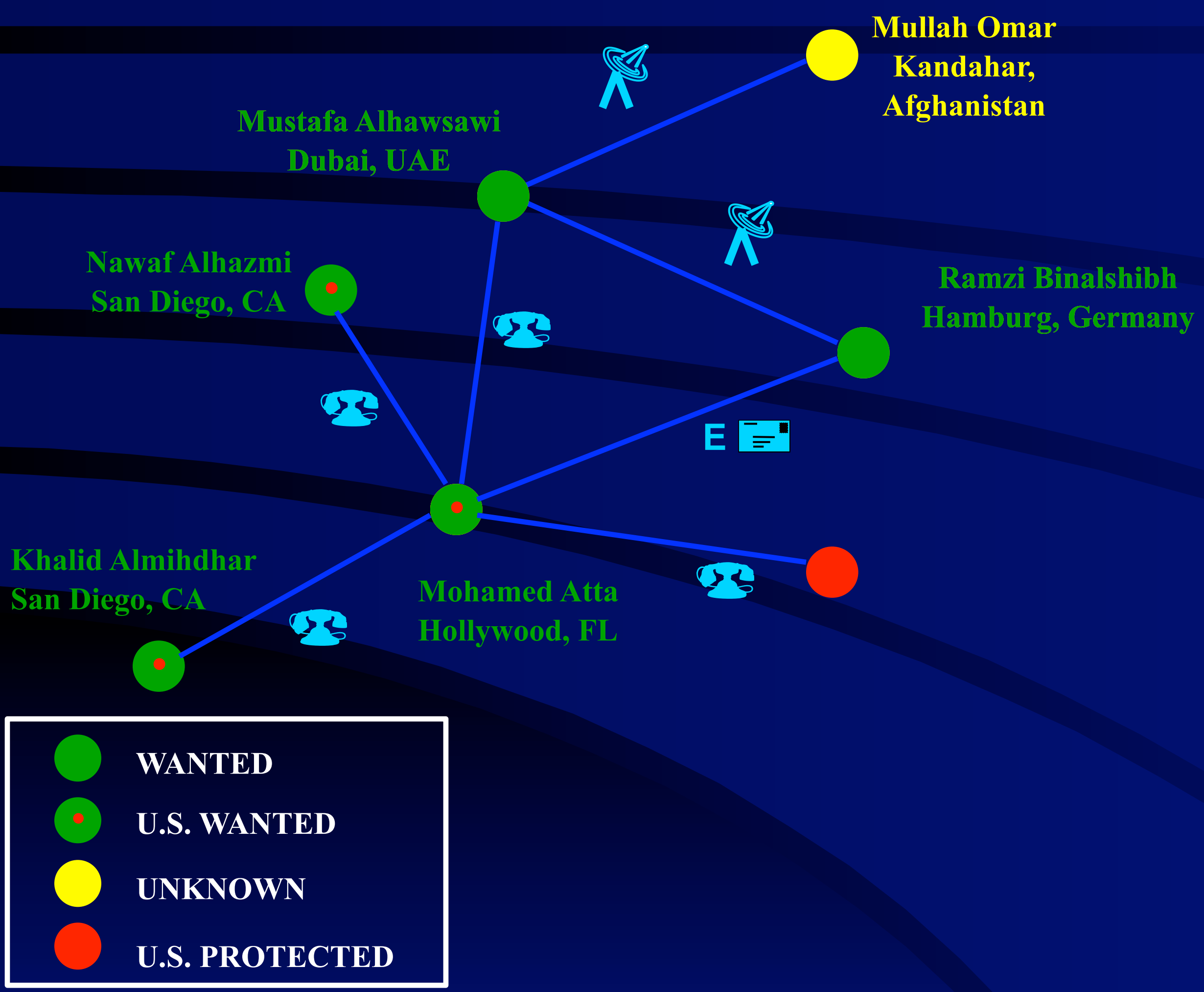

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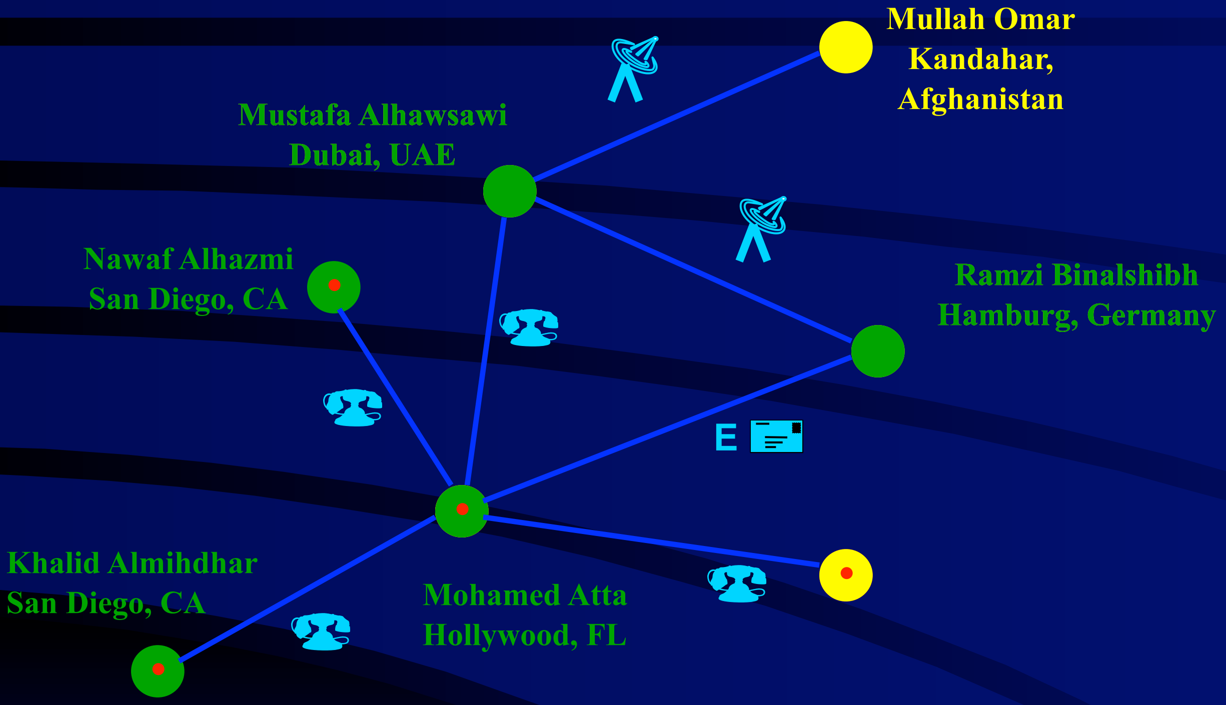

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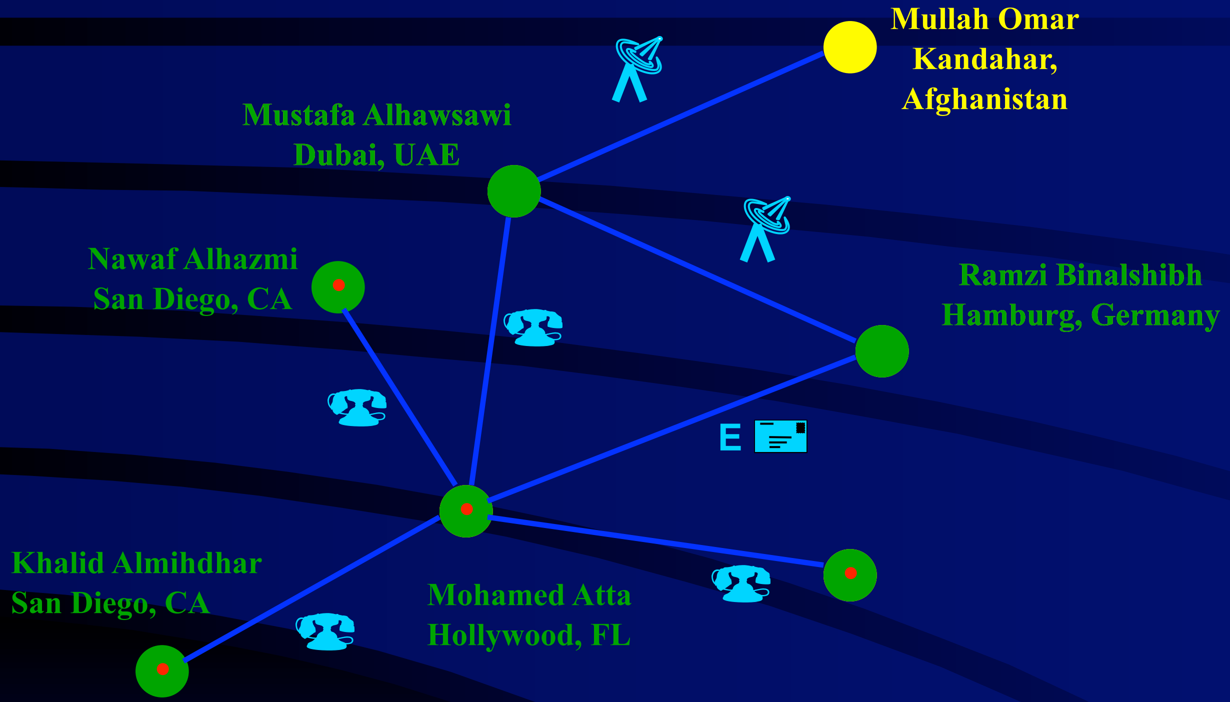

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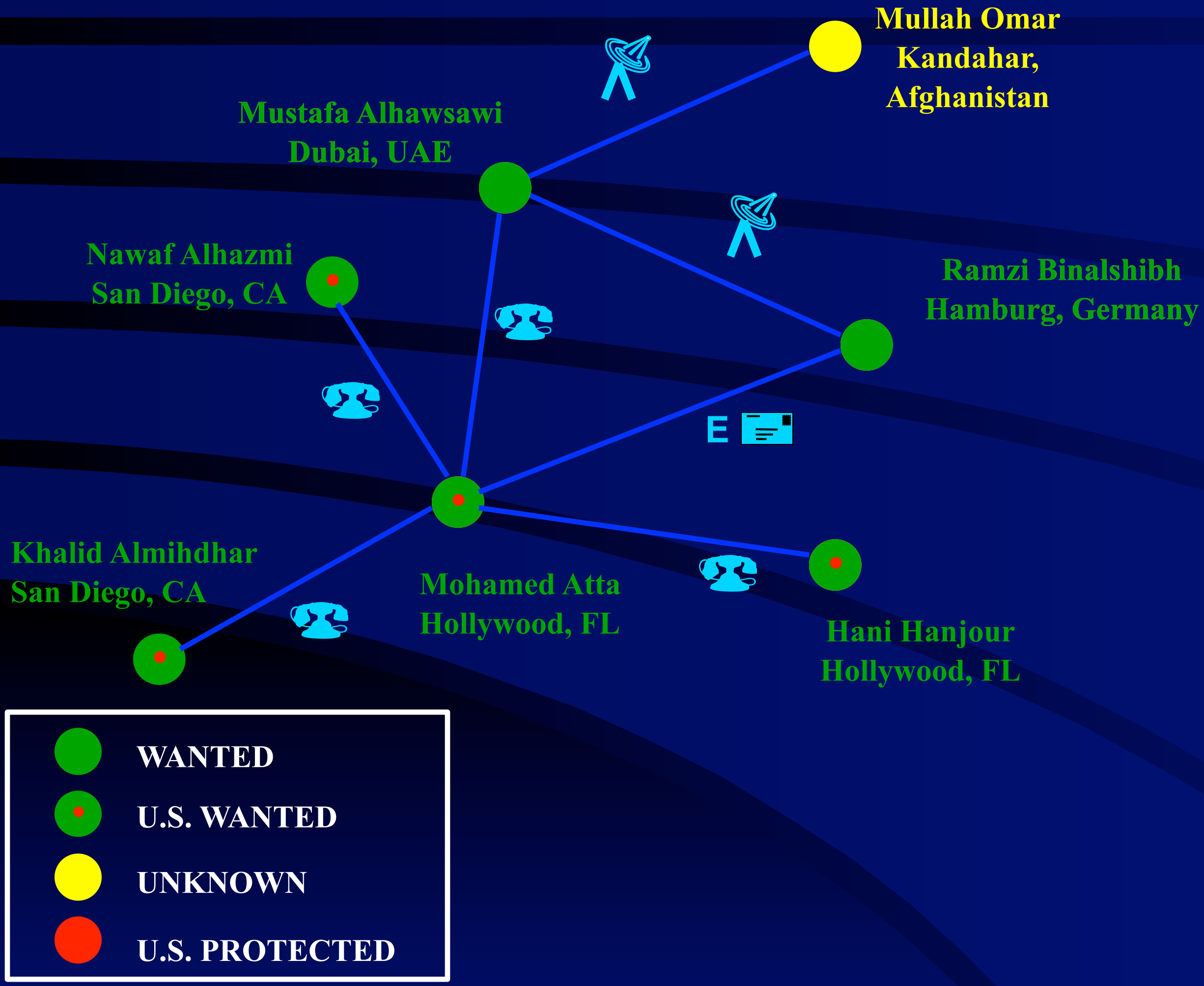

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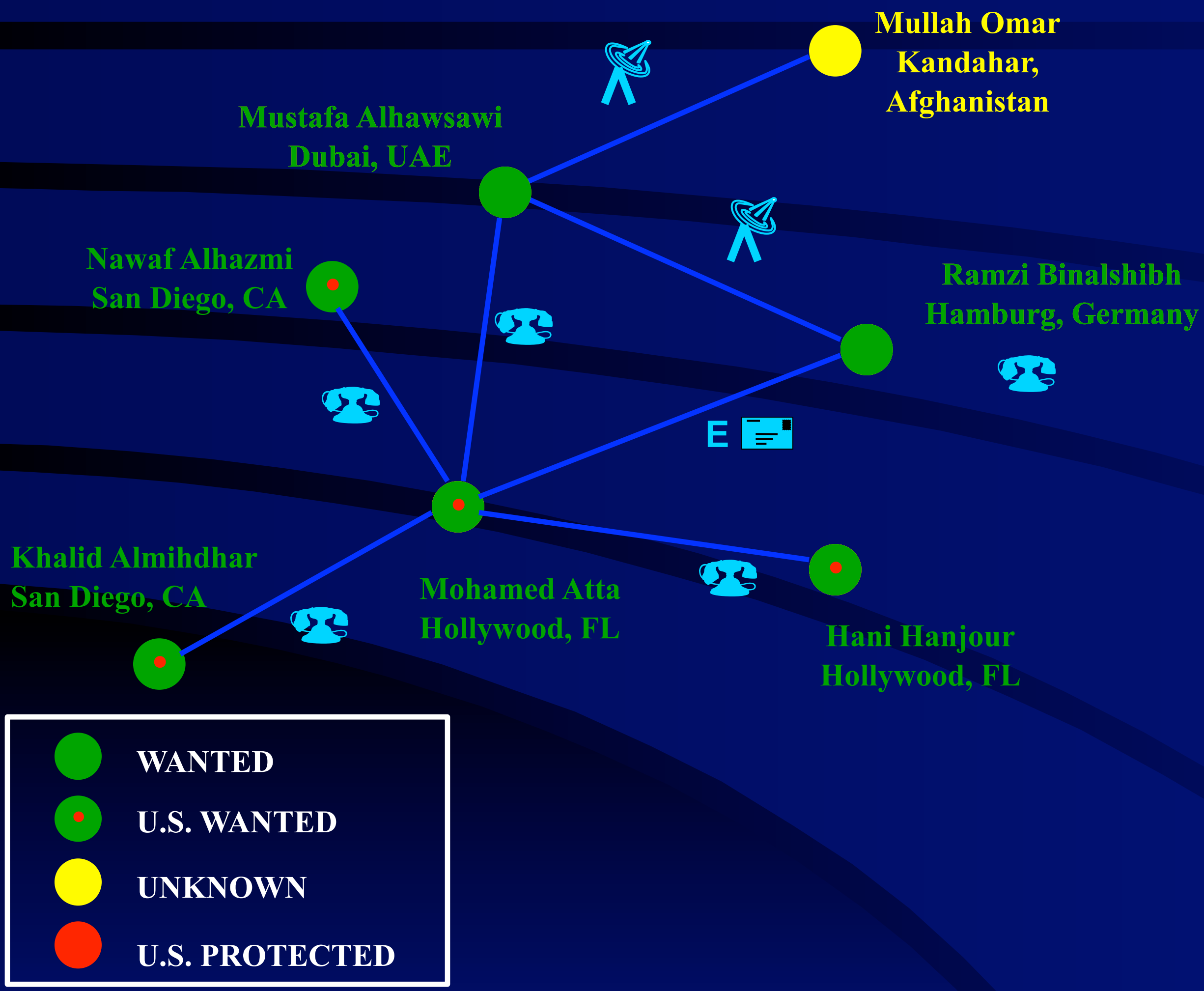

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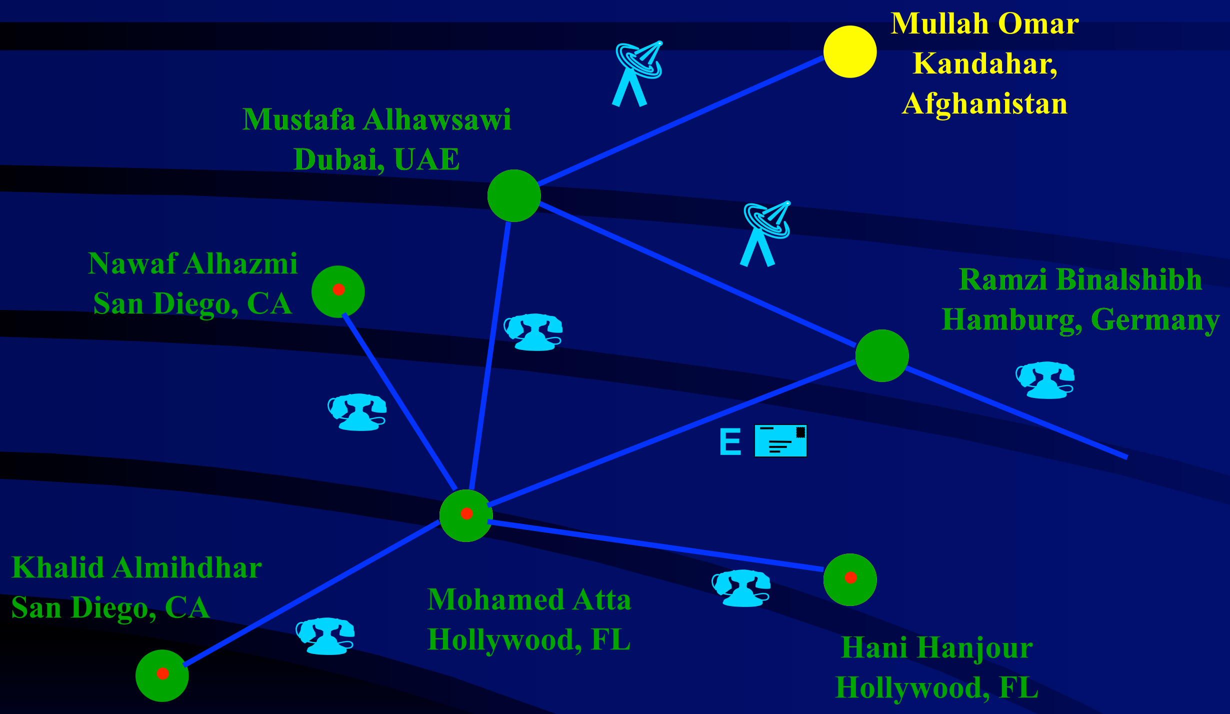

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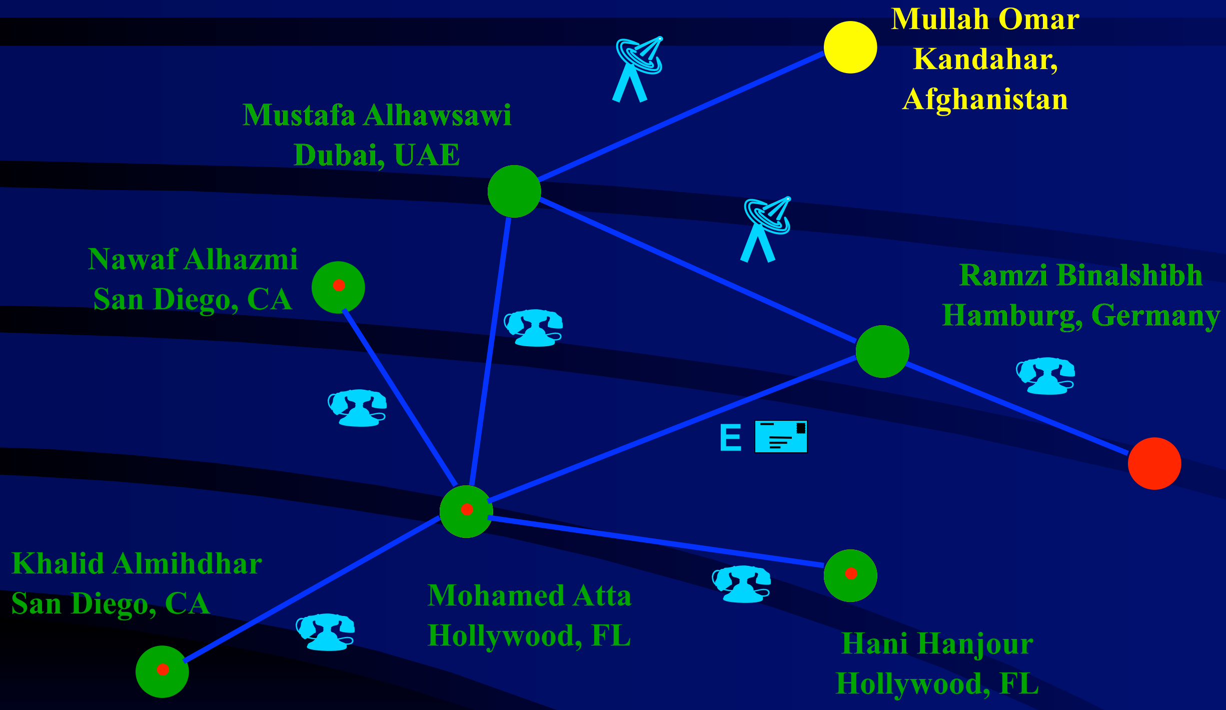

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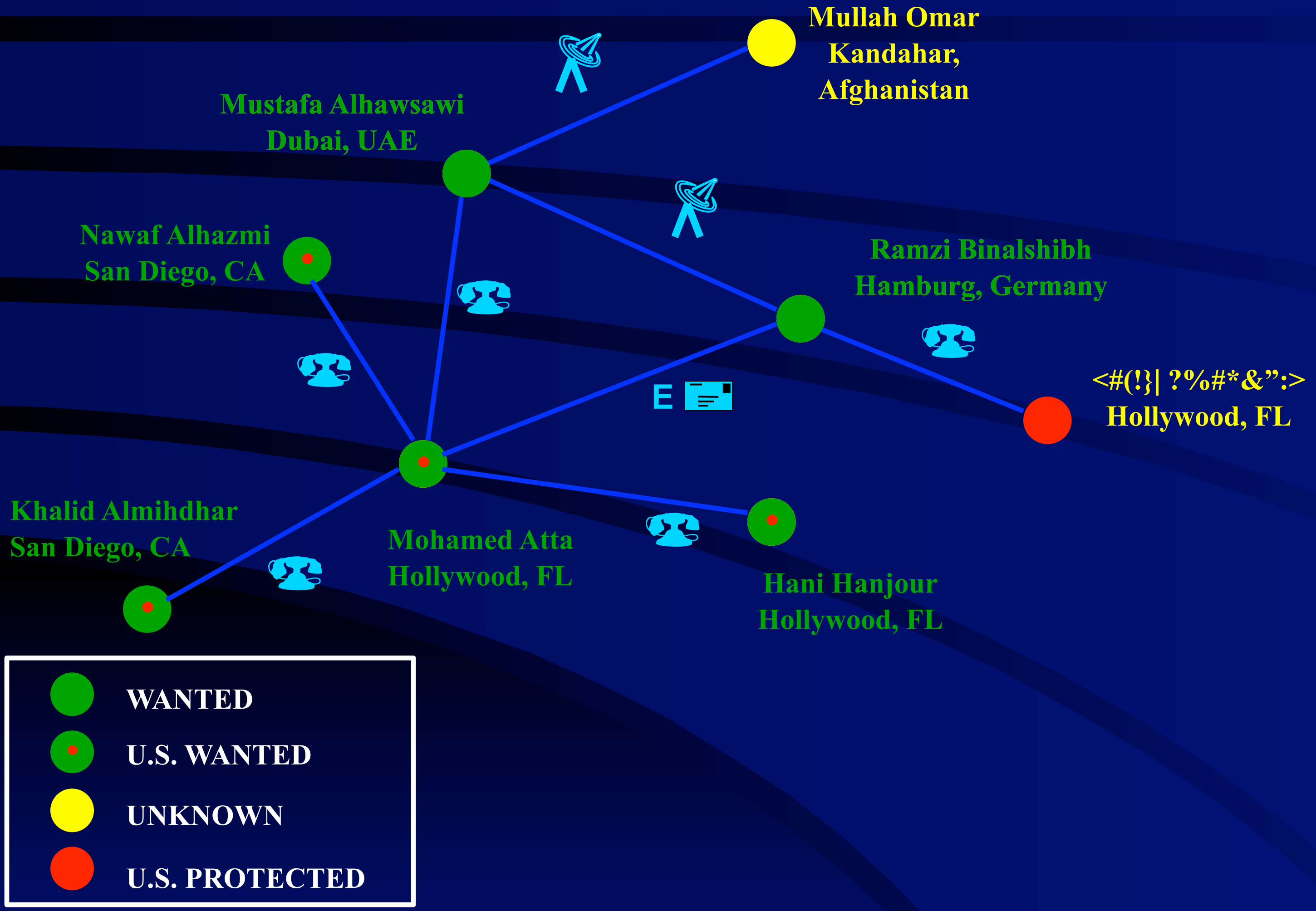

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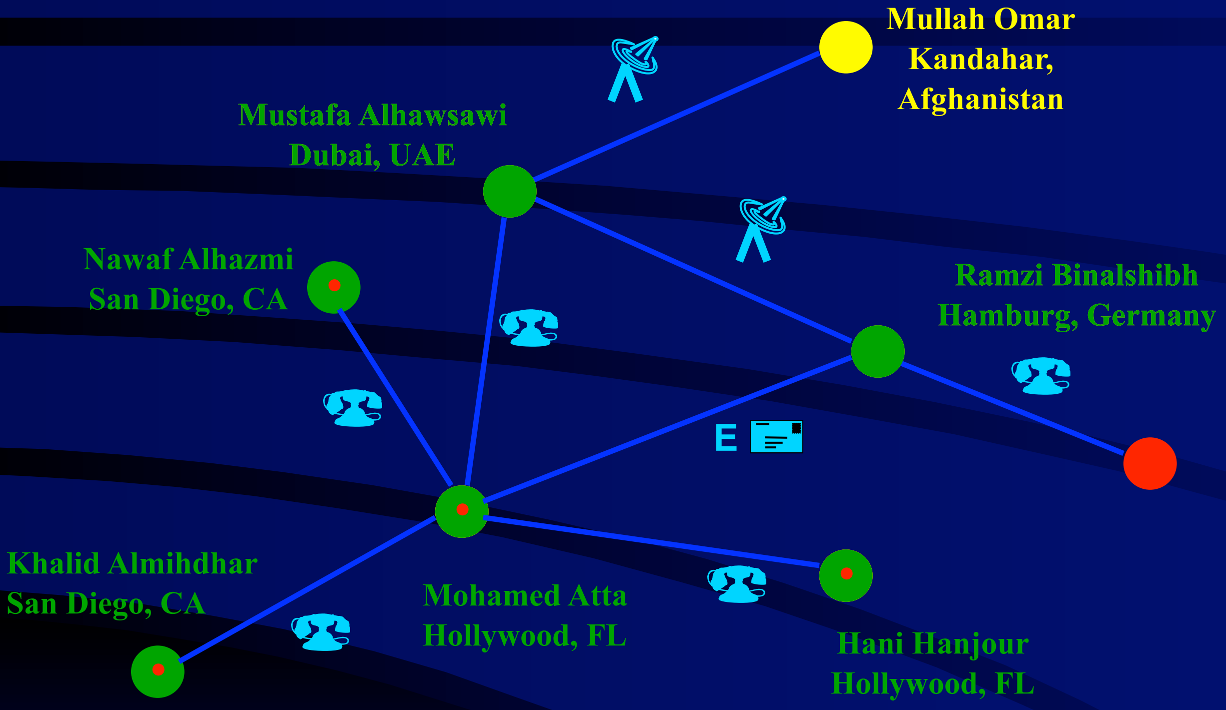

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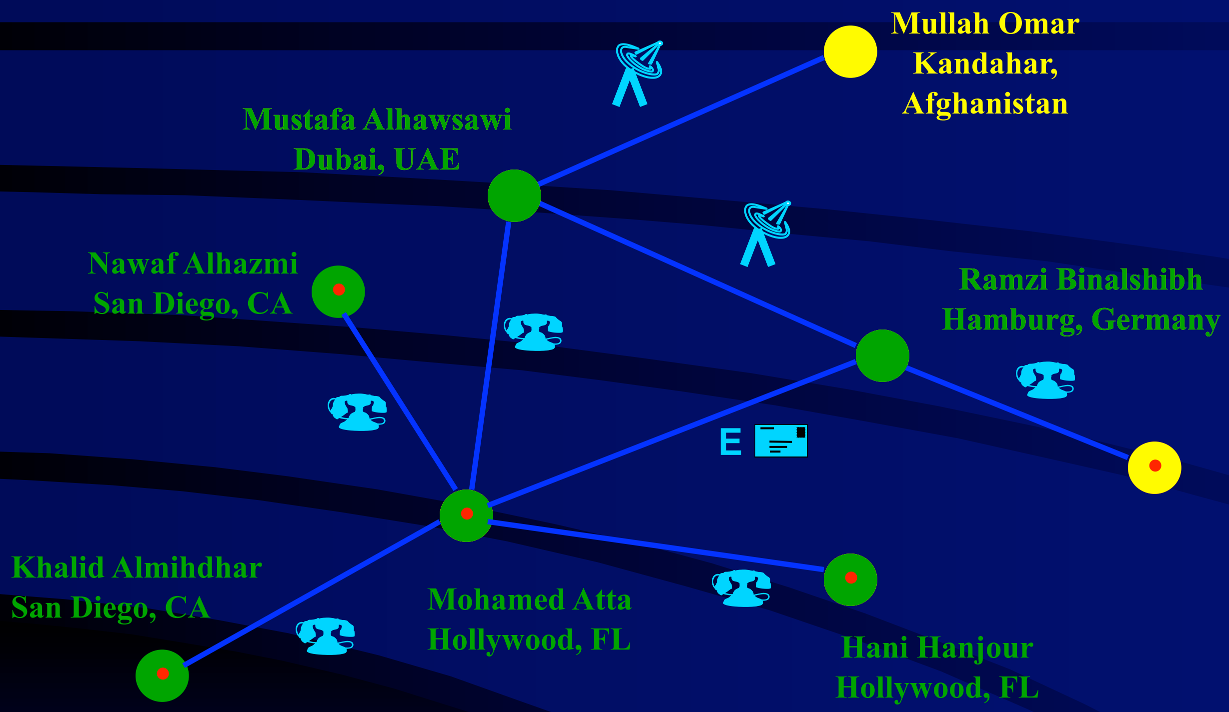

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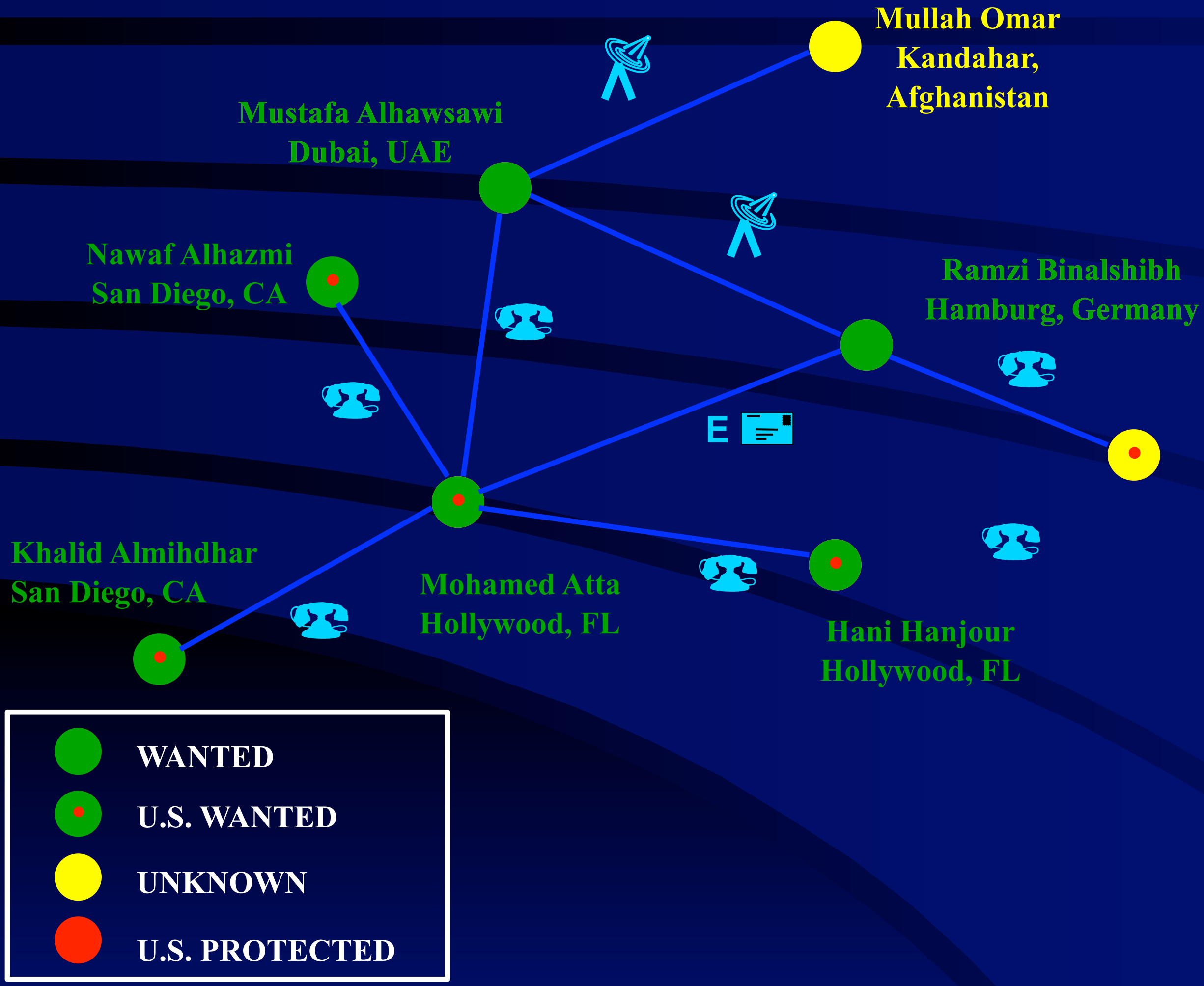

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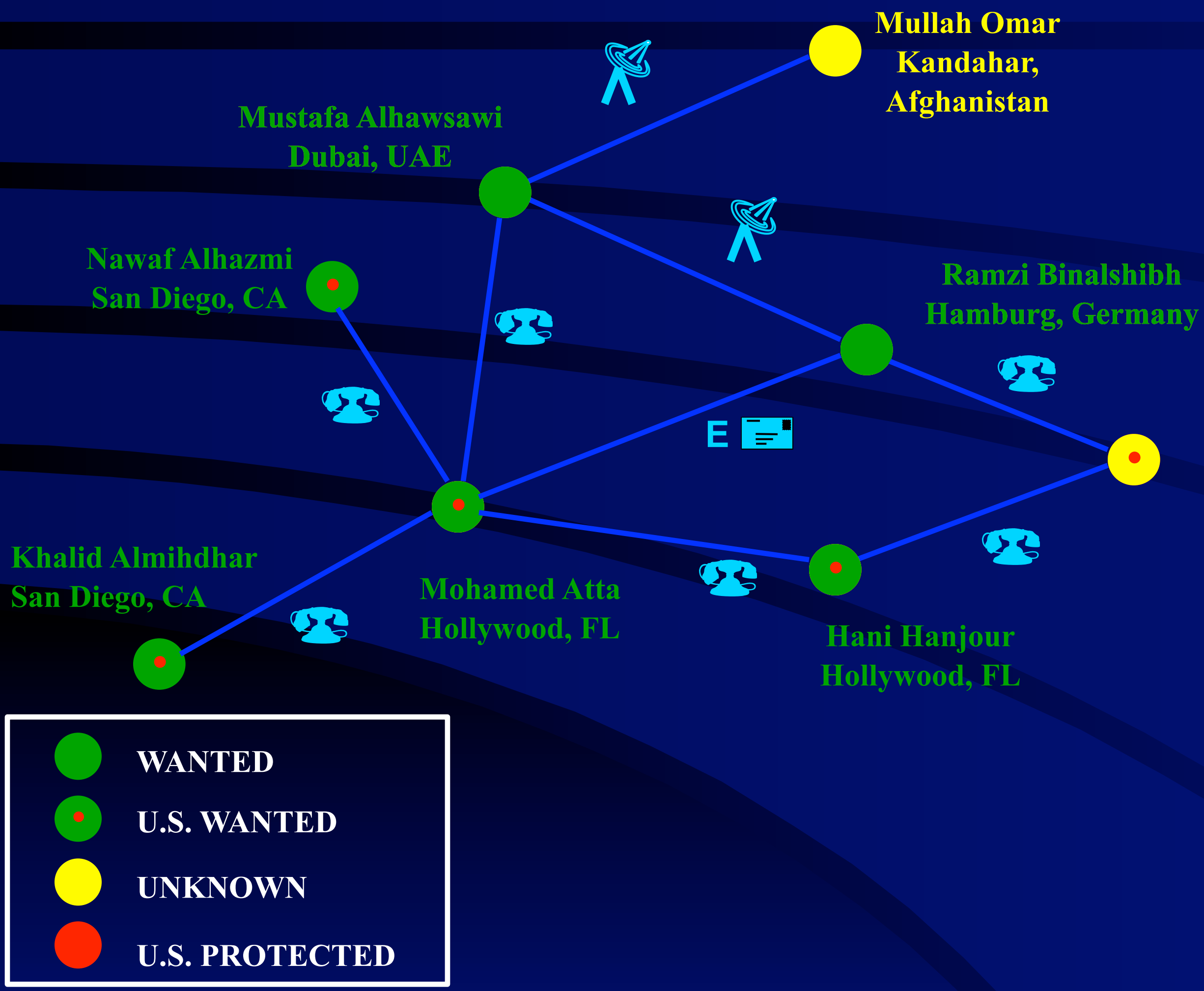

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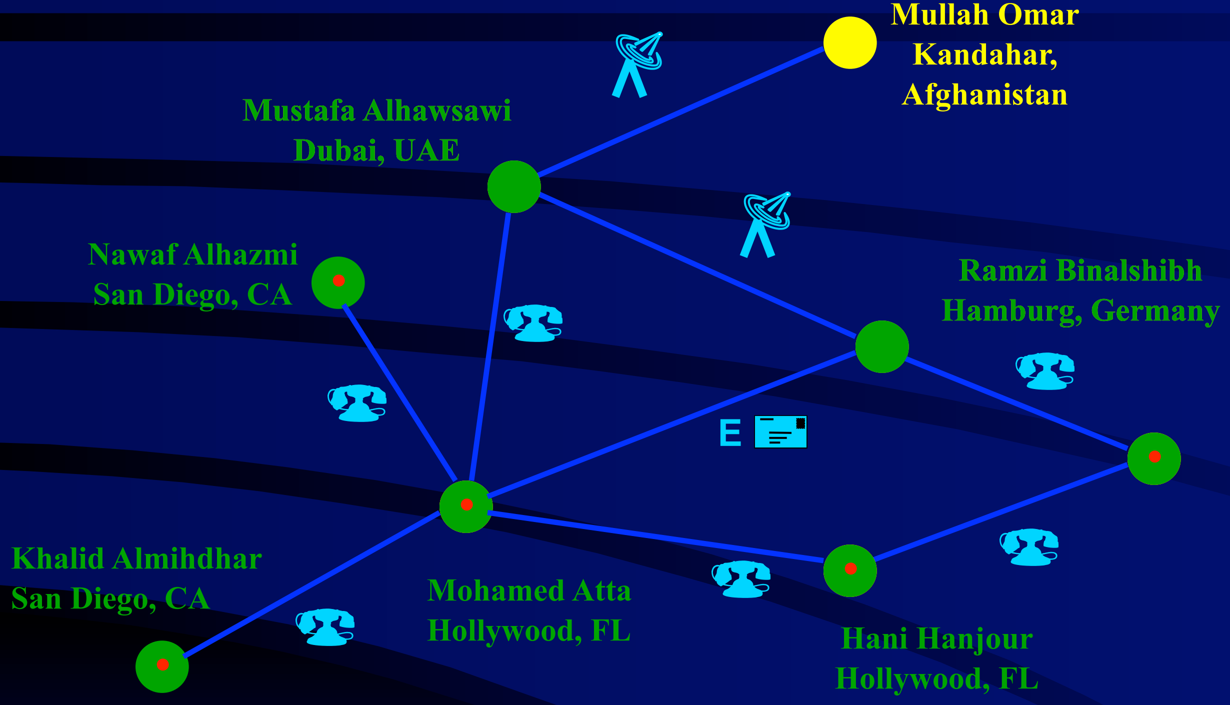

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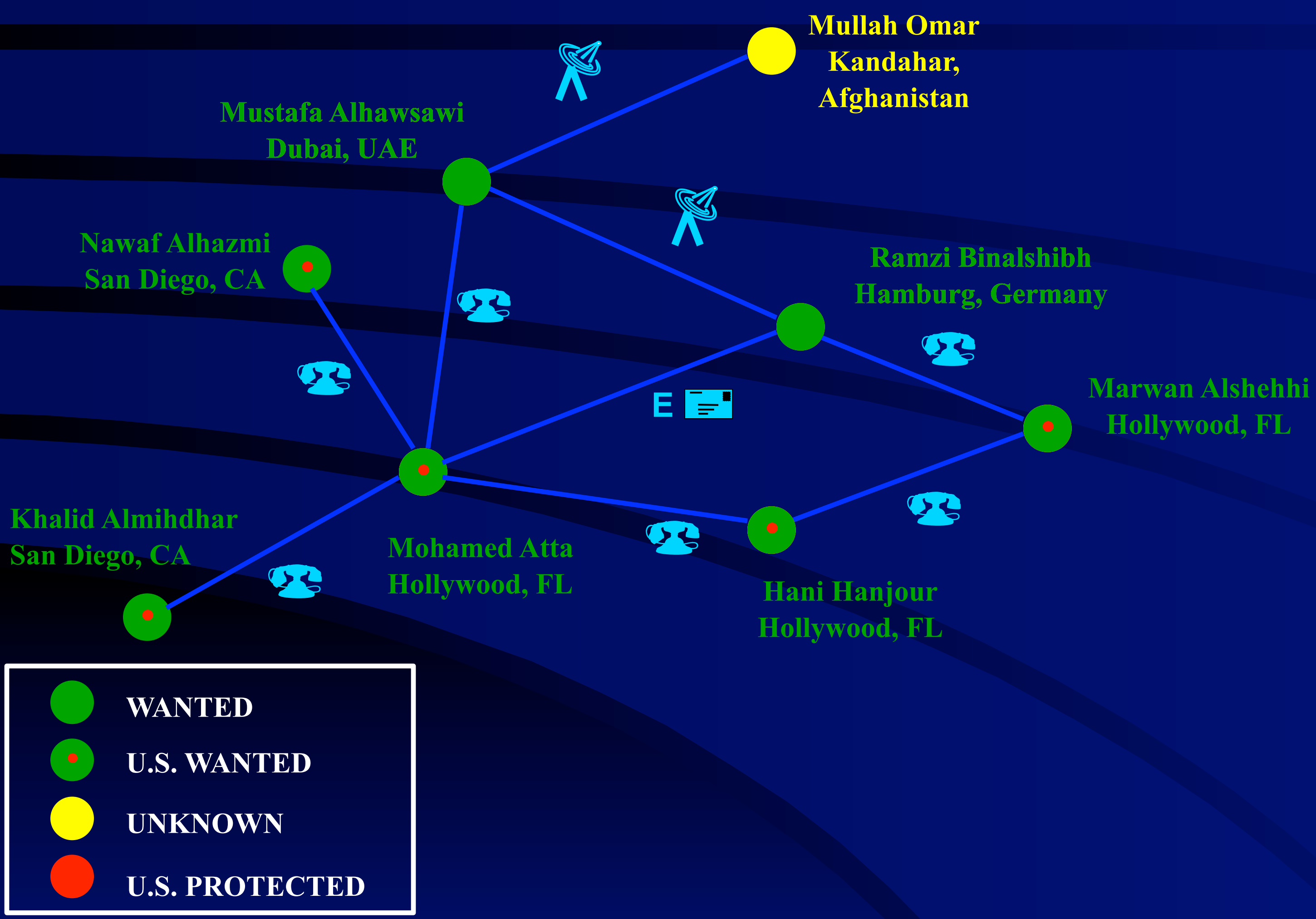

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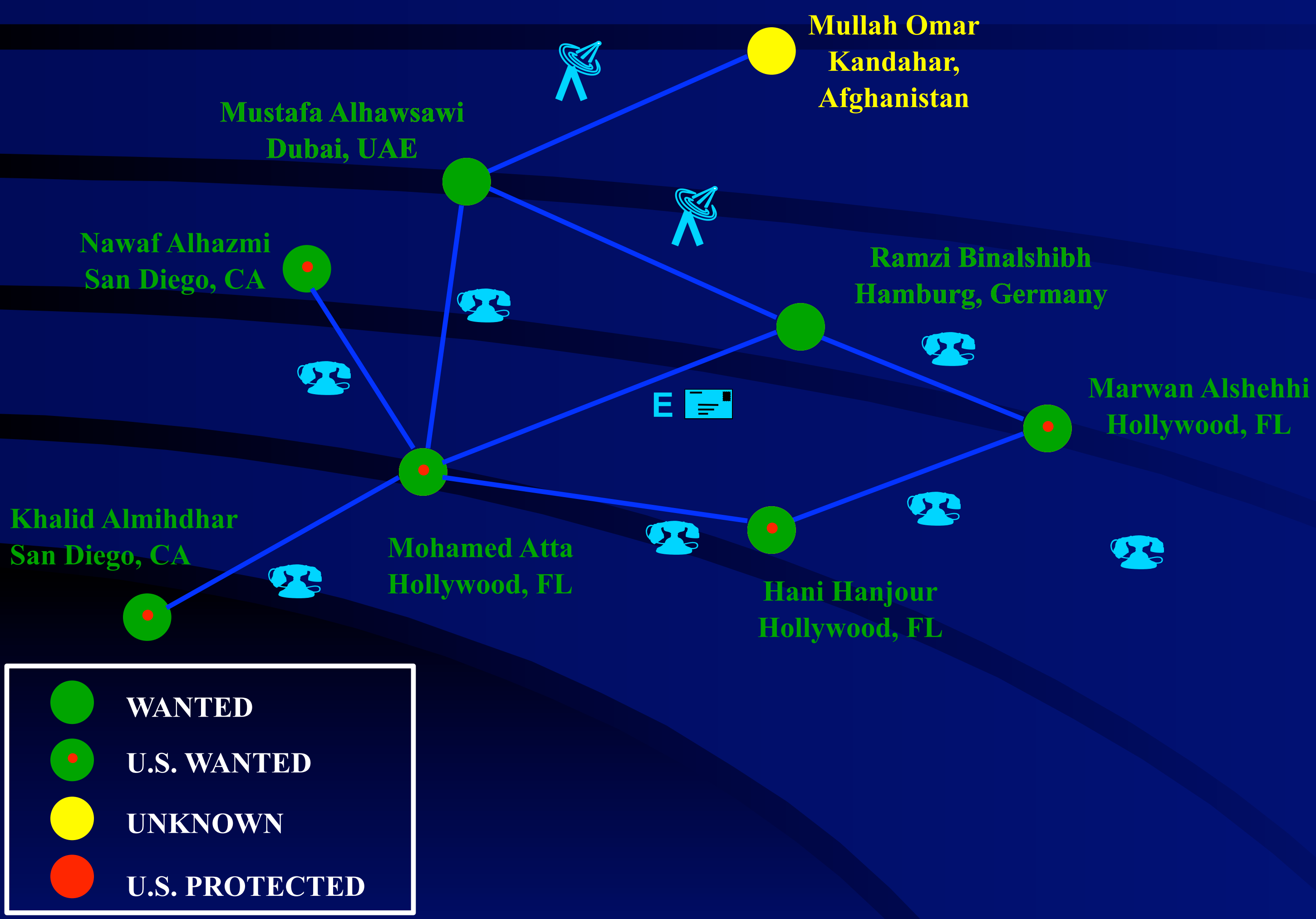

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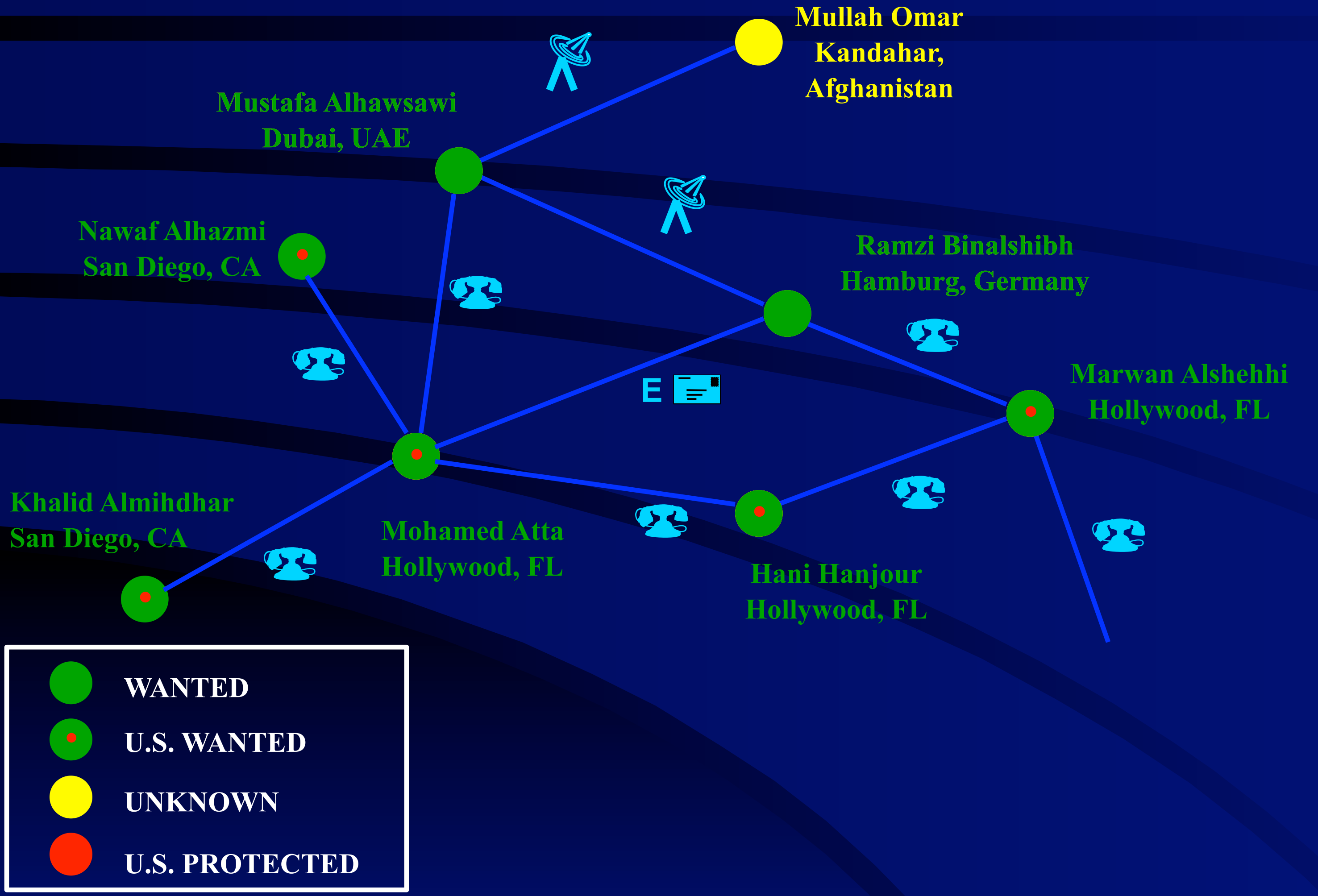

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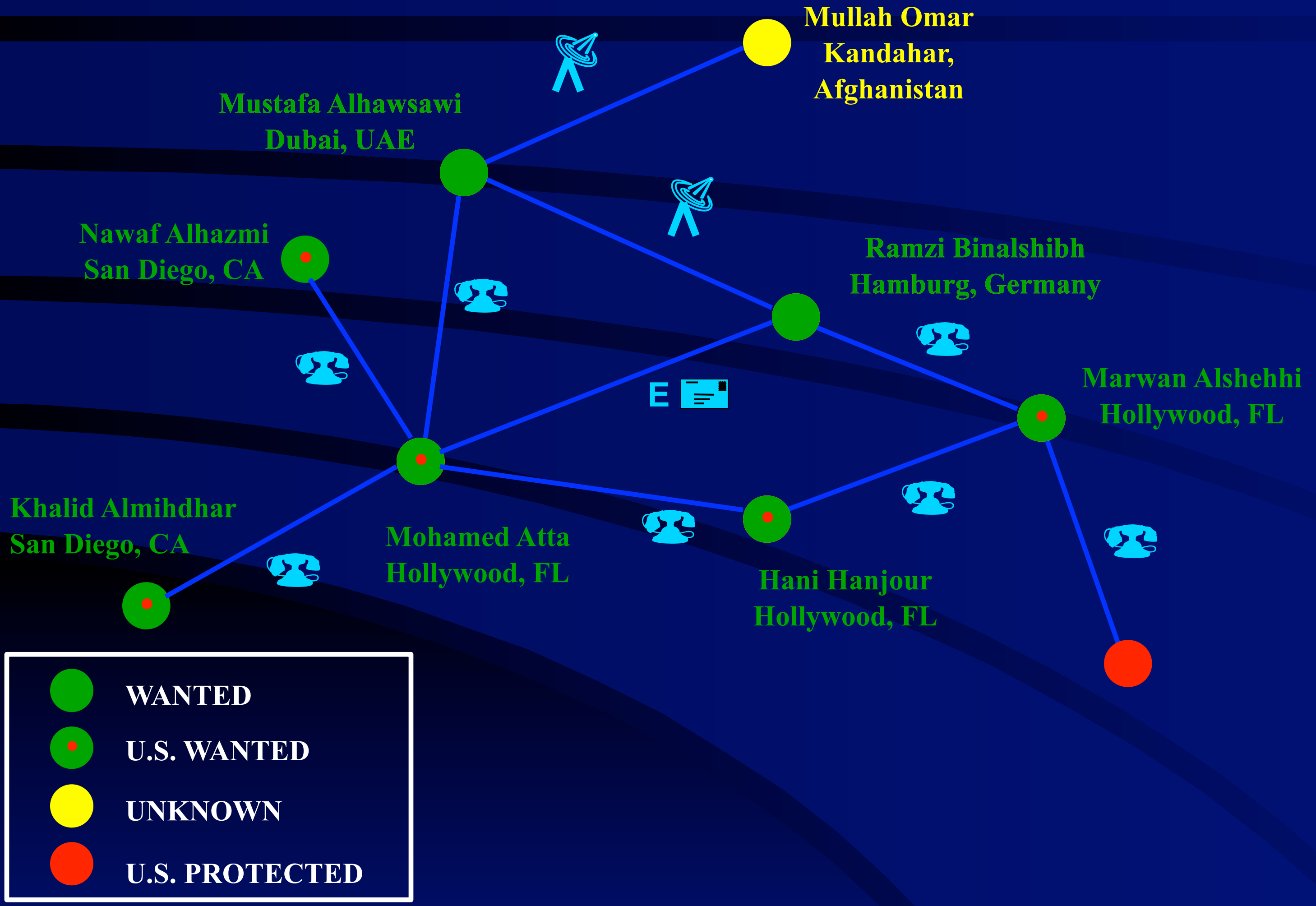

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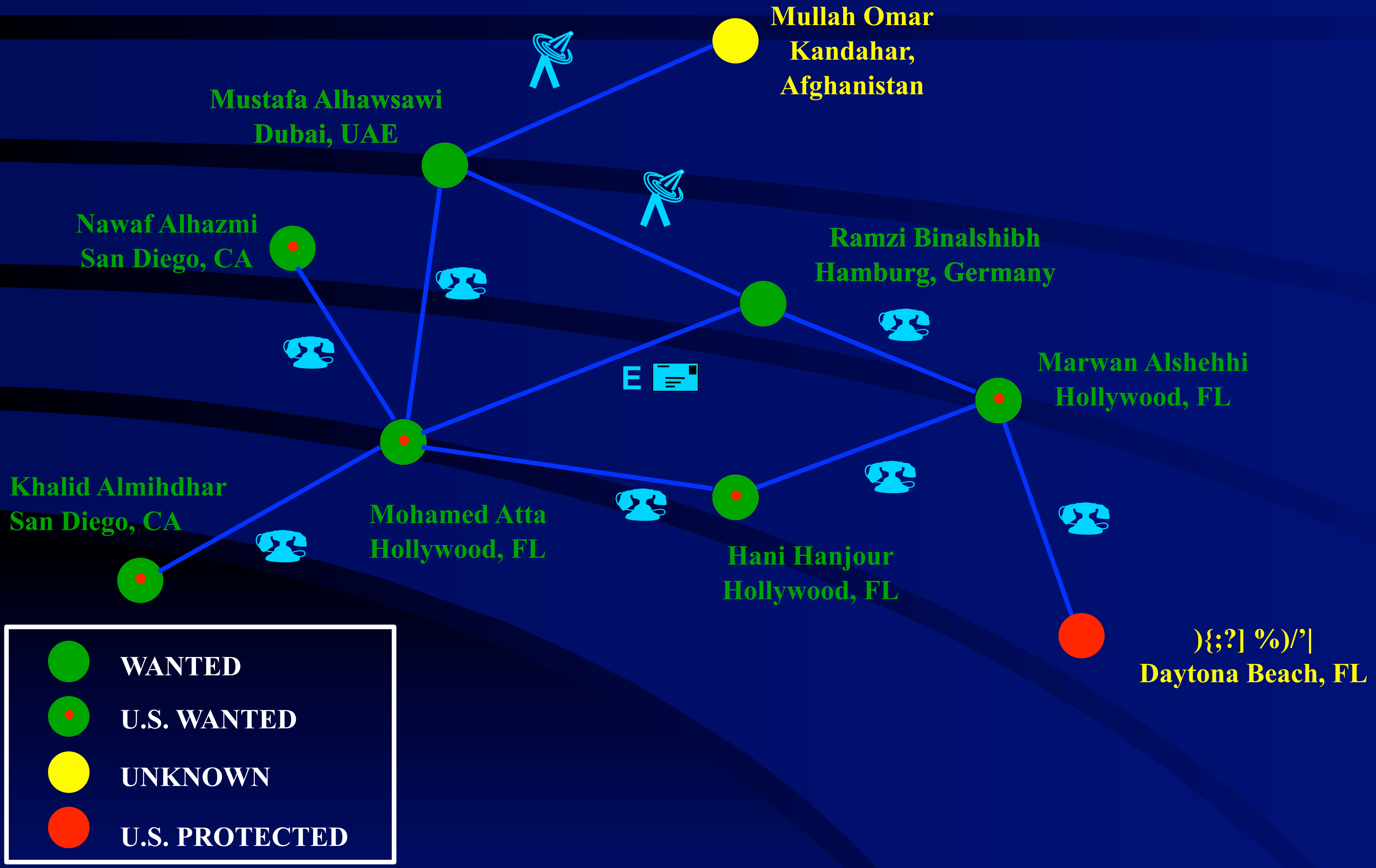

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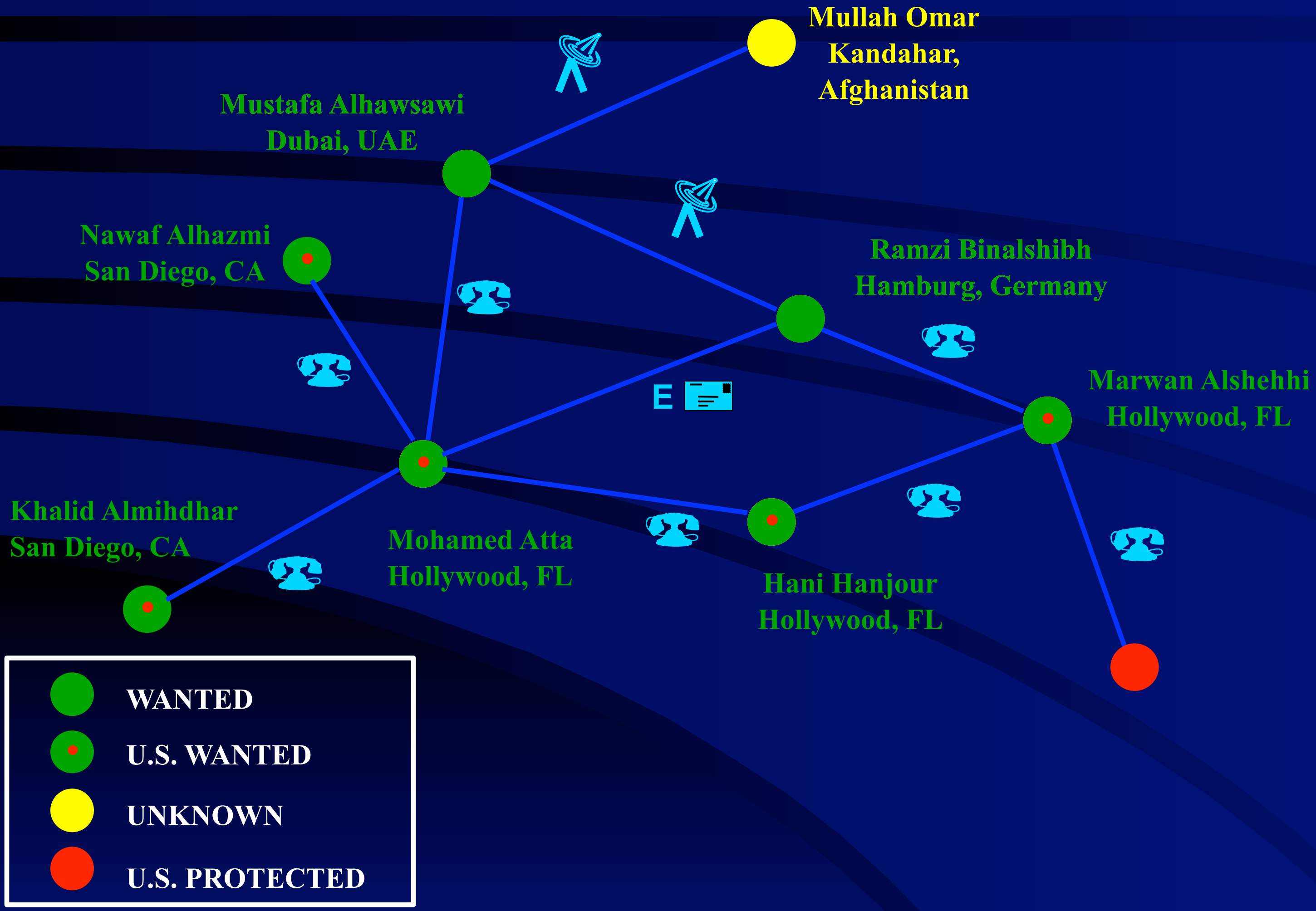

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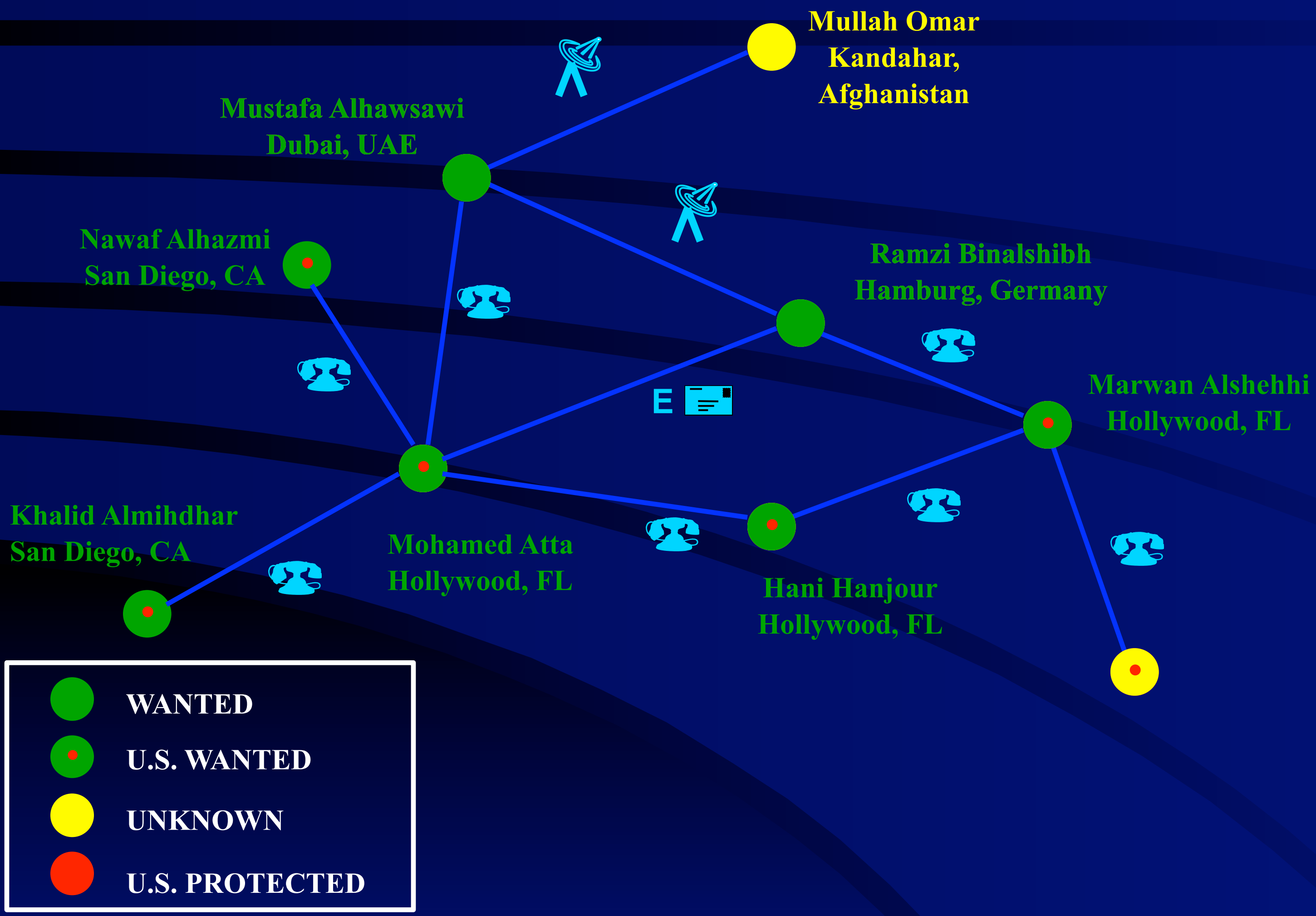

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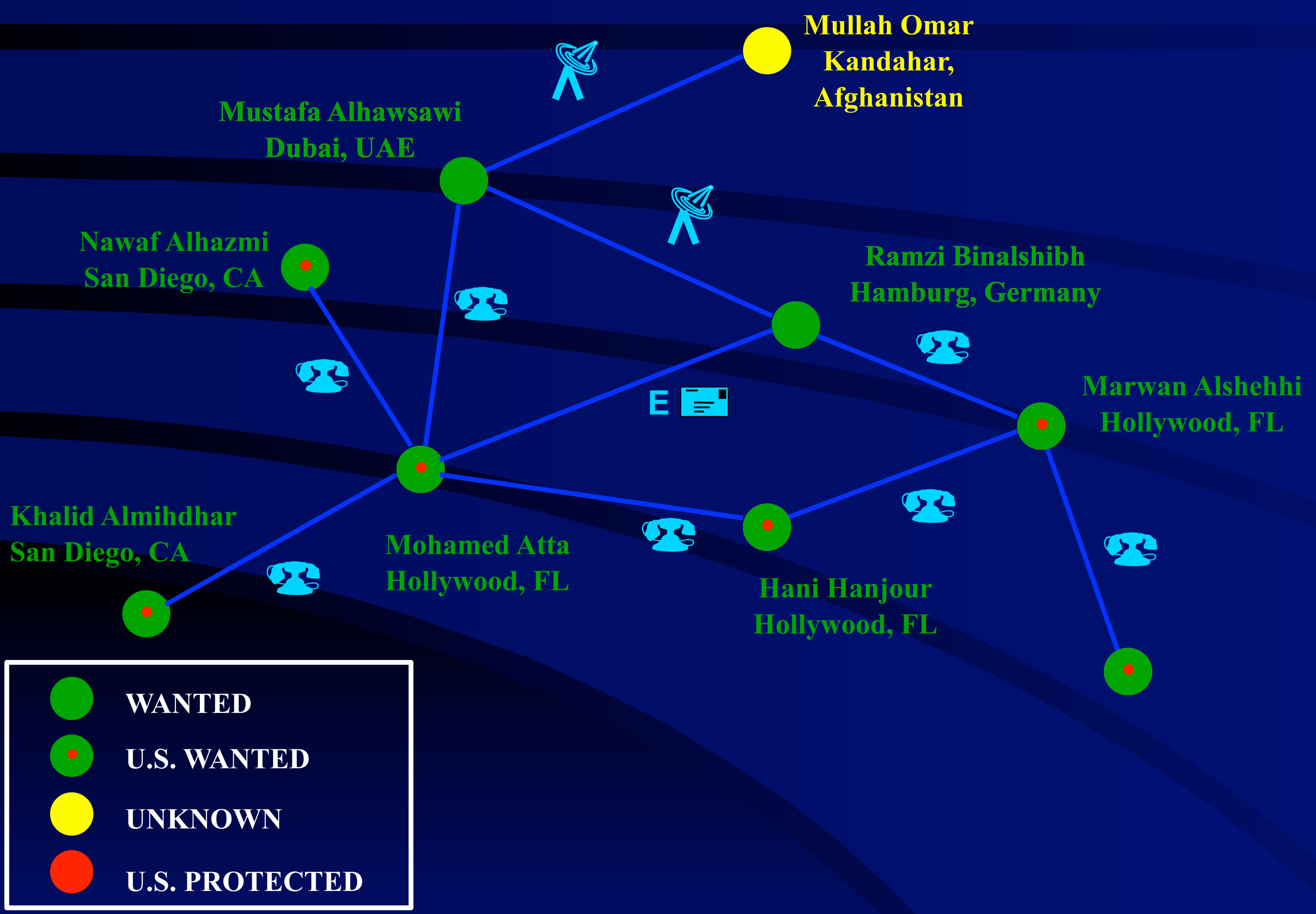

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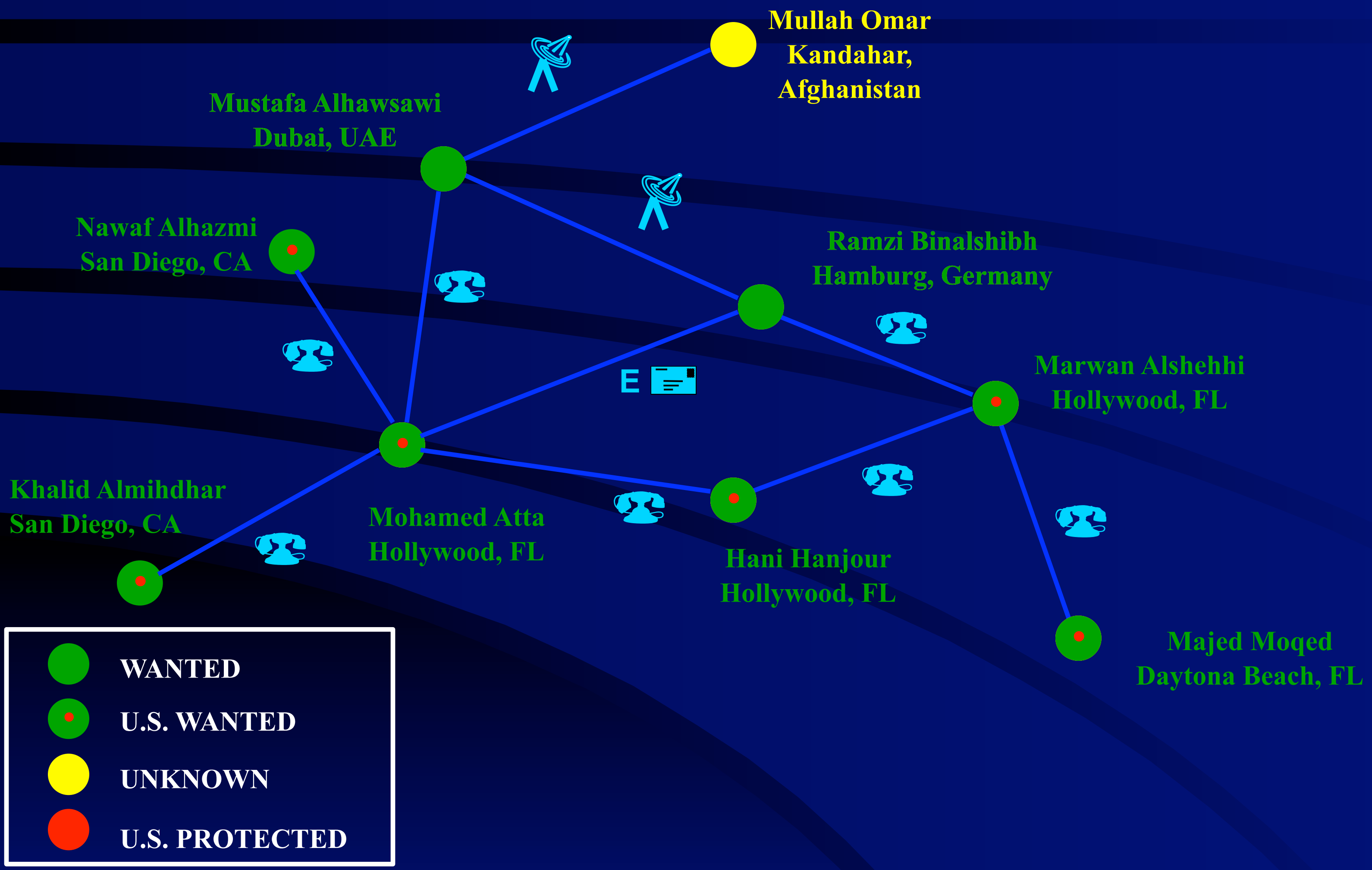

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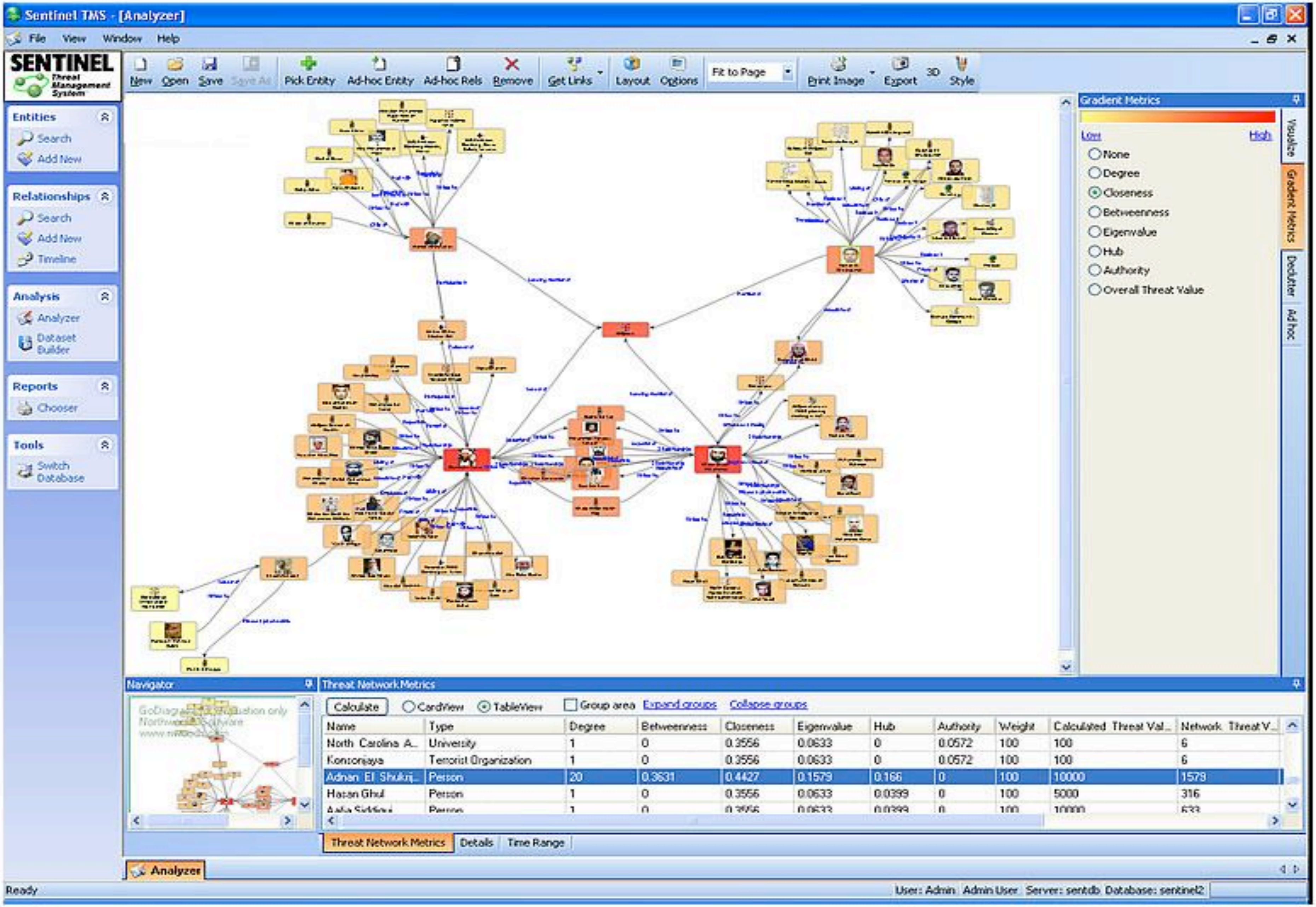


Gradient Metrics: ○ None ○ Degree ● Closeness ○ Betweenness ○ Eigenvalue ○ Hub ○ Authority ○ Overall Threat Value

○ CardView ● TableView □ Group area

Name	Type	Degree	Betweenness	Closeness	Eigenvalue	Hub	Authority	Weight	Calculated Threat Val...	Network Threat V...
North Carolina A...	University	1	0	0.3556	0.0633	0	0.0572	100	100	6
Konsonjaya	Terrorist Organization	1	0	0.3556	0.0633	0	0.0572	100	100	6
Adnan El Shukrij...	Person	20	0.3631	0.4427	0.1579	0.166	0	100	10000	1579
Hasan Ghul	Person	1	0	0.3556	0.0633	0.0399	0	100	5000	316
Aafia Siddiqui	Person	1	0	0.3556	0.0633	0.0399	0	100	10000	633

Ready

User: Admin Admin User Server: sentdb Database: sentinel2

VISION: A Coherent National Security Business Process Based on Merged Multi-Source Data

1) ORG 1

Core Line of Business 'A'

Core Line of Business 'B'

2) ORG 2

Core Line of Business 'A'

Core Line of Business 'B'

3) ORG 3

Core Line of Business 'A'

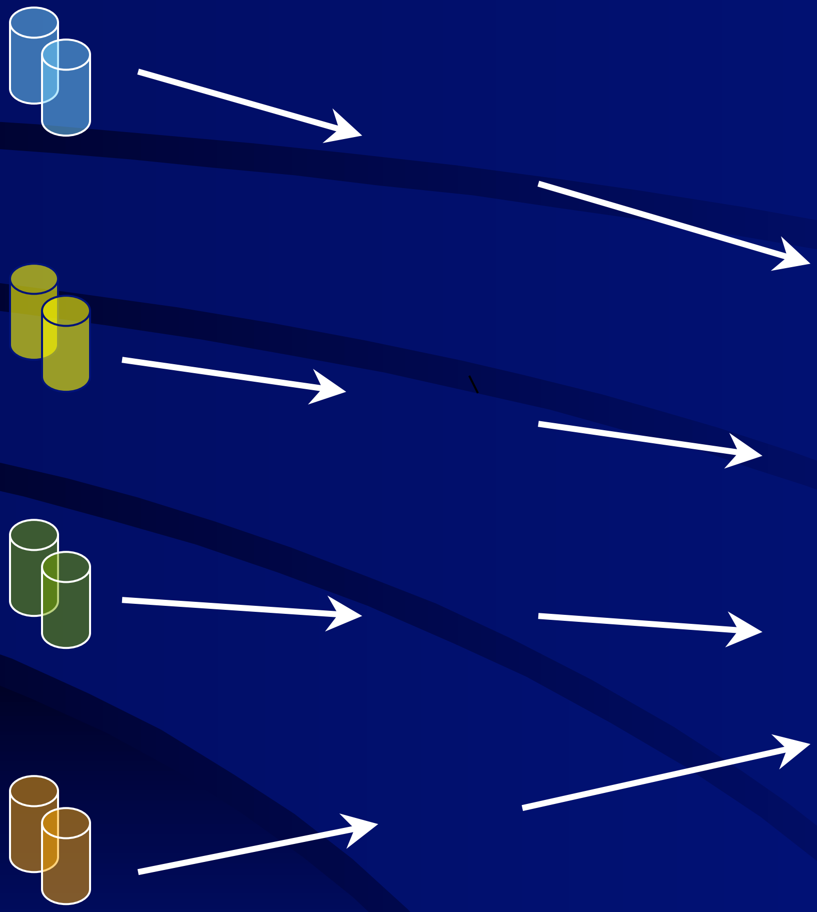
Core Line of Business 'B'

4) ORG 4

Core Line of Business 'A'

Core Line of Business 'B'

Organization-specific Multi-Source Entity Maps (MSEMs)



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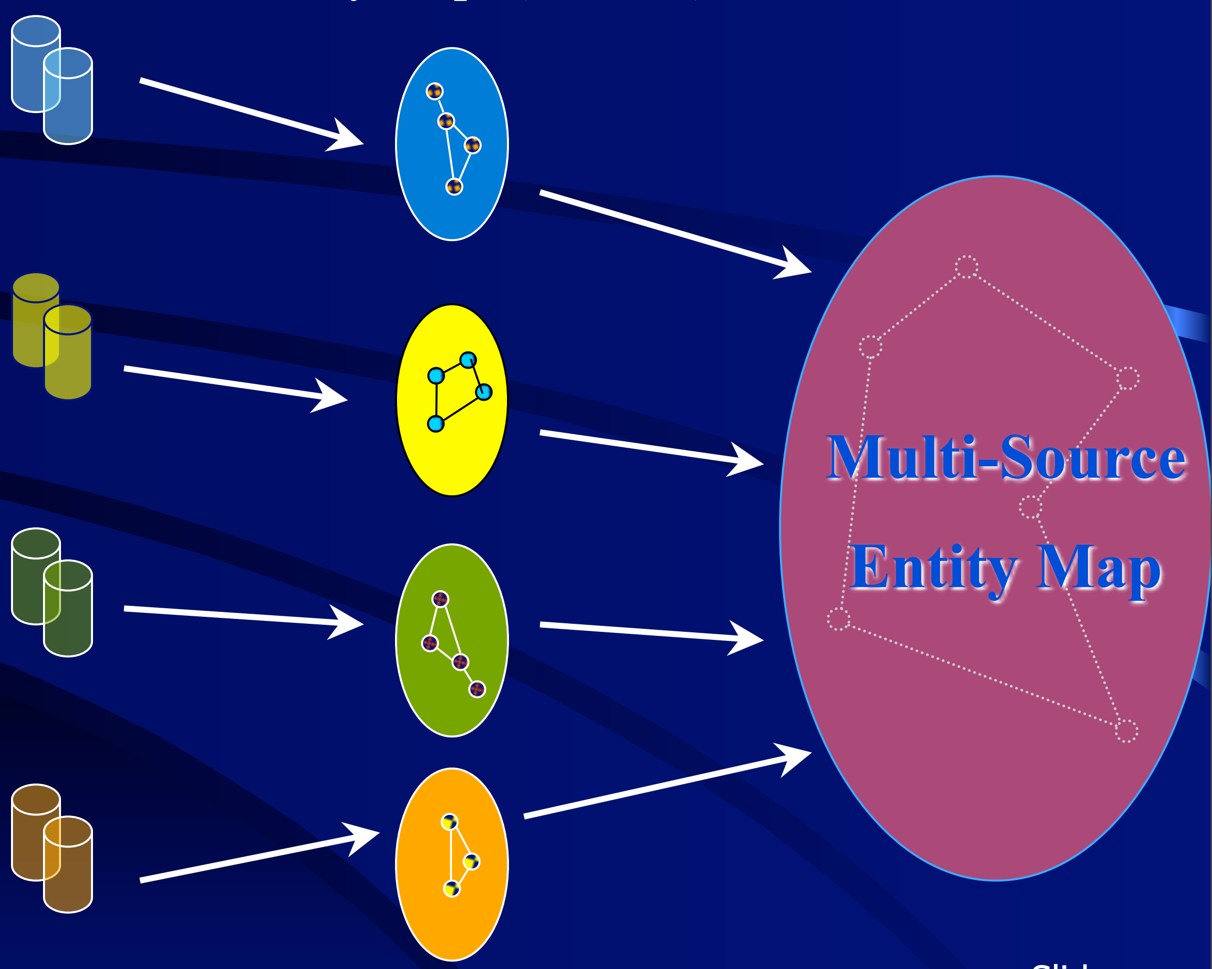
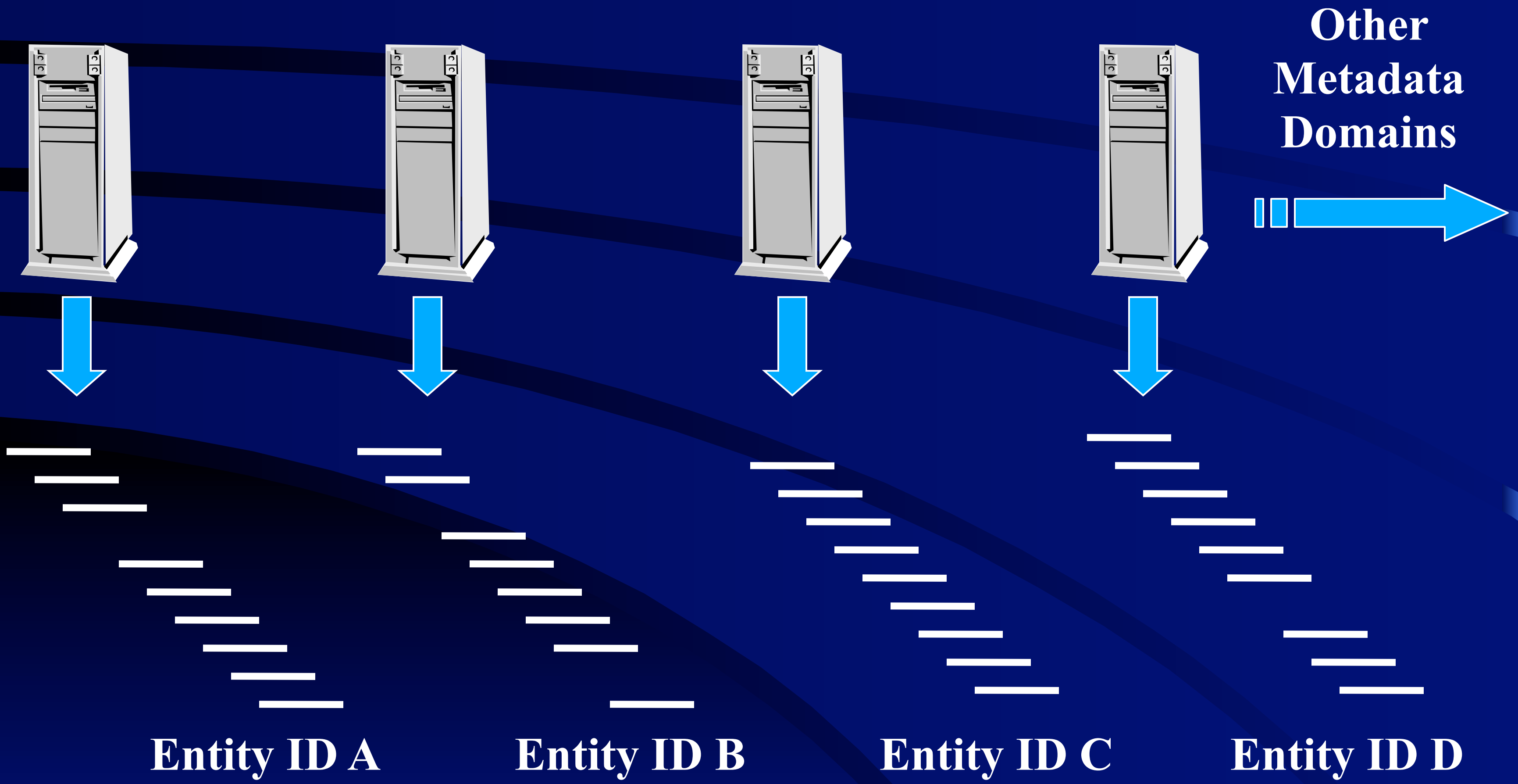


Multi-Source Entity Map

Mapping Entities Across Multiple Sources

Metadata repositories for sources A ~ N…



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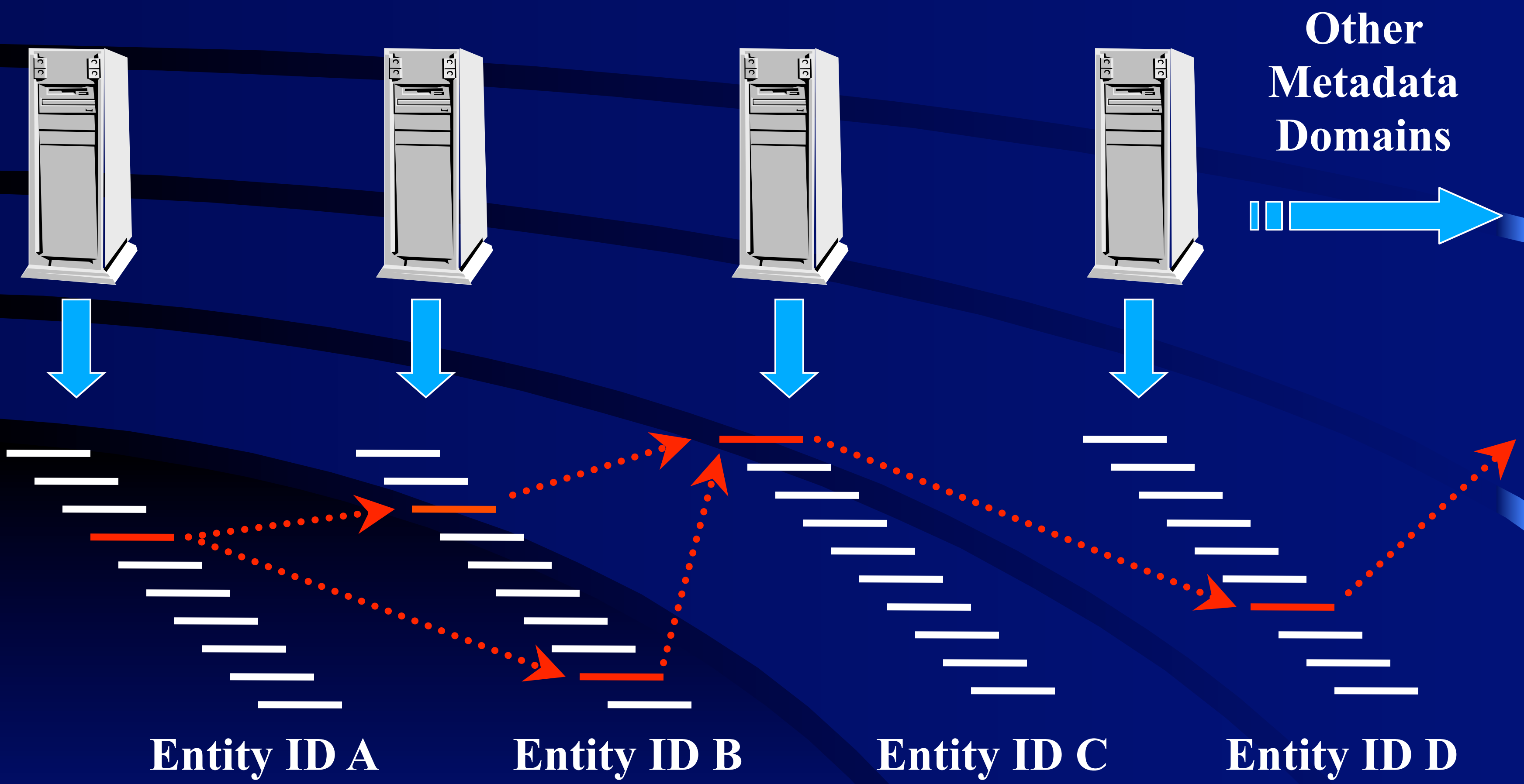


Other Metadata Domains

Entity ID A

Entity ID B

Entity ID C

Entity ID D

IMPACT

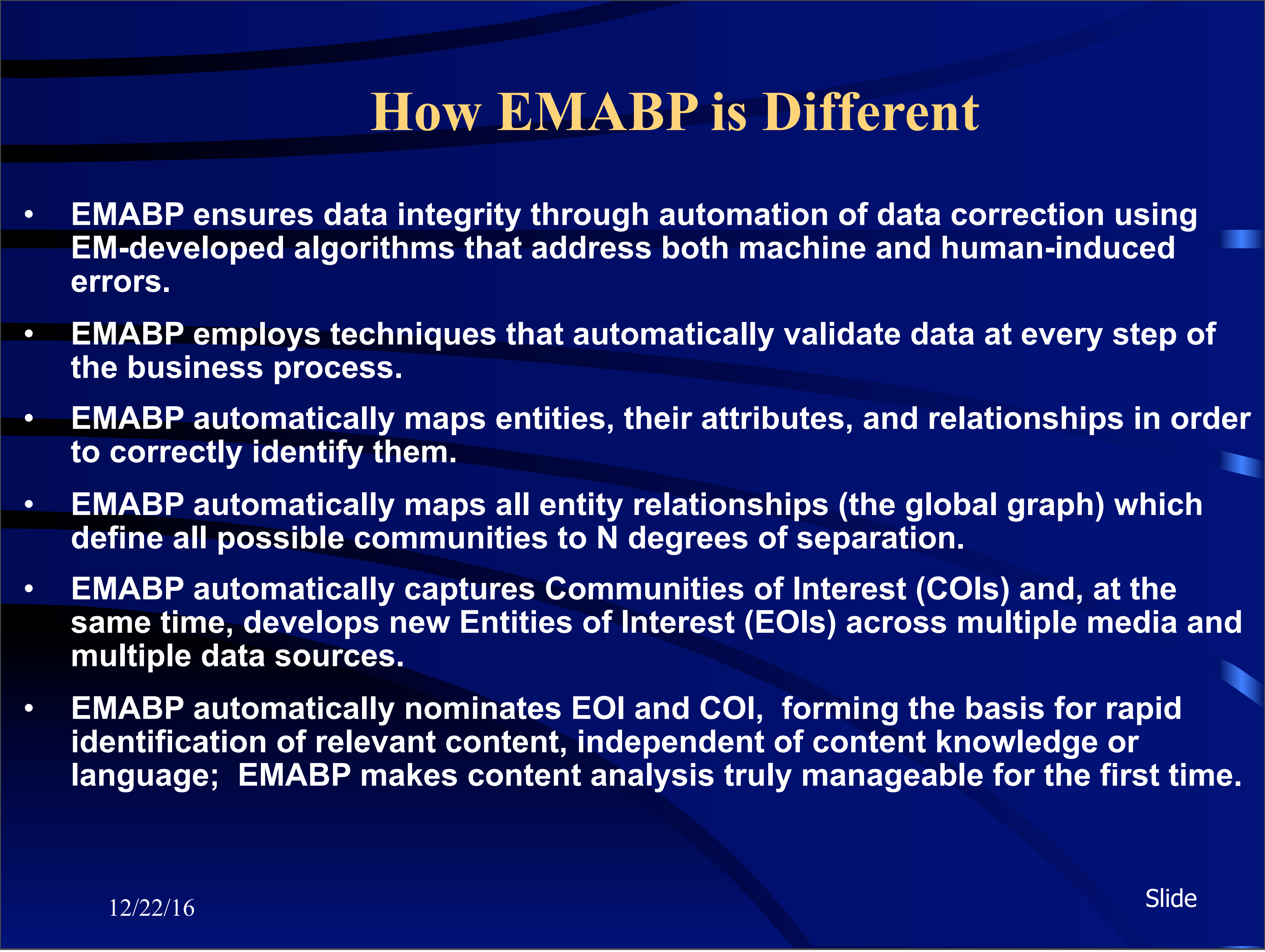
- ✓ Handles *"All the data, all the time"*
- ✓ Builds relationships on world-wide scale
- ✓ Provides analytic focus to target development
- ✓ Provides manageable, relevant content
- ✓ Enables detection of network changes
- ✓ Automatically compiles target activities
- ✓ Captures the information needed to build behavior profiles for inferencing
- ✓ Forms basis for analysis across a number of variables, including proximity, frequency of comms, time, etc.

IMPACT (cont.)

- Estimate orders of magnitude increase in analyst productivity with manual 1 and 2 degree displays of associations – even greater increase with automation of same
- Speed of discovery in massive information environments reduced from 6 months to 2 seconds
- Keeps analysis focused on relevant information
- Near real-time tasking and networking results
- Provides basis for true data integration, knowledge-creation, plus knowledge capture, maintenance, and sharing

QUESTIONS?

BACK-UP SLIDES



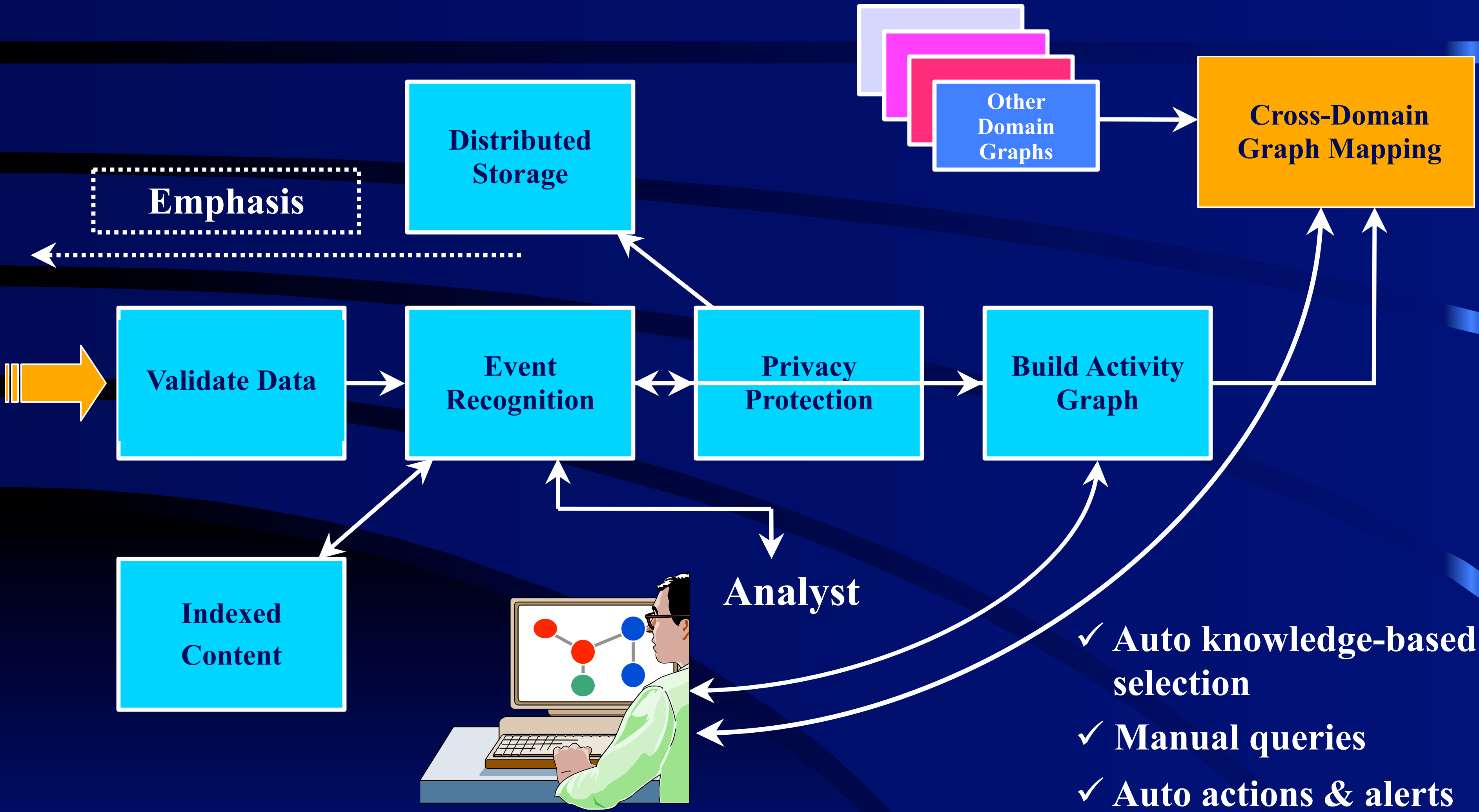
How EMABP is Different

- EMABP ensures data integrity through automation of data correction using EM-developed algorithms that address both machine and human-induced errors.
- EMABP employs techniques that automatically validate data at every step of the business process.
- EMABP automatically maps entities, their attributes, and relationships in order to correctly identify them.
- EMABP automatically maps all entity relationships (the global graph) which define all possible communities to N degrees of separation.
- EMABP automatically captures Communities of Interest (COIs) and, at the same time, develops new Entities of Interest (EOIs) across multiple media and multiple data sources.
- EMABP automatically nominates EOI and COI, forming the basis for rapid identification of relevant content, independent of content knowledge or language; EMABP makes content analysis truly manageable for the first time.

How EMABP is Different (cont.)

- EMABP automatically builds target (EOI and COI) profiles.
- EMABP provides the basis for behavior-based rules development for automated alerting and for the production of actionable intelligence, independent of content analysis.
- EMABP embraces a knowledge management process that captures knowledge, stores, and maintains it, and leverages it throughout EMABP and across the greater enterprise.
- EMABP automatically audits every EMABP process as a basis for systems management and as a basis for calculating and measuring performance, as well as ROIs.
- The EMABP-produced graph is continuously updated in the background, thereby enabling automated changes in emphasis.
- EMABP is a core enterprise business process, not a spot technology solution; unique technology comes with it, and it enables complimentary

New Domain Access and Relationship Mapping



Other Domain Graphs

Cross-Domain Graph Mapping

Distributed Storage

Emphasis

Validate Data

Event Recognition

Privacy Protection

Build Activity Graph

Indexed Content

Analyst

- ✓ Auto knowledge-based selection
- ✓ Manual queries
- ✓ Auto actions & alerts

Opportunities in Open Sources

“The Internet is now the default C4I architecture for virtually the entire world. The principle exceptions are most militaries and intelligence organizations. The Internet facilitates commerce, provides entertainment and supports ever increasing amounts of human interaction. To exclude the information flow carried by the Internet is to exclude the greatest emerging data source available. While the Internet is a source of much knowledge, all information gleaned from it must be assessed for its source, bias and reliability.”

Department of Defense Architecture Framework (DoDAF, formerly **C4ISR**)

-- W. F. KERNAN, General, U.S. Army
Supreme Allied Commander, Atlantic

NATO Open Source Intelligence Handbook, November 2001

http://www.oss.net/dynamaster/file_archive/030201/ca5fb66734f540fbb4f8f6ef759b258c/NATO%20OSI

Slide

Real-World Open-Source Example

Date: June, 2006

Source: Department of Commerce, Bureau of Industry and Security (BIS)

http://a257.g.akamaitech.net/7/257/2422/01jan20061800/edocket.access.gpo.gov/2006/06-5118.htm

COMPANY	P.O. BOX	ADDRESS
Mayrow General Trading	42340 & 171978	A&B&C
Micatic General Trading	42340	A&B
Majidco Micro Electronics	42340	A&B
Atlinx Electronics	42340	A&B
Narinco	42340	A&B
Micro Middle East Electronics	42340	A&B

Open-Source Example (Cont.)

Associated Personal Names

F.N. Yaghmaei

H. Ghasir

Business Locations

Address “A” = 401 --Bin Yas Center -- Al Maktum Road, Dubai, UAE

Address “B” = Shops 3-4, Sharafia Ahmed Ali Building, al-Nakheel, Deira,
Dubai, UAE

Address “C” = Deira, Dubai, UAE

Open-Source Example (Cont.)

Company Name	PO Box	Address	Phone/Fax Nr
Mayrow General Trading	42340 171978	ABC	971-4-2219641 2219642
Micatic General Trading	42340	AB	971-4-2278996 2278995
	171978		971-4-2278997 2278998
Majidco Micro Electronics	42340	AB&D	971-4-2278996 2278995
Atlinx Electronics	42340	AB	971-4-2278997 2278998 971-4-2278996 2278995
Narinco	42340	AB	
Micro Middle East Electronics	42340	AB	971-4-2278996 2278995
(MME Middle East, LLC	42340		971-4-2241400) 2241500) 2278996

Open-Source Example (Cont.)

Associated Personal Names

F.N. Yaghmaei
H. Ghasir

Locations

Address “A” = 401 --Bani Yas Center -- Al Maktum Road, Dubai, UAE

Address “B” = Shops 3-4, Sharafia Ahmed Ali Building, al-Nakheel, Deira, Dubai, UAE

Address “C” = Deira, Dubayy, UAE

Address “D” = Mohamad Abdulla Alqaz Bldg, Bani Yas Square, Al Rigga, Dubai, UAE