

Emerging Leaders in New England's Banking Industry

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Mission

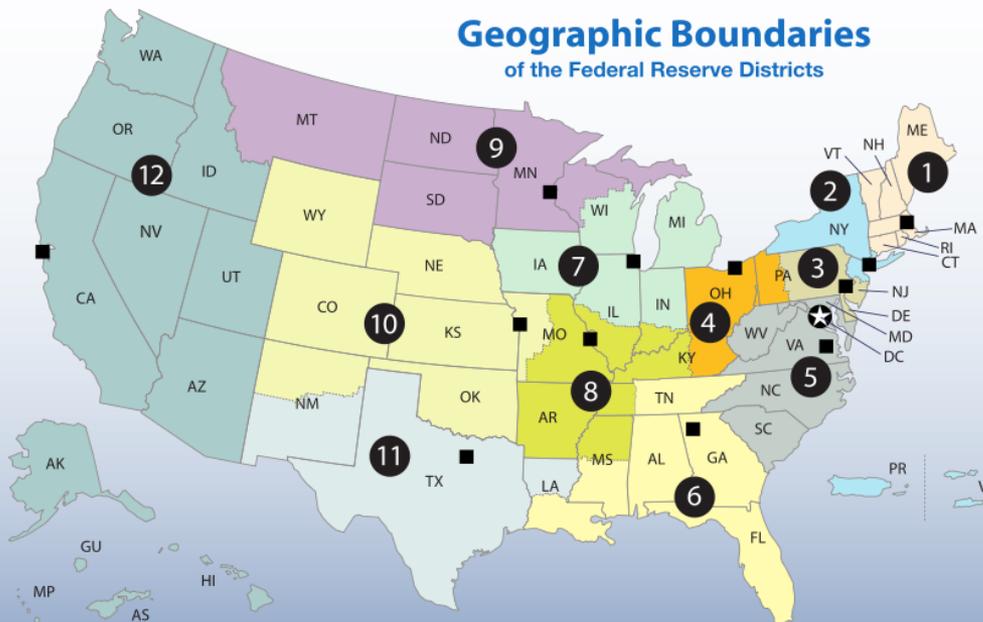
The Federal Reserve System is the central bank of the United States. It was founded by Congress in 1913 to provide the nation with a safer, more flexible, and more stable monetary and financial system. Over the years, its role in banking and the economy has expanded.

Today, the Federal Reserve's duties fall into four general areas:

- Conducting the nation's monetary policy by influencing the monetary and credit conditions in the economy in pursuit of maximum employment, stable prices, and moderate long-term interest rates
- Supervising and regulating banking institutions to ensure the safety and soundness of the nation's banking and financial system and to protect the credit rights of consumers
- Providing financial services to depository institutions, the U.S. government, and foreign official institutions, including playing a major role in operating the nation's payments system
- Maintaining the stability of the financial system and containing systemic risk that may arise in financial markets

The Federal Reserve's Federated Structure

Geographic Boundaries
of the Federal Reserve Districts



12 Districts

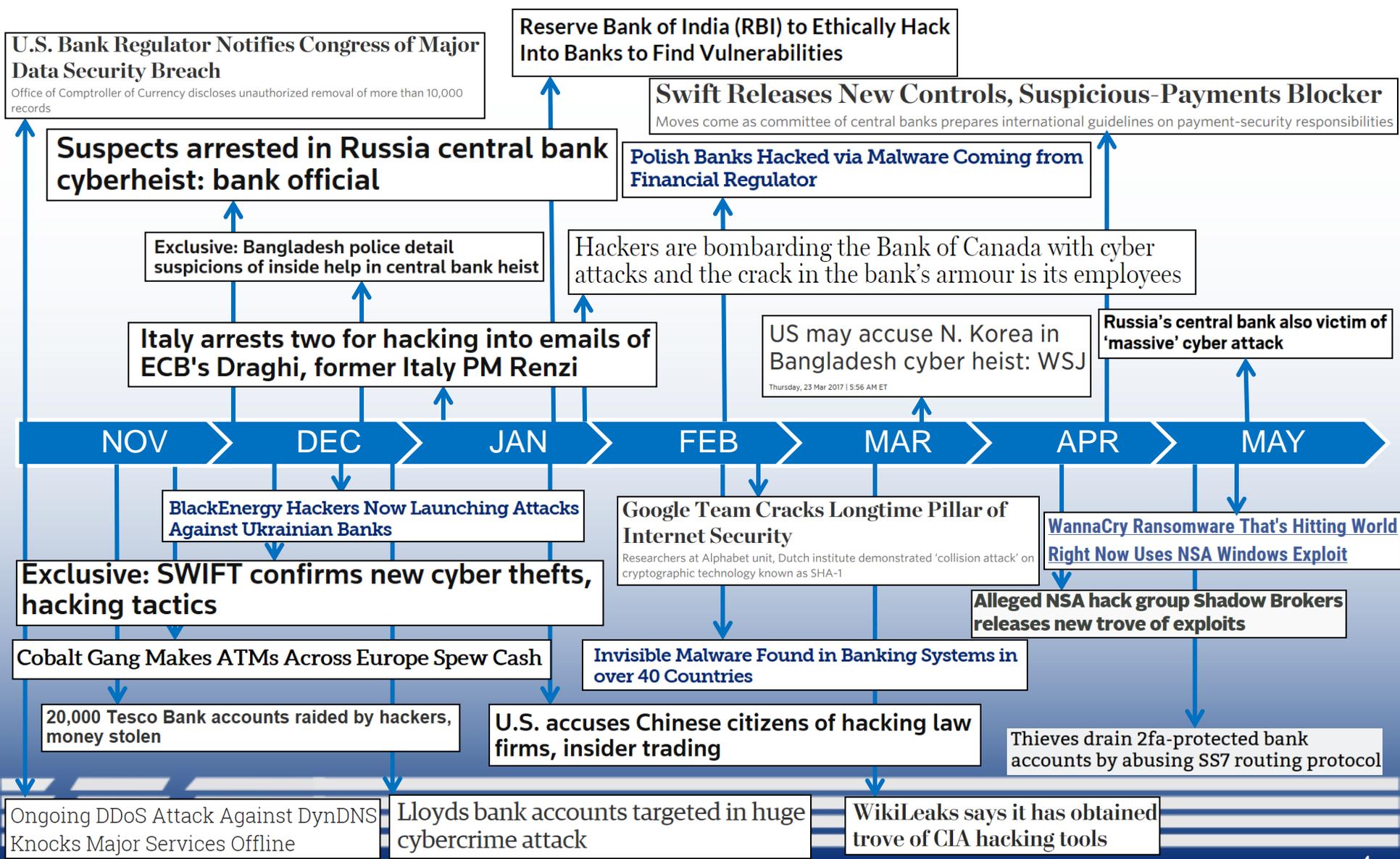
1. Boston
2. New York
3. Philadelphia
4. Cleveland
5. Richmond
6. Atlanta
7. Chicago
8. St. Louis
9. Minneapolis
10. Kansas City
11. Dallas
12. San Francisco

Board of Governors

Washington, D.C.

High Profile, High Intensity Cyber Attacks

Increasing Impact on Central Banks and Financial Services



High Profile – High Intensity Illustrative Cases

SWIFT Network

- February 2016 – Instructions to transfer \$951 million from Bangladesh Central Bank from an account at the Federal Reserve Bank of New York via the SWIFT network. \$101 million was transferred before being stopped.
- Confirmed reports of Banco del Austro (Ecuador), commercial banks in Ukraine, Vietnam and potentially dozens more.

Distributed Denial of Service Attacks (DDoS)

- Large number of computers, under the control of an adversary, overwhelm a computer, website or application.
- 2013 - large scale attacks impact the operations of a number of large banks.
- 2014 to 2016 - DDoS mitigation services become mainstream minimizing the impact.
- September 2016 - Mirai Malware – 1,000 times more powerful.

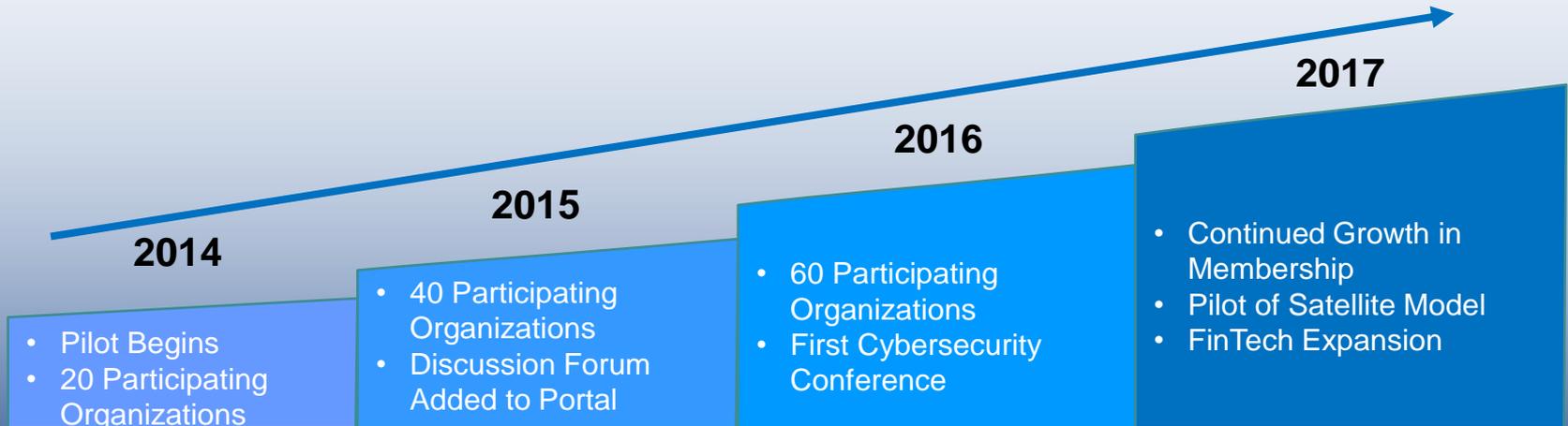
Ransomware

- Impact: 40% of businesses impacted by ransomware (30% lost revenue as a result, 20% had to cease business operations)
- Cost (60% of ransomware attacks demanded over \$1,000; 20% over \$10,000; 1% over \$150,000)
- Protection (96% of organizations are not confident they can stop malware; 79% of organizations are not confident in their backups)
- WannaCry: Over 200,000 Infections in 150 countries; Revenue only ~\$85k
- Profitable Ransomware Examples: Locky - \$220M; Cryptowall - \$100M; CryptXXX - \$73M

Use of Technology Increasing

- Replacement of core banking functions with technology
- Mobile Banking / Payments
- Financial Technology (FinTech)
- Blockchain / Distributed Ledger Technology (DLT)
 - Hub and spoke – peer to peer
 - New trust models
 - More interconnected networks

Boston Fed Cyber Threat Sharing Series



Conclusion

Cyber Risk is Real, Disruptive, and Increasing in Impact/Complexity

Central Banks and Financial System are Key Targets: Interconnectedness Now a Financial Stability Risk

Business Models Will Evolve in Response to New Technical Demands and Cyber Risk

Cyber Risk is an Enterprise Risk Warranting Director Level Reporting, Oversight, and Expertise

