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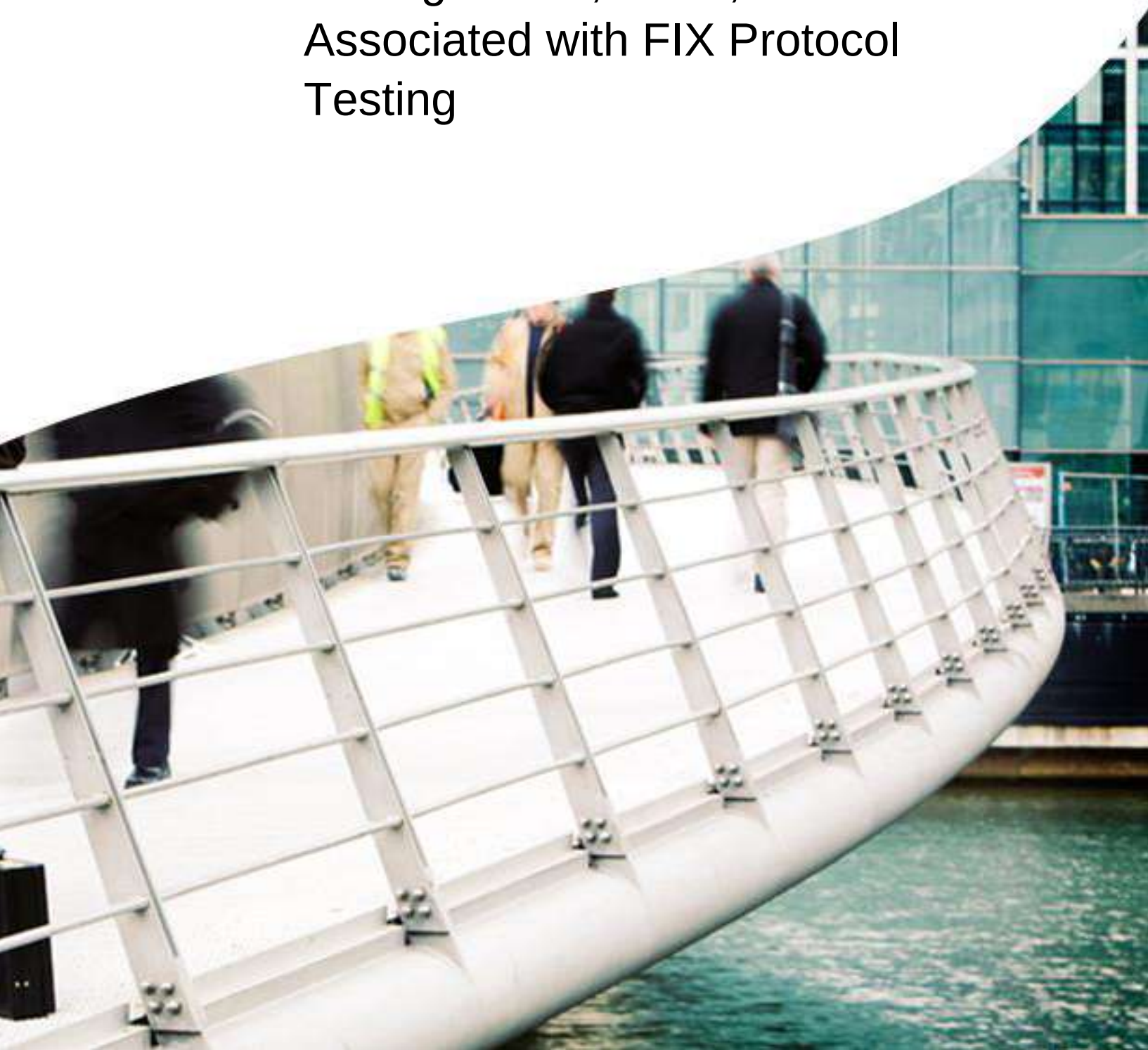
Manage Time, Effort, and Risk Associated with FIX Protocol Testing



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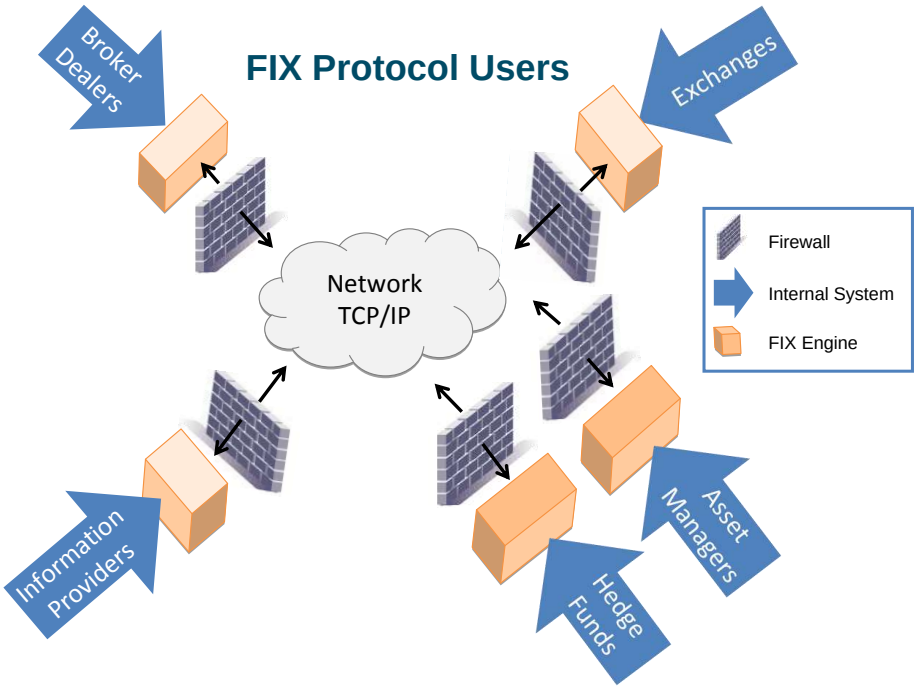
1. FIX Overview

The Financial Information eXchange (FIX) protocol is a non-proprietary, open source and public domain messaging standard for real-time exchange of electronic data on securities transactions. Developed through a cooperative effort by large US and European asset management and brokerage firms, FIX promises a standardized, faster flow of financial information across national frontiers.

Originally developed to support the trading of equities, today, FIX Protocol is used to electronically trade all major asset classes including fixed income, foreign exchange, futures and options. The design of FIX Protocol with its standardized tags, and openness to support customized messages has led to its rapid adoption in the financial services industry.

Exhibit 1: FIX Protocol Users



Source: Capgemini Lab

2. FIX Protocol Testing Challenges

FIX Protocol testing presents numerous challenges to organizations of all sizes. Majority of the common challenges are concentrated in the following areas:

1. Complicated tag library

FIX Protocol Limited (FPL) is a non-profit industry association that defines and manages standardized tags and messages for all asset classes. Highly technical in design, the complicated messages require specific industry knowledge for interpretation that quality assurance teams often lack.

2. Customized tags and messages specific to counter-parties

FIX Protocols' strength is its openness to the introduction of customized tags and messages among counter-parties. However, this openness can often lead to an explosion of customized tags that require documentation, versioning and maintenance for each counter-party. A securities company that has relationships with 20 counterparties, each requiring 20 customized FIX Protocol tags can have up to 400 customized hard to test tags and messages.

3. Lack of subject matter experts (SMEs)

Resources with the industry knowledge required to understand the FIX Protocol standardized tags and messages are hard to find, especially for the emerging asset classes such as foreign exchange, futures and options. In instances where the SMEs are present, they are often high cost resources that can be scarcely leveraged.

4. Lack of documented and digitized institutional knowledge base

Majority of financial services organizations lack institutionalized knowledge base documenting both standard and custom FIX Protocol tags. In the absence of documentation, quality assurance teams rely on their understanding of the requirements for testing of the tags that can lead to errors. In instances where documentation exists, it often contains static information that cannot be easily modified and updated for quick dissemination to implementation teams. This often results in knowledgebase documentation quickly becoming out of date and obsolete.

5. Costly and time consuming updates to FIX Protocol versions and applications

Under FPL's leadership, FIX Protocol has been continuously upgraded to include additional functionality and flexibility. These updates require companies leveraging FIX Protocol to conduct time consuming end-to-end tests on their electronic trading platforms. Companies often undertake costly upgrades to their trading platforms in order to remain competitive in the industry which also require expensive end-to-end testing and validation of FIX Protocol tags.

6. Time to Market pressure

In the competitive world of the financial services industry, market advantage for new offerings is limited to a few weeks or months. In this aggressive climate, business users of FIX Protocol demand quick turnaround coupled with high accuracy from testing teams. Testing teams lacking knowledge, expertise and technical skills are not able to meet these requirements. This often leads to costly delays and/or inadequate testing, resulting in defects causing expensive failures in the production environments.

3. Business and Technical Issues Encountered in Production

Testing compatibility with trading partners before "going live" is a critical step in the connectivity process. Since all products and environments have their own unique features, there are many areas where potential problems can arise. The purpose of testing is to identify and fix these problems before they have a chance to negatively impact something in production. Some of the issues encountered in production with their business impacts are listed in the table.

Exhibit 2: Business and Technical Issues

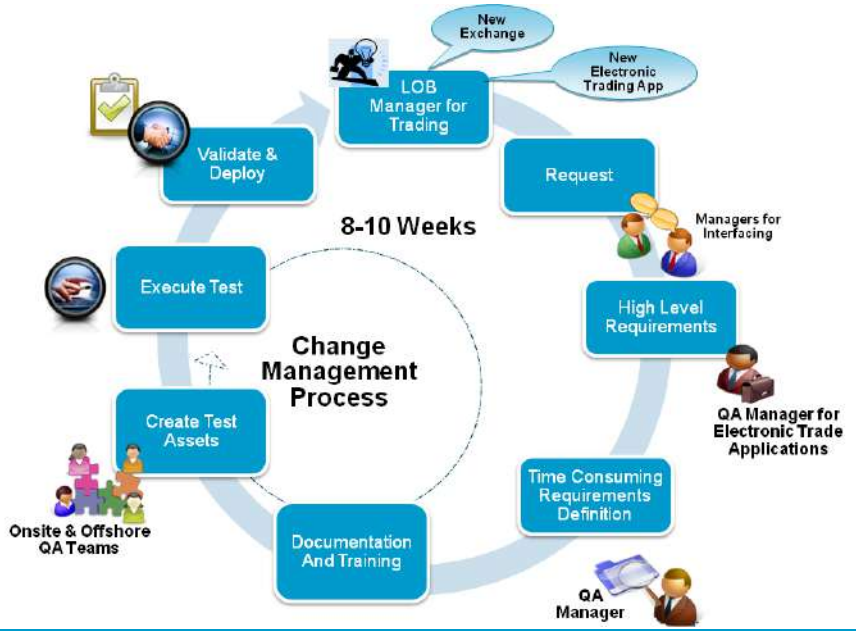
Business & Technical Issues	Business Impacts
The trader's request/actions are not reported. Examples: ▪ Replace request's for order placed have not been received at end party ▪ Cancel request is not being reflected, thus results are inconsistent. ▪ Acknowledgement messages are not received by the sender	▪ Actions requested by the customers will not be reflected in order book. ▪ Customer satisfaction and reputation of client will be affected ▪ Trade reporting to exchange will be affected.
Execution reports not generated for the following scenarios: ▪ Reports not generated for client connectivity acknowledgements or initiations. Hence the trader is not sure if the connection is established or not. ▪ Reports not generated for Order Executions	▪ Trade Reporting to exchange will be affected
▪ CUSIP (Committee on Uniform Securities Identification Procedures) and ISIN (International Securities Identification Number) values are not getting reflected correctly, thereby the symbol cannot be tagged	▪ Invalid securities identification number leads to rejection of orders
▪ Delay in receiving acknowledgment for any requests made by the client causing the following error message: "Timed Out exception"	▪ Customer satisfaction and reputation of client will be affected ▪ Trade Reporting to exchange will be affected

4. A Holistic Approach to Testing FIX Protocol

FIX Protocol compliance requirements and regulations create the need for a holistic approach to testing for financial institutions. Most testing organizations have to juggle similar issues around time, cost and quality. FIX Protocol testing teams differ with the added competitive market forces that augment the need for higher quality and reduced time to market. By in large, these business requirements are not being completely met by the existing quality assurance practices concerning FIX Protocol testing.

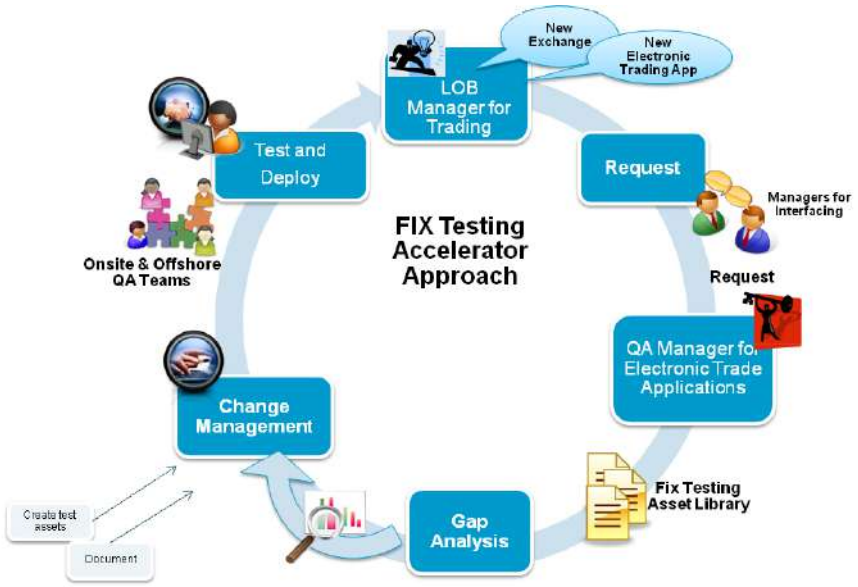
In a traditional FIX Protocol testing life cycle, high level requirements are generated by the line of business and they trickle down to the quality assurance teams for testing. Since most of these requirements are not well defined and testable, quality assurance teams are required to conduct lengthy research into FIX Protocol tags. Once the requirements are well defined, testers need to be trained before they can generate the relevant test cases for validation. In a best case scenario, the entire process may take anywhere between 8 to 10 weeks. Last minutes changes and rework, a natural part of any quality assurance process, can exceed the time line to 12 weeks of total testing time.

Exhibit 3: Traditional Approach to FIX Protocol Testing



The traditional approach can be significantly shortened, sometimes up to 50%, if an accelerated approach to testing FIX Protocol is implemented. The accelerated approach requires that testing teams take advantage of standardization in FIX Protocol tags and introduce a combination of best of breed technology, automation in addition to best practices to generate outcomes that can satisfy both quality assurance and business objectives.

Exhibit 4: Accelerated Approach to FIX Protocol Testing



The starting point for the accelerated approach is the digitization of all standard FIX Protocol tags for all of the major asset classes including equities, fixed income, FX, futures and options. Best of breed technologies in requirements definition and modeling are used to create a library of all standardized FIX Protocol tags. The creation of a digital library is beneficial in numerous ways:

- It reduces the time required for research during the testing lifecycle
- Creates an institutional digital knowledge base that is available across the organization and can be modified at any point during the life cycle
- Creates an integrated system that automatically updates all downstream assets including test scripts when changes are introduced in the requirements/models

- Frees up SME time to concentrate on understanding the company specific requirements rather than standardized FIX Protocol tags

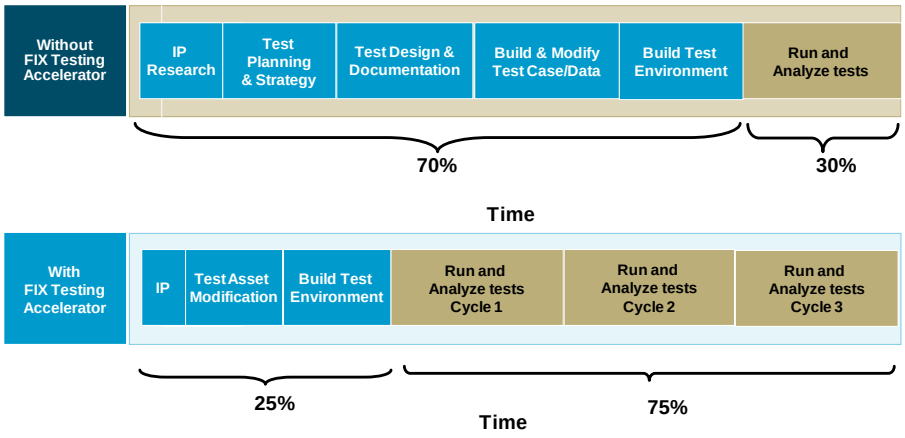
Once the models are created and testing requirements and use cases are generated automatically, industry standard testing tools are used to develop component based automated test scripts. The plug and play nature of the component based re-usable test scripts enables quality assurance teams to quickly create scenarios in order to validate functionality of FIX Protocol for any asset class.

5. Business Benefits

Capgemini research indicates that an accelerated approach to FIX Protocol testing can reduce project duration by up to 50%, lowered costs by 30% and reduced the time it takes to create test cases by as much as 95% over traditional methods. Leveraging the accelerator approach can help quality assurance teams attain the following results:

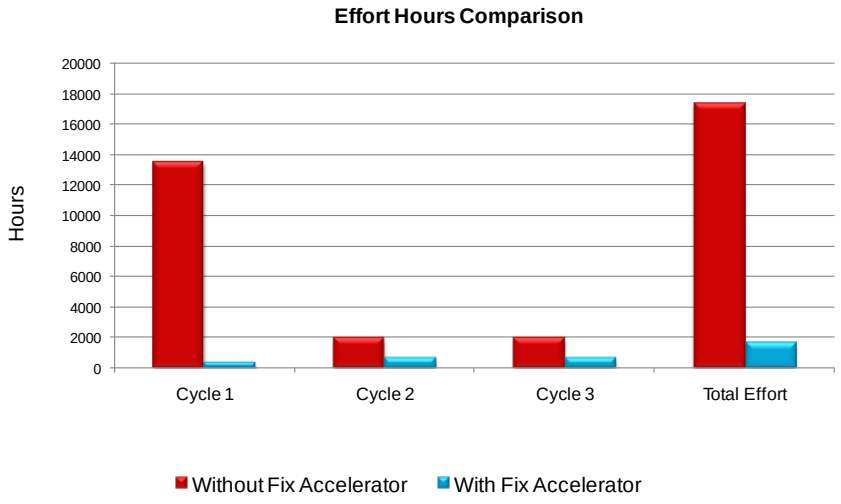
- **Minimize risk** by using proven, repeatable frameworks to provide compliance to FIX Protocol message standards.
- **Support customizations** of test data, FIX Protocol testing assets or FIX Protocol testing framework to match your specific needs.
- **Reduce quality assurance time** with test cases created prior to the applications' availability in Beta. With this the quality assurance teams can get a head start and quality assurance crunch is eliminated. Test cases are executed sooner and defects found earlier in process. Thereby maintenance time is greatly reduced. *Refer Exhibit 5: FIX Protocol testing Lifecycle Comparison*
- **Reduce time to market** with pre-defined test scenarios to shorten the design phase; pre-defined test cases to speed up implementation and proven methodology which streamlines the execution phase.
- **Reduce effort** related to test design, test creation and test execution. *Refer Exhibit 6: Effort Comparison*

Exhibit 5: FIX Protocol Testing Lifecycle Comparison



Source: Capgemini Lab

Exhibit 6: Effort Comparison



Source: Capgemini Lab

www.capgemini.com/financialservices

Find Out More

If you need more information on how to develop, or implement the accelerated approach within your organization visit www.capgemini.com/FIX

or contact the author Murat Aksu, murat.aksu@capgemini.com

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