

--	--

SwiftScale

Business Requirements Document

Business Requirements Document

DOCUMENT INFORMATION AND APPROVALS

VERSION HISTORY			
<u>Version #</u>	<u>Date</u>	<u>Revised By</u>	<u>Reason for change</u>
1.0			

This document is the official Business Requirements Document for SwiftScale, and accurately reflects the current understanding of business requirements. Following approval of this document, requirement changes will be governed by the project's change management process, including impact analysis, appropriate reviews and approvals.

DOCUMENT APPROVALS			
<u>Approver Name</u>	<u>Project Role</u>	<u>Signature/Electronic Approval</u>	<u>Date</u>

TABLE OF CONTENTS

1. Document Purpose	1
2. Document Resources	1
3. Glossary of Terms	1
4. Service Overview	4
4.1. <i>Service Overview and Background</i>	4
5. Background Concepts	4
5.1. <i>Design Tenets</i>	4
5.2. <i>Basic Methodology</i>	5
5.3. <i>Content Type</i>	5
5.4. <i>Organizing the Deal Namespace – Adapting analytic tools to Industry and Business Function</i>	7
5.5. <i>Tracking how Risk affects Investment Objectives and Valuation</i>	11
5.6. <i>Creating value with data managed by SwiftScale</i>	18
5.7. <i>Community and Commercial Interest</i>	20
5.8. <i>Service Dependencies</i>	22
5.9.	22
5.10. <i>Stakeholders</i>	22
6. 5. Key Assumptions and Constraints	22
6.1. <i>5.1 Key Assumptions and Constraints</i>	22
7. 6. Use Cases	23
7.1. <i>Use Case Narrative – Establish Place</i>	25
7.2. <i>Use Case Diagram – Establish Place</i>	26
.....	26
7.3. <i>Use Case Narrative – Setup Persons and BD Team</i>	27
7.4. <i>Use Case Narrative – Initiate a Deal Conference</i>	28
7.5. <i>Use Case Diagram – Initiate a Deal Conference</i>	29
7.6. <i>Use Case Narrative – Identify Kinds of Teams</i>	30
7.7. <i>Use Case Narrative – Investment Review Process</i>	31
7.8. <i>Use Case Narrative – Invite Advisor</i>	32
7.9. <i>Use Case Diagram – Invite Advisor</i>	33
.....	33
7.10. <i>Use Case Narrative – Monitor Deal Review Process</i>	34

7.11.	<i>Use Case Narrative – Load Artifact Catalog</i>	35
7.12.	<i>Use Case Narrative – Load Artifact Corpus</i>	36
7.13.	<i>Use Case Narrative – Setup Persons and Teams</i>	37
7.14.	<i>Use Case Diagram – Setup Persons and Teams</i>	38
	38
7.15.	<i>Use Case Narrative – Monitor Team Review Process</i>	39
7.16.	<i>Use Case Narrative – Select Review Tools</i>	40
7.17.	<i>Use Case Narrative – Add / Refine Review Tools</i>	41
7.18.	<i>Use Case Narrative – Team Training</i>	42
7.19.	<i>Use Case Narrative – Delegate Review Tasks</i>	43
7.20.	<i>Use Case Narrative – Profile Risks</i>	44
7.21.	<i>Use Case Narrative – Report on Review Results</i>	45
7.22.	<i>Use Case Narrative – Investment Valuation Process</i>	46
7.23.	<i>Use Case Narrative – Select Valuation Tools</i>	47
7.24.	<i>Use Case Narrative – Add / Refine Valuation Tools</i>	48
7.25.	<i>Use Case Narrative – Valuation Model Creation</i>	49
7.26.	<i>Use Case Narrative – Establish Community of Practice</i>	50
7.27.	<i>Use Case Narrative – Run and Refine the Valuation Model</i>	51
7.28.	<i>Use Case Narrative – Standardize “New” Tool</i>	52
7.29.	<i>Use Case Narrative – Report on Valuation Results</i>	53
7.30.	<i>Use Case Narrative – Negotiate Deal Issues</i>	54
7.31.	<i>Use Case Narrative – Deal Success</i>	55
7.32.	<i>Use Case Narrative – Deal Failure Closeout</i>	56
7.33.	<i>Use Case Narrative – Integration Process</i>	57
7.34.	<i>Use Case Narrative – Deal Success Closeout</i>	58
7.35.	<i>Use Case Narrative – Decommission Place</i>	59
8.	8. Appendixes	66
8.1.	<i>8.1 Appendix A – Business Process Flows</i>	66
8.2.	<i>Appendix B – Application Programming Interfaces</i>	66
8.1.1	<i>As Is Diagrams</i>	67
8.2.2	<i>To Be Diagrams</i>	67
8.3.	<i>Appendix B – Business Rules Catalog</i>	69
8.4.	<i>Appendix C- Models</i>	69
8.5.	<i>Traceability Matrix</i>	69
8.6.	<i>Appendix D – Content Type Inheritance</i>	69
8.7.	<i>Metamodel Decomposition into Content Type Elements</i>	71
8.8.	<i>Market Efficiency and Orders of Ignorance</i>	74

9. Bibliography Error! Bookmark not defined.

1. Document Purpose

This document defines the high level requirements of the SwiftScale SaaS offering. It will be used as the basis for the following activities:

- Creating solution designs
- Developing test plans, test scripts, and test cases
- Determining project completion>
- Assessing project success

2. Document Resources

Name	Business Unit	Role
<Identify all stakeholders and resources involved in gathering requirements>		

3. Glossary of Terms

Term/Acronym	Definition
Subject	A planning, execution or operational area of expertise supporting a business or organization. SwiftScale provides a pre-package standardized Subject categorization.
Subject Matter Expert [SME]	A practitioner in a subject domain related to the planning, execution or operation of an organization.
Community SME	An SME participating in a Community of Practice to create a standard categorization for their subject expertise identifying the risks and mitigation affecting the outcome of transactions.
Valuation Analyst [VA]	A person responsible for assessing the value of an investment in a corporate transaction.
Decision Maker [DM]	A person (i) responsible for making a go-no go decision on a Deal or (ii) having the ability to direct the pace and scope of Deal-related activities.
Risk	Impact x probability of an event affecting the outcome of a transaction. Risk arises from Business Practices, Business Strategies and Business Conditions. More complicated formulations are deferred until later versions.
Driving Factor (Driver)	An identified Risk concerning aspect of a Business Practice, Strategy or Condition having a direct relation to affecting the success or failure of business objectives of the investment.
Defect	An unacceptable Driver concerning an aspect of a Business Practice, Strategy or Condition.
Mitigation	A structured document referencing a Risk including an action to reduce the impact or probability of a Risk
Remediation	A structured document referencing a Defect including an action to correct the Defect
Space	A searchable name space supporting discovery of the existence or non-existence of previous risk observations, profiles or valuation models. The dimensions of the space are industrial classification and business function subject domain expertise
Place	A secured virtual work, meeting and storage place to support an organization's pursuit of corporate transactions.

Term/Acronym	Definition
Enclosure	A storage perimeter, of a Place or contained within a Place, that defaults the access control classification and categories of information created or copied into the storage perimeter. Any information created or copied directly into an enclosure is assigned the access control classification and categories of that enclosure. From an access control perspective, an Enclosure corresponds to an Compartment in the Bell LaPadula mode of Label Based Access Control. Enclosures also represent the scope of broadcast for communications within the Team assigned to the Enclosure.
Conference	A access perimeter between Places providing controlled sharing of information between Places
Disclosure	The act of making an Artifact accessible to one or more Transactors. In SwiftScale, this is accomplished by assigning a category that will expose that Artifact to another Enclosure or Conference.
Descriptor	An indexable, typically composite token used to find an object or group of objects in the SwiftScale search Space.
Business Practice	A method , procedure , process , or rule employed or followed by a company in the pursuit of its objectives . Business practice may also refer to these collectively. Read more: http://www.businessdictionary.com/definition/business-practice.html
Business Strategy	The principles guiding how a business uses its resources to achieve its goals.
Business Event	A historical event in the history of a Transactor typically represented by an Artifact. Business Events include a legal action, a product release, a hire of an employee, signing of a customer, and acquisition or divestiture, etc.
Business Condition	The general state of an economy as it affects individual businesses.
Categorization	The act of ordering Categories into collections of related topics.
Industry Classification	One dimension in the “paradigm” classification of Business Practices, Strategies, Conditions and the corresponding Risks. This dimension is based on the ISIC Rev.4 standard http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=27
Subject Classification	The second dimension in the “paradigm” classification of Subject Matter Expertise based on the O*Net Occupation Standard. http://www.onetcenter.org/taxonomy/2010/updated.html?fmt=print
Community	A group of interacting people, living in some proximity (i.e., in space, time, or relationship).
Community of Practice [CoP]	A community of practice (CoP) is a community of people who share a craft and/or a profession. (e.g, lawyers, investment bankers, accountants, marketers, sales personnel, engineers).
Organization	A legal entity participating in a corporate transaction either a transaction actor or as an advisor or assistant to a transaction actor.
Account	An identity of an Organization with respect to SwiftScale billing.
Team	A Group of persons possibly from different Organizations working together on behalf of a transaction actor in a corporate transaction. Teams are automatically allocated an Enclosure.
Group	A collection of persons.
Member	A person belonging to a Team
Principal	A set of credentials know to SwiftScale that map to a Person.
Person	A person know to and participating in SwiftScale. A Person is identified through a set (one or more) of credentials known to SwiftScale as a Principal. A Person can have multiple Principals in SwiftScale.
Type Definition	A metadata definition of a document stored in SwiftScale
Profile	A structured document distilling targeted aspects of an unstructured artifact such as a document.
Profile Type	A metadata definition of the structure of particular type of Profile.
Observation	A component of a Profile capturing one aspect of an artifact
Item	A component of an Observation serving as the atomic structure of Profiles
Item Type	One of several pre-packaged types such as Date, Choice, MultiChoice, Duration, etc.
Item Value	The value assigned to an Item. A value can also be unassigned.
Model	An incomplete representation of a real world system or phenomenon designed for a specific analytical or explanatory purpose
Valuation Model	A model designed to assess the value of a business or an asset or equity of a business.
Deal	A corporate transaction, including venture capital investment, public offering, a private equity investment, a debt financing, merger or acquisition.

Term/Acronym	Definition
Participant	A party engaged in a Deal either transacting the Deal or assisting in the transaction. Participants can engage across a series of Deals as well.
Transactor	A party engaged in transacting a Deal.
Advisor	A party assisting in a Deal by advising either an Investor or Investee
Investor	A Participant in a Deal investing in other Participants in anticipation of financial gain
Investee	A Participant in a Deal taking investment from other Participants.
Message	A communication propagated from a sender to one or more recipients designated either by explicit enumeration of the recipients or implicitly through the relationships between the sender and recipients. There are several types of Messages.
Post	A Message broadcast the recipients that are members of the context where the Post is sent.
Mail	A Message narrowcast to recipients enumerated by an address list.
Comment	A Message broadcast to Post recipients referencing a Post.
Question	A Message broadcast to Post recipients referencing a Post soliciting a response from the sender of the Post.
Response	A Message broadcast to Post recipients referencing and responding to a Question
Authentication	The act of confirming the truth of an attribute of a datum or entity
Authorization	The function of specifying access rights to resources
Encryption	Encoding information using keys so as to make the information unreadable
Audit Trail	Capturing who, what and when of any information creation, deletion or modification
Identity Management	Managing the principals and credentials of users of a system
Label Based Access Control	Associating Labels with information and users to dictate what users can access and operation on what information. See the Bell- LaPadula model: http://en.wikipedia.org/wiki/Bell%E2%80%93LaPadula_model
Level	One of a set of ordered labels indicating the restriction of access to information or clearance of users
Category	On of an unordered set of labels indicating information topics and a users' access to those topics
Principal	An entity, either person or program, that can be authenticated by a computer system or network. See : https://en.wikipedia.org/wiki/Security_principal
Security Administrator	A Principal associated with a Participant authorized to create and authorize other users on behalf of that Participant
Site	A physical or virtual source of Deal Artifacts from a Deal Participant
Location	The location of a Site
Corpus	The collection of Artifacts contributed and categorized by a Participant across all Sites of that Participant.
Artifact	A document, spreadsheet, recording, transcript containing information useful in assessing the value of an investment.
Provenance	Metadata information concerning the source of an Artifact or collection of Artifacts
Catalog	A structured directory of Profiles, typically referencing Artifacts, over a Corpus
Lifecycle	The full breadth of events a system or system component will engage from initial setup and deployment, through its different phases of use, to decommissioning.
CRUD	Acronym for Create, Read, Update and Delete
API	Application Programming Interface - a specification intended to be used as an interface by software components to communicate with each other
Due Diligence List	The list of documents and Disclosures requested by the Investor of the Investee

4. Service Overview

4.1. Service Overview and Background

SwiftScale is a SaaS application for assessing the valuation, risk and opportunity of a corporate transaction such as VC investment, an M&A deal, a PE deal or an IPO. SwiftScale can also be used to plan for and execute pre-closing activities and, in M&A deals, post-closing integration activities.

Business Opportunity: Deal assessment is an expensive, *ad-hoc* process which can be (i) streamlined by introducing workflow tools to automate the gathering of relevant data, (ii) made more effective by focusing attention on areas of greatest deal valuation payback and (iii) made more predictable by tracking the assessment progress against the overall assessment scope.

- The deal assessment process is *ad hoc* due the high reliance on disjointed, labor-intensive manual processes and the lack of standards that can be shared and applied uniformly by deal participants.
- Assessment scope can be benchmarked against comparable deals previously assess by SwiftScale.
- The corporate transaction market is currently an inefficient one mainly due to poor information flows. [see Section 8.8]
- Though constraints are required on information flows to ensure strategic intents of transaction partners are private, there is an opportunity to increase information flows without signaling intent to competitors.

Problem statement:

Corporate transactions should:

- be more efficiently executed
- be more effective in their outcome
- executed in a market with greater information flow, while maintaining protective privacy.

5. Background Concepts

5.1. Design Tenets

- **Convert inbound unstructured data to machine analyzable structured data**
- **Harness industry practitioner expertise to define what data is relevant**
- **Tune investment analytics to specifics of each investment**
- **Aggregated data across investments provides analytical context**
- **Keep all information controlled by the information owner**
- **Owners reveal information on the basis of perceived benefit**

5.2. Basic Methodology

- **Source and refine the investment review, assessment, intervention and valuation metadata (data definitions) from industry practitioners familiar with comparable transactions**
- **Extract investment review data from review documents and other artifacts**
- **Create an investment assessment using both industry benchmarks and the review data**
- **Identify investment interventions based on the assessment and their merit in previous transactions**
- **Create an investment valuation from the assessment and interventions**
- **Create the investment agreements from the valuation and assessment**
- **Feed the investment review, assessment, intervention and valuation data back into industry benchmarks**

5.3. Information Types

SwiftScale manages a wide variety of information to support the pursuit of corporate transactions. During the course of evaluating a potential transaction, experts will review hundreds to thousands of documents, charts/graphics/diagrams, spreadsheets, videos, recordings, files, etc. These artifacts are typically categorized into scores of different “types”. The experts distill the essential details related to the transaction into profiles defined by a profile “Type” for each category of artifact.

In order to allow for comparison between investments and organizations within and across industries, characteristics representing the same qualities or quantities should be recognized as the same. For example, if every investment has a set of investors, then it would be useful for each investment to refer to its investors with the same identifier. That way, different investments involving the same investors would be easy to determine. This is desirable property for all information elements across SwiftScale. Having idiosyncratically different identifiers representing the same underlying real world phenomenon discards useful information from the SwiftScale aggregate view of the corporate transaction marketplace.

Currently a casual set of Internet searches for “due diligence list” or similar keywords specifically requesting yonl PDF files yields millions of results. A Google search of “due diligence list filetype:pdf” returns “About 2,650,000 results”. Perusing the resulting PDFs shows lists of due diligence questions that largely overlap, i.e. the lists are composed of questions with the same meaning, but phrased slightly differently and listed in a different order. So if two different due diligence teams created a report responding to two different due diligence lists, comparing the results compiled from each team would be a tedious, error prone, manual task. Had the two teams agreed on conventions when composing the question lists and responses, this task could have been automated and a host of new opportunities emerge to process and analyze the assessments of the teams.

Considering the prospect of creating uniform conventions across all industries, we have to recognize some limitations in communications across widely dispersed economic activities. Industries and the occupations within them are social entities – they are communities that have their own dialects and specialty subject matter. The vocabulary of such communities is typically dynamic; changing to reflect new practices and purpose. There may be overlap of meaning between the dialects of different communities, but that relating vocabularies between communities is a living process of discovery.

SwiftScale seeks to leverage common, but dynamic, conventions within communities, while providing flexible correspondences across communities. There are two tactics invoked to strike this balance.

1) *Exploit the commonalities of business across industries*

If we look at different businesses across different industries and compare the same business functions, such as product/service development, marketing, sales, human resources, finance, legal, etc., across the industries, a pattern emerges. Some business functions in different industries have quite divergent operations, where as some functions are quite similar. Finance and legal have more similarities than differences. Product / service development will be driven in different directions by the differences in what the business delivers to the market.

We can use a metaphor to see the drivers behind the pattern. There are a broad range of electrical appliances we use every day with widely differing purposes. Washing machines perform differently than refrigerators which in turn perform differently than televisions. But they all share the use of electric power to run and most often assume that power is delivered from an electrical utility. The grids and connectivity standards that allow appliances to “plug into” the utilities are common infrastructural elements enabling delivery of a very diverse set of capabilities. Similarly, legal institutions and financial regulations serve as the foundational infrastructure to business and commerce. They are the common elements that allow businesses to “plug into” markets and the economy.

It is largely through legal frameworks, financial standards and conventions that very different businesses become comparable across the entire economy. Within industry sectors, smaller scale regulations and standards support comparability in businesses across the sector. And more narrowly, within industries and market, even finer grain comparisons are possible. SwiftScale seeks to support comparability between business and investments at the most relevant level of scale. For business functions comparable across the economy or sectors, SwiftScale comparisons include a very wide set of comparators, which can be further selected with refining relevance filters. For business functions unique to a market, SwiftScale comparisons will be more limited, but more relevant.

2) *Harness the communities to establish the conventions*

Since business practices and the language describing them evolve dynamically within a practitioner community, and the set of communities involved across corporate transactions is inherently large, SwiftScale needs to draw upon community expertise to determine appropriate conventions to support assessment of corporate transactions. SwiftScale enables communities of practice to setup community work places at different levels of scale to refine existing observational information types and define new ones specific to their practice assessment needs. As practices become more specialized to smaller industry and market communities, the information capturing the more specialized practices may need to supersede that from a more general practice. Information elements may need to be omitted or added to cover the communities' specific practices. The practitioners will be better served if such an override process can be achieved in an orderly way, allowing generalized information to be broadly shared, while flexibly overriding only information unique to the more specific practices.

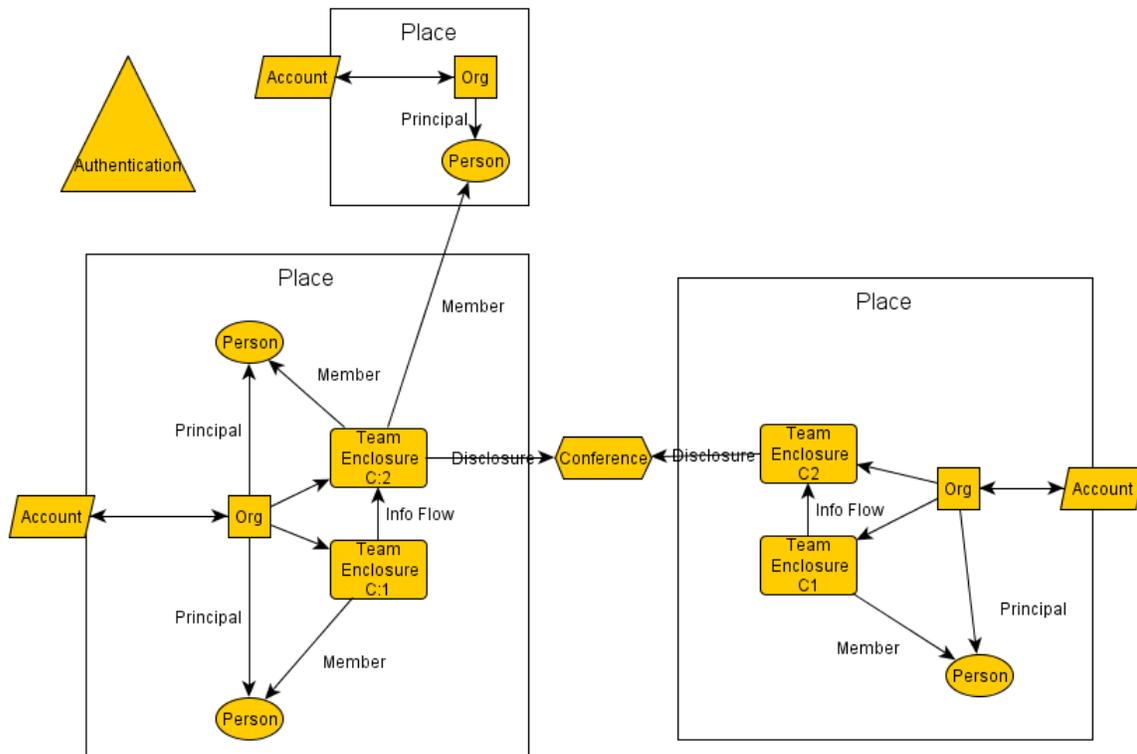
Communities working in different industries or geographies may incorporate practices that are similar or identical, but be unaware of counterparts and without the opportunity to coordinate terminology, have diverged descriptions of those practices. In future releases, SwiftScale will allow for “isomorphic” practices, i.e. practices that are different in naming only, and provides mechanism for consolidating such similarities after their discovery. These include support for mapping relationships which enable articulation of resemblance and equivalence.

5.4. Organizing the Deal Namespace – Adapting analytic tools to Industry and Business Function

Corporate transactions (aka “Deals”) have to strike a balance in confidentiality and candor between participants of a transaction. Any service supporting these transactions needs to provide to each organization a secure, but permeable, place to work and conference with flexible access controls which are easy to use. Each organization participating in a transaction requires the authority to administer its own secured perimeter, to manage teams within that perimeter, to enable confident organizations controlled access to resources within the perimeter, and controlled disclosure of information between parties of the transaction.

SwiftScale offers a number of features to meet these needs. These features are arranged carefully to strike the necessary balance. They include:

- A central authentication services used by all organizations to identify participating persons and their relationship to each organization.
- A secured perimeter provisioned for each organization known to SwiftScale.
- Team Enclosures providing multi-level and multi-label security for Team work-streams.
- Long running Conferences between Places provide a venue to confer with other organizations
- Controlled Disclosure in a Conference exposes selected information from one organization to another
- Each organization has an Account which tracks the billable resources consumed and the associated billing to the organization.



Each Place is associated with one or more industries in an overarching industry Space. This association leverages existing industry standards and how an organization is classified by those standards.

Every US operating business must state its Business Activity Code to the IRS to enable the IRS to categorize that business for tax profiling. The Activity Code is the upper part of the NAICS classification tree.

The EU requires companies to state their NACE classification as well as does Japan (JSIC), Australia /New Zealand (ANZSIC) and China (NatSIC). Overtime these standards have been undergoing revision to create greater coherence.

The method to categorize deals will be as follows:

1. Determine the nationality of each business
2. Determine the national business activity code of each business
3. Map the national activity code to ISIC
4. Determine the size of each business (Revenue)

The Descriptor for each business will be the 3-tuple:
(ISIC, Nationality, Revenues)

The Descriptor for each Deal will be the 2-tuple:
(Investor, Investee)

where Investor and Investee are the company Descriptors of each.

This method only clusters business and deals in categories enabling one to find a comparable business or deal.

A further desire is to allow a Deal assessor to comprehend how deal and business clusters relate to each other through an ordering. This comprehension would accommodate realities not represented in the above method. First, businesses often operate in multiple geographies and second businesses often engage in multiple activities. The procedure of declaring a singular ISIC categorization of a business forces the over-simplification of the business by coercing the business to a so-called "primary" classification. This is usually accomplished by splitting the revenues of a business across different business activities engaged and declaring the business to belong to the activity classification with the largest revenue. However, valuable information is lost by this procedure which could be retained by allowing a business to declare the set of business activities it is engaged in. Correspondingly, multiple geographies can also be declared.

A further enhancement extends the categorizing method described above. With multiple classifications declared, a containment (partial) order could be constructed over the set of business activities declared by business represented in the Space. So too could a containment order be constructed over business geographies. (See https://en.wikipedia.org/wiki/Containment_order). One multi-classification "container" can contain another by having the set of classifications associated with the contained be a subset of the container's. The business assigned to the container would engage in a broader, more general set of activities than a business assigned to the contained. Moving up the containment order, one moves from the more specific to the more general business. The containment order would also correlate strongly with business size.

At the top of the containment order, assessed risks and valuations would be most general. Further down in the hierarchy, the assessments would be more specific to the narrow set of classifications. For convenience, a (synthetic) so-called "supremum" container could be introduced to retain the most general assessments. These general assessments can be "overridden" further down the order by more specific assessments capturing concerns not shared outside of the lower, more specific,

container. This kind of inheritance mechanism allows for an orderly sharing of assessment tools such as risk profiles and valuation models across the space of industrially classified businesses and deals.

Within an industry classification, assessment tools can be further categorized across the following Subject hierarchy levels:

1. Business Process
2. Business Function
3. Occupation
4. Community of Practice

The Bureau of Labor Statistics (BLS) has started the process of classifying Business Functions in the course of an effort to provide Mass Layoff Statistics (MLS). (A similar United Nations effort also looks to standardize a classification of Business Function, but driven by a different purpose – tracking international sourcing of business functions.

<http://unstats.un.org/unsd/class/intercop/expertgroup/2011/AC234-27.PDF>)

The first two levels of the Subject hierarchy are based on the BLS/MLS Business Process/Function hierarchy shown below:

Core Processes

- Procurement, logistics, distribution: activities associated with obtaining and storing inputs, and storing and transporting finished products to customers.
 - Business Function examples: Buying, distributing, loading, shipping, warehousing
- Operations: those activities that transform inputs into final outputs, either goods or services. (In most cases, the functions under operations correspond to the production process that is the basis for the establishment's NAICS classification or the activity most directly associated with it.)
 - Business Function examples: Producing goods, providing services, assembling products, fabricating components, conducting QA/QC, direct managing
- Product and/or service development: activities associated with bringing a new, redesigned, or improved product or service to market.
 - Business Function examples: Analyzing markets, researching, designing or developing the product/service, testing
- Marketing, sales, customer accounts: activities to inform existing or potential buyers including promotion, advertising, telemarketing, selling, retail management.
 - Other Business Function examples: Billing, conducting market research, coordinating media relations, branding, merchandizing
- Customer and after-sales service: support services to customers after purchase of a good or service, including training, help desks, call centers, and customer support for guarantees and warranties.
 - Other Business Function examples: Installing products, customer relations, maintaining and repairing products

Support Processes

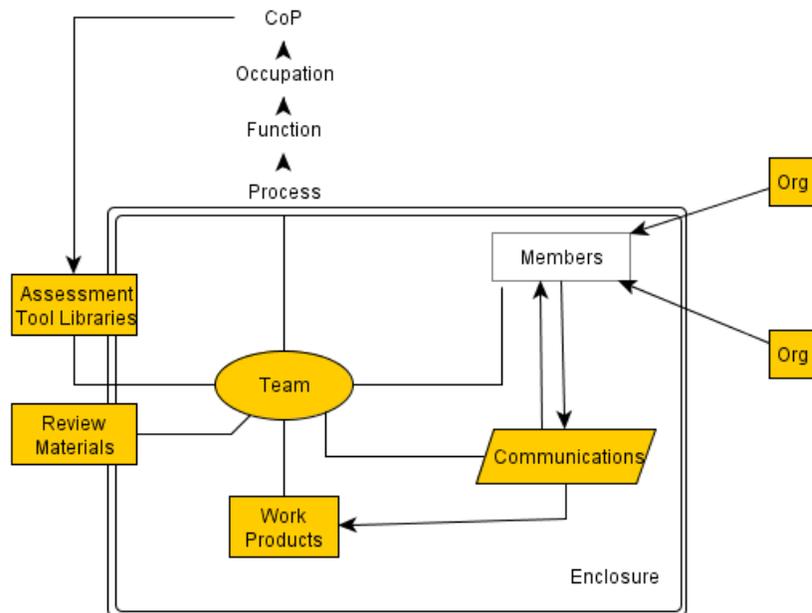
- General management and firm infrastructure: activities related to corporate governance (which includes legal, finance, planning, public affairs, and government relations), accounting, building maintenance and services, general management, and administrative support.
 - Other Business Function examples: Cafeteria services, clerical support, security
- Human resource management: activities associated with recruiting, hiring, training, compensating, and dismissing personnel.
- Technology and process development: activities related to maintenance, automation, design/redesign of equipment, hardware, software, procedures, and technical knowledge.
 - Other Business Function examples: Computer systems development, computer systems maintenance and repair, managing data, data processing, providing Internet

web services, development and testing software, providing software and IT services, designing processes

The third level is based on the International Standard Classification of Occupations (ISCO) as defined here: <http://www.ilo.org/public/english/bureau/stat/isco/isco88/major.htm>.

The fourth level accommodates occupational specifics relative to different industries as classified by ISIC Rev.4. At this level, Communities of Practice arise, some specific to an industry, some crossing industries.

See the Appendix: “Content Type Inheritance” for more details on the hierarchical structures.



An example use of the Subject hierarchy to identify an engineering design practice for new airplanes in the aerospace industry using all four levels would be as follows:

Business Process (BLS/MLS)	Product/Service Development
Business Function (BLS/MLS)	Design & Develop Product
Occupation (ISCO)	Engineer (say Electrical) – 2144
ISIC Community of Practice	Aeronautics (2651) Engineer

Subject matter experts, working in communities of practice, provide insight about appropriate investment assessment criteria relative to their subject areas. These insights are codified in assessment tools made available to Investment Review Teams as CoP Libraries. When an organization establishes a Place of Business and Deal Conference in its respective Industry Spaces, it makes the most suitable CoP Libraries available as part of Team Enclosures. If no CoP has been established specific to its industry for Subject area, a cross industry (and more generic) CoP library will be linked into the Team Enclosure. If the Team elects to tailor the more generic assessment tools, they will be able to create the more specific CoP and contribute their tailored tools to its library for future use.

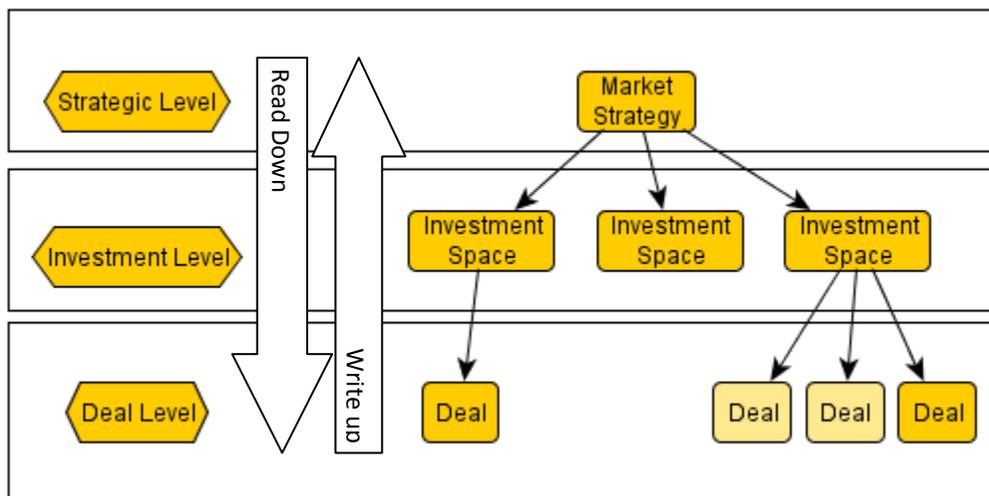
5.5. Securing Deal Information

Security is paramount in a strategic activity such as corporate investments. Deal activity must be kept confidential to the extent possible, but information must also be carefully shared within and among transaction participants. The scope of information access will also vary with the scope of responsibility. A Deal Manager will need to understand, to some extent, all aspects of a Deal. Business Development team members may need to understand multiple Investment areas and the deals active in those areas. Subject Matter Experts need only access information related to their subject area.

To meet these requirements, a familiar model is leveraged - the Bell LaPadula model which focuses on providing confidentiality by separating topic information into Categories (acting as Compartments) as well as scoping the information access through Classification levels. To start, SwiftScale will follow a “convention over configuration” philosophy, mapping the security Categories to the aforementioned Business Process/Business Function hierarchy. The Classifications are mapped to the following three levels:

- Strategy
 - o The persons responsible for picking the investment spaces and which deals to pursue operate at the strategic level. This is typically a core team of executives, principals or partners.
- Investment
 - o The persons responsible for pursuing deals in an investment space are typically the leadership of a business unit, investment area of focus or division. In smaller organizations this group may be the same as the overall strategy group.
- Deal
 - o The persons responsible for vetting specific deals are typically senior operational and staff management in the part of the organization that will ultimately be operationally responsible for the investment.

The relationships between the levels and focus are depicted as follow:



The strategy team develops an overarching market strategy decomposing that strategy into investment spaces. Investment teams look for deal opportunities to meet the strategic intentions for

their investment space. When a deal candidate is found, a Deal is formed in the Investment area that interprets the Investment Strategic Intentions into specific Deal Objectives.

A Business Development team typically operates at the Strategic Level and below. A Deal Manager is likely to participate in multiple Deal attempts in an Investment Space. And Subject Matter Experts can participate at a Deal Level aware only of Deals, to which they contribute their expertise, but not other Deals or Investment Spaces. Of course, individuals can be assigned any Classification Level as well as be assigned multiple Classification levels.

By default, any information written to SwiftScale will be classified at the highest level assigned to the writer. The Bell LaPadula ("BLD") model confidentiality policies prohibit writing down classification below your classification levels as well as reading up above your classification level. If a writer seeks to write information to a lower level, they must be assigned that additional level and explicitly select that the write be issued at that level.

The compartmentalizing Categories are designated through a combination of the Business Process/Function hierarchy, geographic areas and Investment spaces / Deals. At the lowest level, a Principal can be granted access to a Deal team focusing on a Business Process/Function. Each Deal is already defined within an intended Investment space (classified by industries) and situated nationally.

As strategic corporate investment information is a very high value target for a range of purposes including financial gain, political advantage and breaching national security, a variety of cyber threats including advanced persistent threats should be expected. To increase the barrier to illicit access of managed information, a defense in depth approach should be employed.

All information should be encrypted in flight and at rest with AES-256 encryption or better. Each architectural tier should be network isolated with port access restricted to only those required for the architectural components designated for each tier.

Information access should be controlled following the "principal of least privilege" at all tiers. Currently the best practice for least privilege access is through capability-based security architecture. (Capability-based security). This kind of architecture can be achieved through object or actor capability coding techniques and should target the user-agent, interactivity and persistence tiers. The mapping between the BLD model and the capabilities can be accomplished as described by (Herbert, 1984).

Since security can be cast as a strategic game with active adversaries seeking to defeat your defense, the defense needs to be dynamic, anticipatory and responsive. This leads us to view security protection as a process rather than an end state. This requires activity monitoring and full activity tracking to provide sufficient information to detect anomalous events that could be indicators of intrusion activity. The dynamic aspect of attacks demand that further, fine grain, security constraints beyond the general perimeters and capability grants, be simply expressible as targeting policies in order to be able to respond quickly enough to evolving attacks. Up to date attack signatures should be monitored and restrained. But newer approaches to monitoring reverse this strategy, looking for anomalous activity rather than known attack signatures increasing the odds of detecting zero day attacks. Third party solutions employing these approaches should be used at the outer most exposure of the security architecture.

For more internal tiers, detecting and responding to anomalous activity requires the ability to state what "normal" activity is. To start, normal could be established by a set of activity monitoring policy rules. Subsequently data analytics techniques could be explored to refine the process. Both approaches require sufficient exposure of granular activity to detect potentially threat events and interpret them as threat incidents.

Actor models of computation provide both the ability to implement capability based security models and to provide complete exposure of the operational semantics as a trace of message activity. Supervisory actor models provide the opportunity for higher level supervisor actors to intervene when threat activity is detected either on a policy or statistical basis. There is also the opportunity to “replay” actor sequences if a perceived potential threat event turns out to be harmless. To protect confidential information, access would be exposed as a set of capabilities based on the principle of least privilege through actors. The message trace of activity is exposed to supervisory actors who enforce policies across the trace and intervene according to policy specified actions when suspect activity is encountered. If the activity is interpreted as a threat incident, the activity will be aborted and higher level supervisor actors will clean up, report the incident and terminate the activity of the principal driving the access attempts while maintaining the trace history of activity to that point. There is the possibility of false positive incident detection. An additional layer of confirmation can request evidence that the principal’s access was authorized and not a thread, and the activity preceding the declaration of the false threat incident to that point can be replayed, facilitating bringing the principal back to their last point of action.

An example of such monitoring policy would be to continuously examine the trace of activity looking for a pattern of information lookup failures that would be typical of intruder probing to find weakness at the early stage of an attack. A simple case would have the same principle issuing failing access requests in a short period of time.

5.6. Information Storage Strategy

SwiftScale avoids copying information elements. Rather than creating new copies of information when information is to be shared, SwiftScale manages one copy, but provides flexible schemes to allow others access. In SwiftScale, information is uploaded or created in a single store, but each information element is labeled with Categories such as the Org or Business Process/Function Team owning the information.

A Principal is authorized access to a set of Category labels allowing that Principal the ability to read or write information elements with those labels. If an information element is to be Disclosed to another party such as an Investment Participant, a Conference is required between the two participating Organizations. The information element can be labeled with the Conference Category and select Principals of the Organizations can be authorized to access the Conference information. If the Disclosing party Withdraws their Disclosure, the Conference Category label is removed and the Principals authorized to that Conference Category can no longer access that information element. Since no copy of the information element was made, there is no need to track and destroy the copies.

5.7. Information Partitioning

As the volume of data stored in SwiftScale grows, a method to scale storage becomes essential. A common method to scale storage is to partition data across multiple storage servers and volumes. Requests for information are then dispatched to the appropriate partitions based on the values of some set of application information elements serving as the partition keys. To this end, it is helpful to select in the data architecture of SwiftScale which application data fields will serve as the partition keys. SwiftScale has natural fissure upon which a partitioning can be implemented. Each Organization manages a pool of information and information flows between Organizations tends to be restricted due to confidentiality needs. Though two Organizations may elect to become very intimate and extensively share information, that sharing doesn’t tend to extend to other Organizations simultaneously. Though Organization provides a partitioning element, the specific partitioning implementation entails a strategy which requires more general properties of the partitioning keys. See the Technical Approach document for further details.

5.8. Tracking how Risk affects Investment Strategic Intent and Valuation

Largely a successful corporate transaction entails managing risk. At the beginning of the investment process, the proposed investment is characterized through a series of interview questions?

- What kind of corporate transaction: M&A, VC, IPO, PE?
- What kind of purchase: the whole business, the assets?
- What are the strategic intentions of the investment?

Strategic Intentions for a Corporate Transaction

M&A

- To gain economies of scale
- To increase financial growth
- To achieve vertical integration
- To eliminate competition
- To acquire new assets
- To hedge a counter-cyclical business
- To gain Intellectual Property (IP)
- To expand into new markets
- To expand into complimentary products and services
- To eliminate emerging IP and product threats
- To acquire new customers

Venture Capital

- Rate of Return expectations.
- Long- term or short- term capital appreciation.
- Early, Middle or Late Stage Companies.
- Sectors interested in.
- High growth potential.
- Liquidity Options.
- Expertise, Experience & Reputation of the Fund.
- Advisory Board Members.
- Members of the Fund.

IPO

- To raise capital for expansion
- To use publicly traded stock to acquire other companies
- To attract and retain talent using investment stock plans
- To diversify and reduce investor holdings
- To provide liquidity for shareholders
- To enhance the company's reputation, raise its profile in a particular market, and create brand awareness
- To pay down debt or move toward an optimal debt/equity capital structure

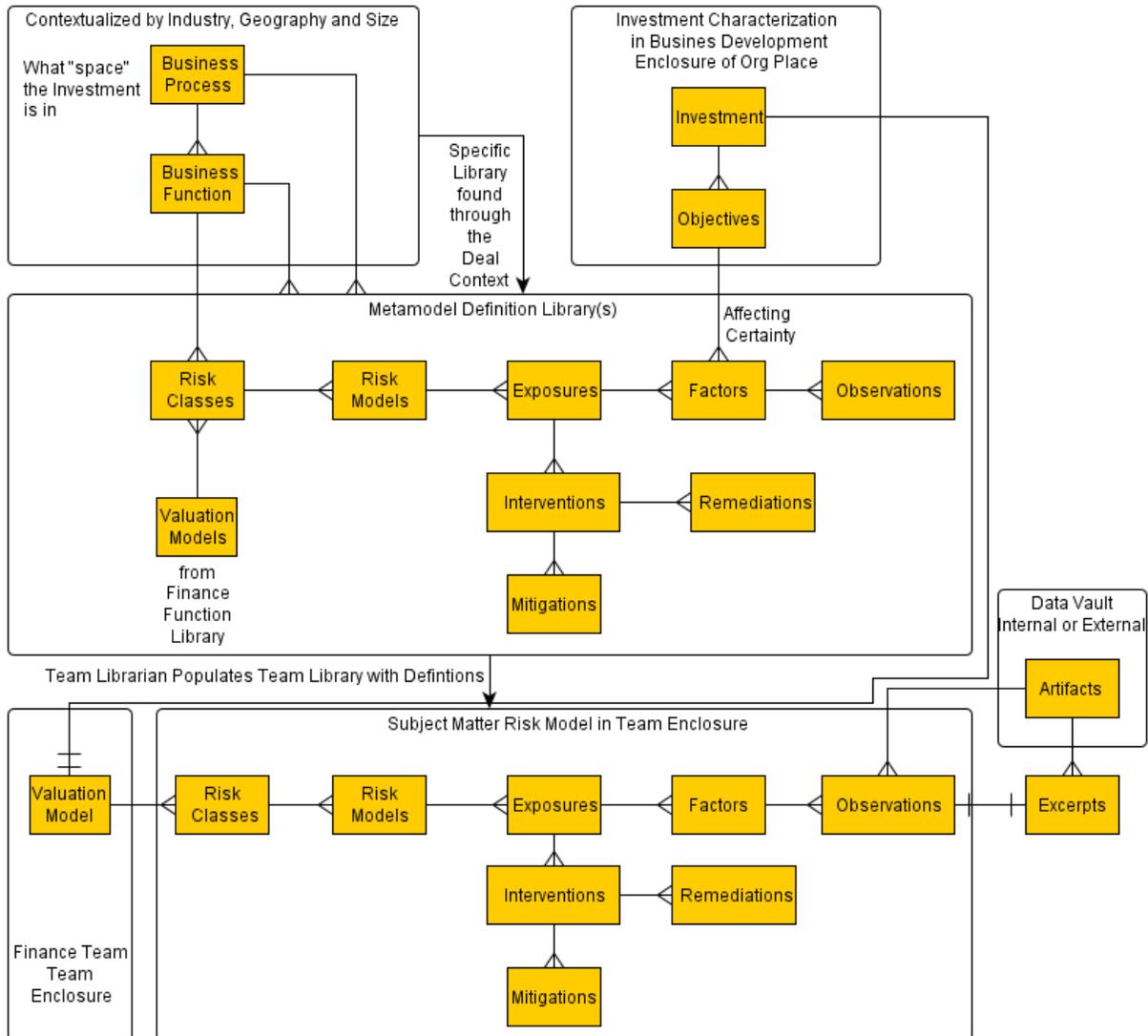
Private Equity

- Nurture the expansion of the company they invest in
- Help with new product development
- Restructure the company's operations, management, or ownership structure

Based upon the objectives, typically a "core" team identifies the type of expertise needed to help assess the investment. Other teams are chartered with assessment in their areas of expertise. SwiftScale encapsulates value insight and experience in the form of Risk Modules specific to the industry and Business Function. Prior practices shown to be most effective in identifying and managing risk in each subject area are captured in metamodel definitions and curated by practitioners in the associated subject matter community.

For example, the Sales function would need risk modules for Revenue and Bookings pipelines. An Engineering function would need risk modules for Technical Debt, IP Licensing and Process Maturity. Each Business Function team would have access to Risk Modules appropriate to their area of expertise in their industry and geography. A team librarian would extract the relevant models from the community library populating them into a library in the Team Enclosure and initiate the process of identifying which Risk Factors introduce uncertainty affecting the Investment Objectives. Those dominant Factors, so-called “Drivers”, drive what observations need to be made of Investment target. See the Software Engineering Institute’s “A Framework for Categorizing Key Drivers of Risk”: <http://www.sei.cmu.edu/reports/09tr007.pdf>.

From this set of needed observations, a list of what evidence is needed from the Investee is composed – the Due Diligence List. The Investee responds by providing a corpus of documents and other artifacts for review. Subject matter reviewers can then scrutinize the artifacts make the observations required to assess the necessary Risk Factors tracking the excerpts where the observations were made. In the case Risk Factors are observed, the Exposure can be assessed and countering interventions, such as a preventative or limiting mitigation actions, can be prescribed. The exposures with risk reducing actions can be aggregated into Risk models that accommodate the impact of correlated exposures and prepare the aggregated impact to be folded into the valuation model.



Different valuation models are afforded targeted by industry, investment target and investment type. They combine Intrinsic and Relative valuation methods. Investment targets include:

- Young Growth Companies
- Growth Companies
- Mature Companies
- Declining Companies

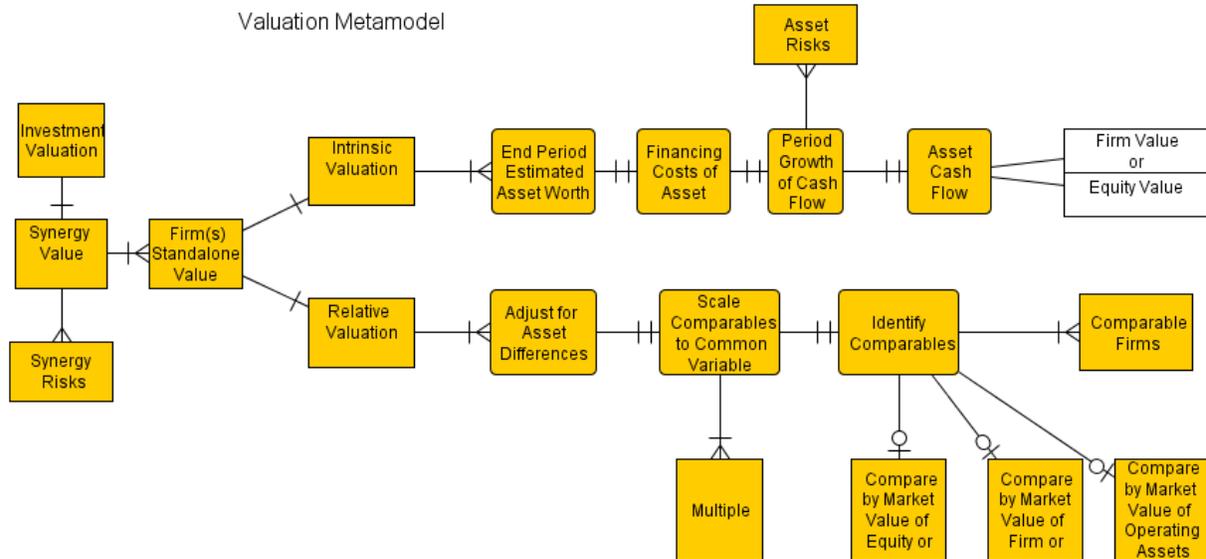
Special adaptations are provided for:

- Service Companies
- Cyclical and Commodity Companies
- Companies with Intangible Assets

The models offer consideration of different kinds of Synergies:

- Strategy – pure financial, pricing power and cross border

- Operations – costing savings, revenue enhancement
- System integration – impact of limitations on integration
- Control and Culture - potential downsides due to a variety of integration risks



Naturally some investment types limit the options in the other classifications, e.g. VC investments will not be in Declining targets and will not have the impact in Control and Culture as would an M&A investment. By characterizing the Investment, the library offering Valuation Models can be filtered to contain the relevant model types.

The process for assembling a Valuation Model and computing valuation broadly proceeds as follows:

1. The firm standalone value is estimated through a combination of intrinsic and relative value models. Depending on the transaction type, the process may end here.
 - a. The Risks affected each asset valuation adjust the contribution of the asset to the valuation.
2. If the Transactors are combining, the combined firm standalone values are augmented by the value of synergies. Specific types of synergies incorporated include:
 - a. Operating Synergies
 - i. Economies of Scale
 - ii. Greater Pricing Power
 - iii. Combination of different functional strengths
 - iv. Higher growth in new or existing markets
 - b. Financial Synergies
 - i. Cash Slack (better use of excess cash)
 - ii. Debt Capacity
 - iii. Tax Benefits
 - iv. Diversification
3. Risks to the types of synergies are computed and adjust the impact of synergy.
4. The balance of the different kinds of synergy is formulated.
5. The time horizon for the impact of synergies on cash flows is formulated.

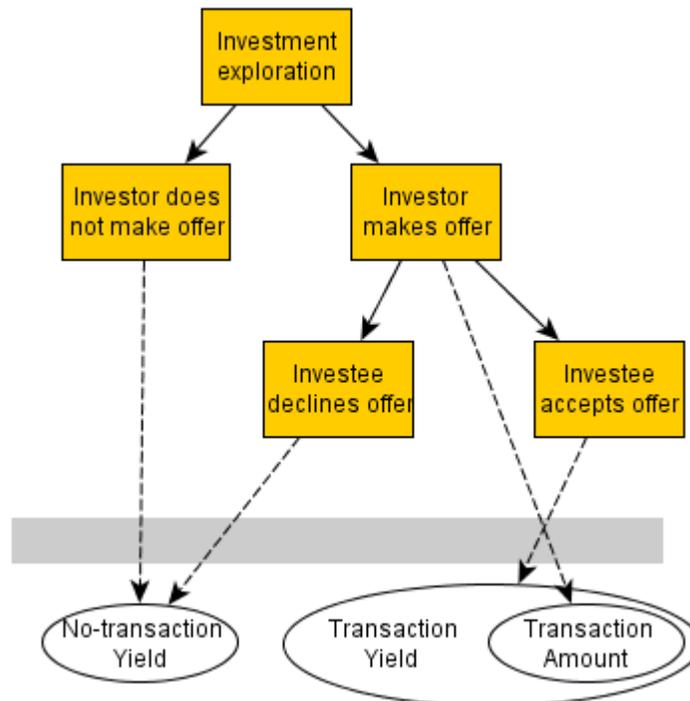
The computational path for valuation will vary based upon Transaction type and the types of companies involved in the Transaction. (Damodaran, 2011), [The Value of Synergy](#), [The Value of Control](#), [Acquisition Valuation](#)

5.9. Creating value with data managed by SwiftScale

Underpinning the SwiftScale solution service is a business objective to make the data managed by SwiftScale valuable, but valuable to whom? Different classes of SwiftScale customers will want to pull different information from the data.

- An **Investee** will want to know what factors affect Deal closing whether positively or negatively.
- An **Investor** will want know the factors affecting the post-transaction value of the investment they make.
- An **industry analyst** will be interested in information that allows a 3rd party assessment of an investor's claim about the going forward value of announced investment.
- **Advisors** to both the Transactors would value information providing evidence that their services are of high value.
- And **regulators** have interest in gaps between the transaction value and post-transaction value.
- **Academics** will be interested in the economic conditions supporting and effects of corporate transactions.

Addressing these interests requires imposing some organization on the data. Fundamentally a transaction can be represented by a decision or game tree. The transactions due diligence and valuation activities are effectively creating payout models of the choice alternatives in the tree.

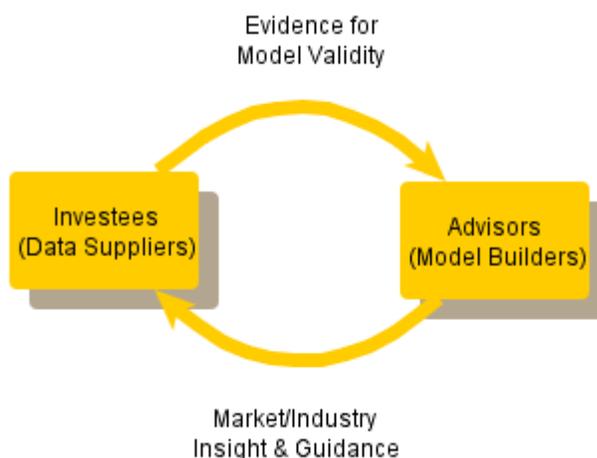


SwiftScale affords the opportunity to construct thousands of such payout models and, if the data is collected and organized appropriately, affords the opportunity to empirically test those models. Over time as the models are tested and vetted, trust in the models can build and these models can inform the process of building a business. If the use of the models broadens, the models can serve as a

kind of communicative norm enabling Transactors to coordinate their intentions while at the same time exchanging less confidential information.

Where do these models come from? The Transactors will build some models, but the more general models would be based on a broader base of transaction data and would require sophisticated skills to create models that draw valid inferences from the observational data collected during due diligence reviews. Development of this kind of model requires well designed observational studies, not the kind of activity one can reasonably expect a Transactor to pursue as a sideline. The trusted models will be created by 3rd party advisory firms, Advisors, who make investments in constructing and proving out valid models. In return for their efforts, the Advisors can expand their impact in the market and capture the value associated with that impact.

Third party Advisors can work on behalf of either Investor and/or Investee balancing the overall perspective on a potential investment and mitigating concerns of advice shilling for one party or another. Use of generally constructed eModels, not specific to a single investment, also reduces bias in the investment assessment process.



Realizing the value of the SwiftScale data is dependent on contributions of investment review data that is accurate and comparable across investments. Investment review data contributors, Investees, must have the correct incentives and assurances to curate and contribute data. Two Investee motivations must be addressed:

- 1) The motivation to perform a costly review process
- 2) The motivation to share the review data

There are two existing contexts where the Investee finds the motivation to initiate a review process. One stems from a potential investment at the request of an Investor. The other is in the case of so-called “sell side” or “reverse” due diligence where the Investee initiates a due diligence review to better prepare for a potential transaction. In both these cases, SwiftScale due diligence and valuation tools can reduce the cost of review and provide the review information in a form that offers greater comparability to other similar business and investment contexts. If Investees elect to contribute their review data to an eModel provider, the value of their data could serve as a discount to the cost of a model assessment and the model itself would become better adapted to the Investees’ business. In return for the use of the data, the eModel provider can provide back perspective and guidance to the Investee in the context of their industry. As eModels become more accurate and predictive, a third motivation arises for the Investee to perform reviews and share the data: to proactively help steer the building of their business towards driving factors that increase the value of the business in the corporate transaction market.

Additionally Investees can benefit during the pre-LOI phase of investment discussions. The Investor wants a reliable basis for a proposed investment offer and as such seeks information from the Investee to ground the offer. The Investee on the other has to consider that possibility that no offer is forthcoming and so naturally is reticent to provide information that offers insight into their business. A 3rd party running of an eModel that provides a synopsis of the health of the Investee's business provides assurance to the Investor while minimize disclosures on the part of the Investee. Both Transactors can hire their own eModel reviewers. And eModels themselves can be varied enough enjoy broad enough use so as to serve as an acceptable and unbiased standard of assessment.

The Investee needs assurances as to the use of the review data. SwiftScale can help to address these concerns by:

1. Providing standardized confidentiality agreements for all who access Investee data
2. Remove or de-identify Investee data elements in the context of aggregate level data access
3. Provide statistically based obfuscating access methods to aggregate level data

SwiftScale must also process data so as to avoid Insider Trading issues. Two tactics can be employed to this end:

1. Collecting data from Sell-side due diligence when investment transactions are not in play
2. Collect data from transactions after the transactions are public.

So far, the discussion has focused on data provided by the Investee. The Investee data reflects the value of the portion of the business that an Investment would buy, and as such serves to provide an underpinning for a model of transaction value, not the post-transaction value of the investment. The post-transaction value model would also seek to be informed by data representing post-transaction activities and outcomes, e.g. the integration phase of an acquisition. Here the Investor would need incentive to contribute data that tracks for example what happens to Mitigations and/or Remediation identified during Due Diligence and what the impact of those risks being managed effectively or not.

Investors would share the same confidentiality assurances as the Investee. And Investors would benefit from eModels that direct their attention during the Due Diligence risk assessment to those risks the empirically have had the greatest impact.

For both Transactors, SwiftScale can make a condition of gaining access to eModels that data from the model using organization be contributed to the model development data pool.

What is SwiftScale's role in the value chain of corporate transaction data? SwiftScale can serve by provisioning a data collection and access platform upon which model builders can derive, construct and test models that make corporate transactions more effective and efficient. That platform must:

- Protect confidentiality
- Not disclose Insider Information
- Motivate contributors of data ready for the development of models and compatible with the models evaluations
- Streamline the coordination of Transaction Participants

Preliminarily, SwiftScale can provide value simply through enabling data exploration which is typically a prerequisite to observational studies.

5.10. Community and Commercial Interest

Another objective of SwiftScale is to harness the talent and insight of 3rd party community and commercial individuals, groups and organizations. The community and commercial interest will be discussed in sequence.

Community

The practitioner participating in the Community of Practice mentioned earlier must have motivation and self-interest to continue participation. There are several possible motivations:

- Credentials – practitioners accumulate and refine skills for years and those skills have significant economic value. The ability to signal the holding of skill, experience and other qualifications is essential in a reputation economy. Credentials offered through a Community of Practices through attribution of contributions to the community can serve as such a signal.
- Pragmatism – existing models of risk or value may be a poor fit for a particular investment context. The practitioner may realize the need for better models or practices and see the most expedient path to obtaining the improvements is to work individually or collectively to introduce the necessary changes.
- Social good – as in all markets, the corporate transaction market can deliver on needed social challenges as well as degrade conditions. Usually markets have good and bad aspects. A practitioner may contribute to raise the level of play and seek to create a further social good.
- Power – practitioners may be constrained from enhancing or promulgating practices in their professional capacities. Participation in a community may provide another outlet to effect change. One powerful foundation that can serve as a maturing force in the market is that of standards. Practitioners can facilitate the creation of standards that make the market more transparent and efficient.

Practitioners have a variety of methods available through SwiftScale to engage the community. These include:

- Authoring, editing, refactoring and merging models
- Voting and rating models, practices and processes
- Testing and documenting models, practices and processes
- Commenting on, critiquing, questioning and editing other practitioners work
- Identifying a need, e.g. for a model or model component
- Connecting people to models and people to people
- Defining, administering and monitoring process
- Training or providing training to new community members

These methods can be used to contribute very broadly composing new models and practices out of whole cloth, or more narrowly by identifying a new Risk Class or Exposure, or defining a new Observation that yields a potential Risk Factor to be monitored. Business Development, strategy or executive practitioners can identify new candidate Investment Objectives and financial experts can new valuation models or components. All contributions are attributed and utilization of the contributions tracked to provide a measure of value. Practices, particularly best practices, are a gateway to standards. Communities can also foster the evolution of practices into standards as well as driving the standard up and across to other communities. The creation and adoption of models and standards, attributed to the contributors, provides an opportunity for participants to earn credentials for their efforts.

How does a practitioner start a community? Once a practitioner joins SwiftScale, an option is provided to propose a group. An interview follows to gather information about the industry,

geography, occupation and business function related to the group. Some additional descriptive information is gathered as well as a group mnemonic. The group proposal is available for others to vote their support for the group creation. Once five people have voted their support, the group infrastructure is created (mailing lists, blogs, etc.) and the group is announced. At that point, people may join the group and get started. The group nominates their own chair and institutes their process preferences. Balloting tools are provided to assist the coordination in the group.

Commercial

Commercial advisors, both individuals and firms, have motivations that are analogous to those of community members. These include:

- Selling of proprietary models and support for process such as billing and delivery
- Increased visibility and marketing and channel access
- Responding to competitive pressures
- Driving ancillary services to customers

Since advisors are often brought into Investments under a confidential relationship, advisors need infrastructure supporting their more intimate relationship with clients. Advisors are provided access to long running conferences and enabling direct participation in client work processes.

Like community practitioners, advisors can create models and components, as well as training, process support and documentation. But advisory sell these services, and SwiftScale facilitates that process.

5.11. Service Dependencies

<List any related known projects that relate in whole or in part, or has a dependency on this project.>

5.12.

5.13. Stakeholders

The following comprises the internal and external stakeholders whose requirements are represented by this document:

	Stakeholders
1.	
2.	
3.	

6. 5. Key Assumptions and Constraints

6.1.5.1 Key Assumptions and Constraints

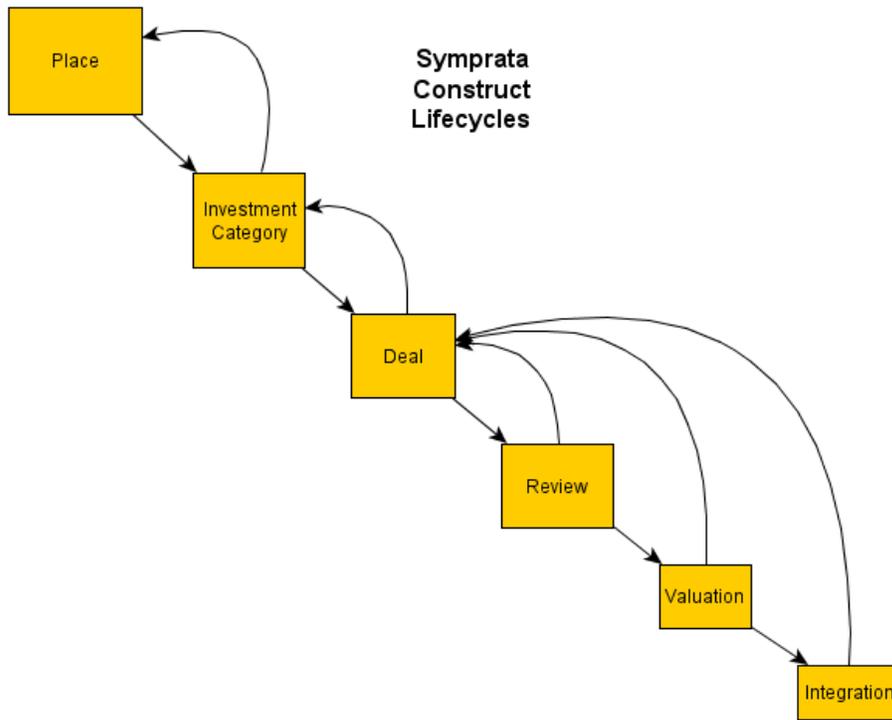
#	Assumptions
	SwiftScale will be a SaaS only offering
#	Constraints
	List any constraints the requirements are based on

7. 6. Use Cases

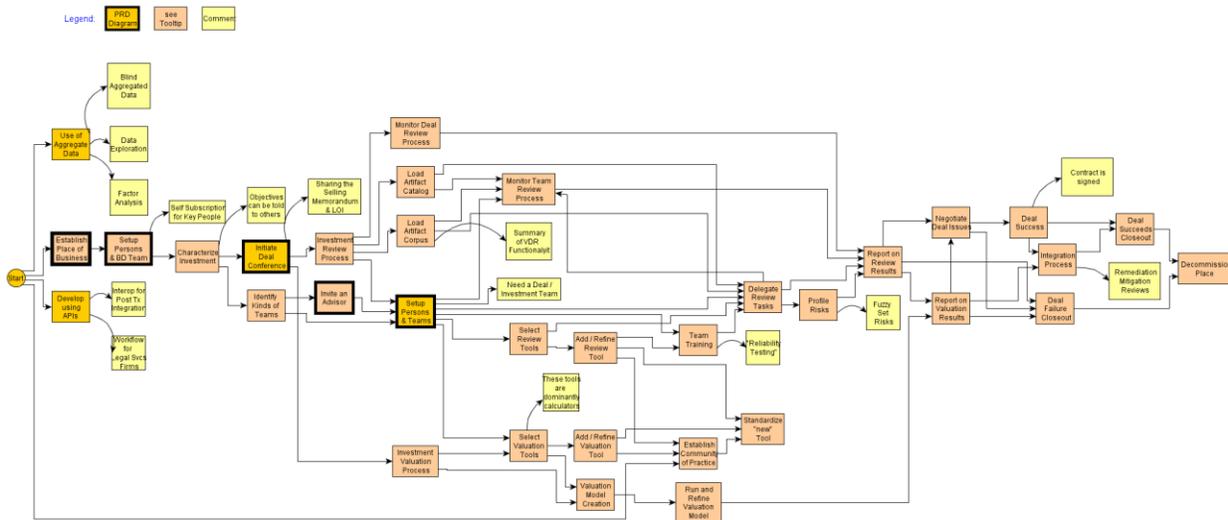
The following use cases are included:

1. Customer establishes a SwiftScale Place of Business
2. Define an Intended Transaction
3. Define Transaction Objectives
4. Identify Kinds of Teams Needed
5. Place an Enclosure in Space (Normalizing)
6. Setup Team Training
7. Setup Persons and Teams
8. Invite an Advisor to Participate
9. Initiate a Deal Discussion
10. Load Artifact Corpus
11. Load Artifact Catalog
12. Investment Review Process
13. Investment Review
14. Manage Review Process
15. Select Review Tools
16. Delegate Review Tasks
17. Add / Refine Review Tool
18. Standardize “new” Tool
19. Monitor Review Process
20. Profile Risks
21. Report on Review Results
22. Manage Valuation Process
23. Select Valuation Tools
24. Add / Refine Valuation Tool
25. Valuation Model Creation Process
26. Report on Valuation Results
27. Deal Failure Close Out
28. Deal Succeeds Close Out (Strategic & Financial)
29. Integration Process
30. Assessment Tool Creation & Refinement
31. Establish Community of Practice
32. Create / Refine Assessment Tool
33. Decommission Place
34. Developer Uses API (Not available yet)
35. Use of Aggregate Data (Not available yet)

SwiftScale supports the Use Cases through the lifecycle of these constructs:



The following diagram depicts the relationships between the Use Cases



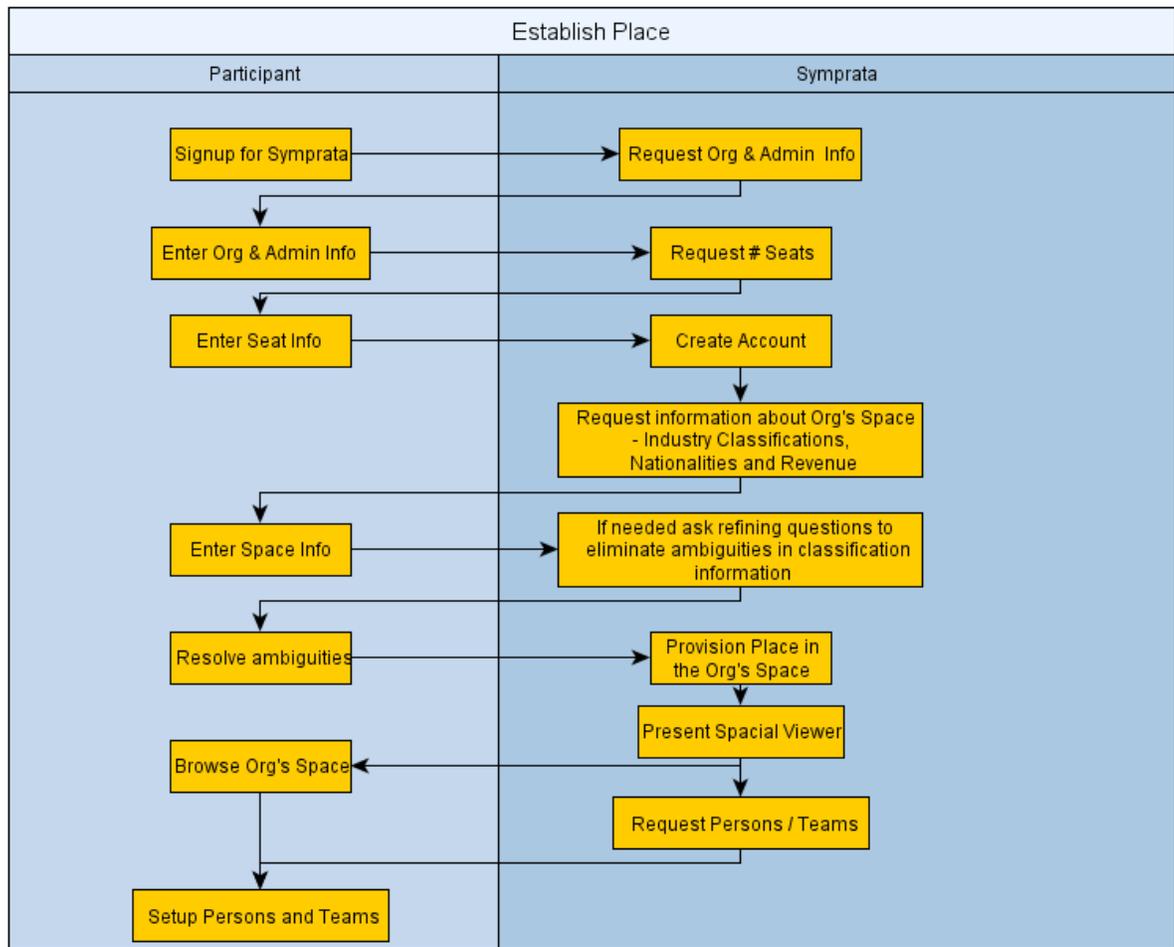
See the accompanying HTML/Flash documents for a larger scale version of this diagram.

7.1. Use Case Narrative – Establish Place

Use Case ID:	Establish_Place		
Use Case Name:	Establish SwiftScale Place of Business		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Administrator of Organization to use SwiftScale
Description:	Setup the Organization in SwiftScale by establishing a SwiftScale Place of Business
Preconditions:	<ul style="list-style-type: none"> • User knows Web address of SwiftScale and can Signup
Postconditions:	<ul style="list-style-type: none"> • Organization’s Place is provisioned • User has a secured, administer-able Place • User is an administrator
Normal Course:	1. See Use Case diagram for normal course
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.2. Use Case Diagram – Establish Place



7.3. Use Case Narrative – Setup Persons and BD Team

Use Case ID:	Setup Persons and BD Teams		
Use Case Name:	Setup Persons and Business Development Teams		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

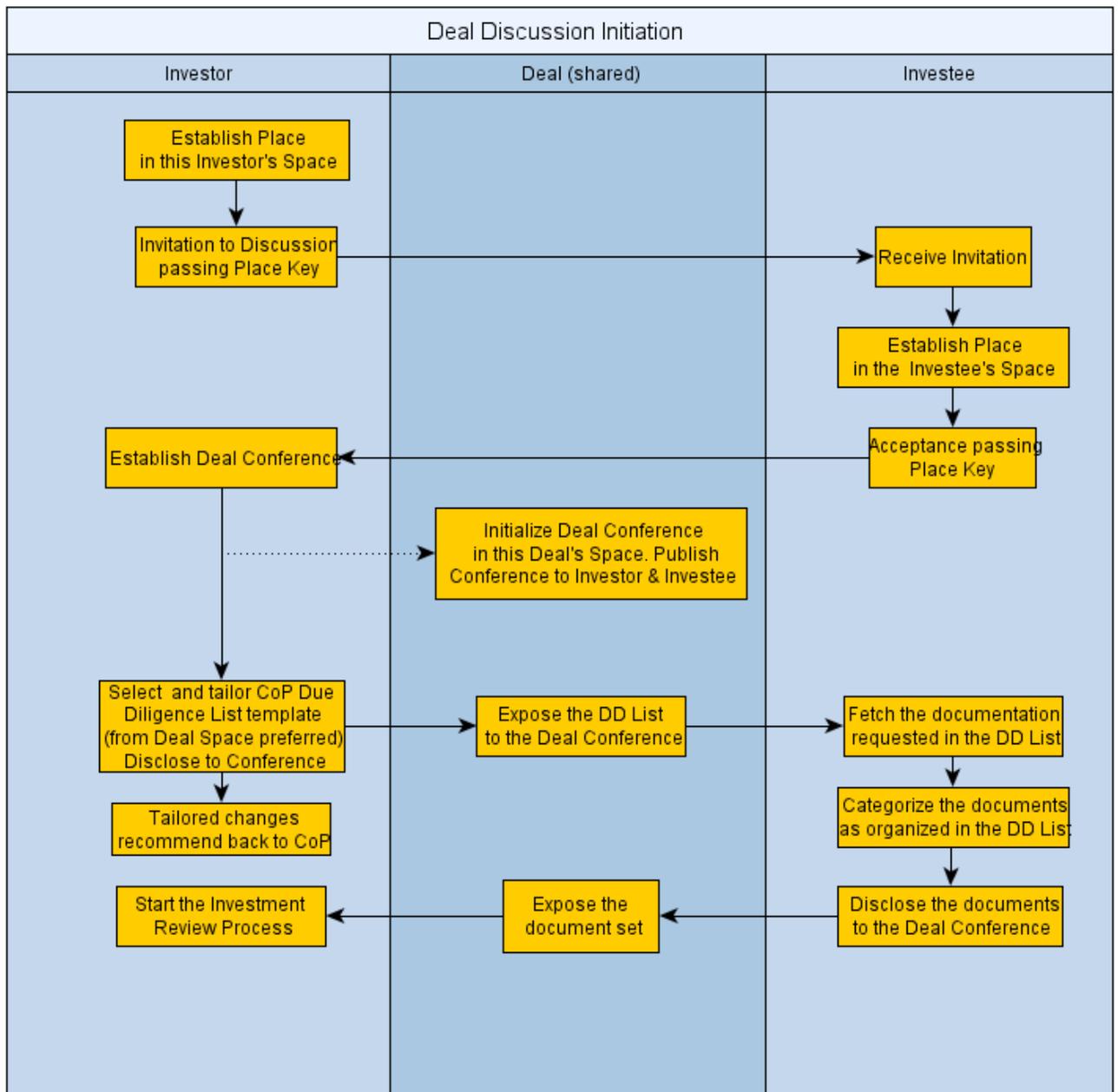
Actors:	
Description:	
Preconditions:	Organization set up done
Postconditions:	BD Team setup and ready to play
Normal Course:	1. See Setup Persons & Teams Diagram in PRD for general process
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.4. Use Case Narrative – Initiate a Deal Conference

Use Case ID:	Initiate a Deal Conference		
Use Case Name:	Initiate a Deal Conference		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Deal Leader
Description:	
Preconditions:	Business Development Team is set up
Postconditions:	
Normal Course:	1. See sequence diagram
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.5. Use Case Diagram – Initiate a Deal Conference



7.6. Use Case Narrative – Identify Kinds of Teams

Use Case ID:	Identify Kinds of Teams		
Use Case Name:	Identify Kinds of Teams		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	
Description:	
Preconditions:	Investment Objectives and Criteria Characterized
Postconditions:	Have identified a list of Teams (both DD and Valuation) to setup with associated Enclosures ready
Normal Course:	<ol style="list-style-type: none"> 1. Look at Business Process / Functions affected by the Objectives and Criteria 2. Create Enclosures for work on the affected Process/Functions 3. See if there are CoP's associated with a Process/Functions 4. If so, attach their library(s) to the associated Enclosure. 5. If Org is experienced in target space then use staff 6. If target is new space, 7. then identify possible Advisors to the teams
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.7. Use Case Narrative – Investment Review Process

Use Case ID:	Investment Review Process		
Use Case Name:	Investment Review Process		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

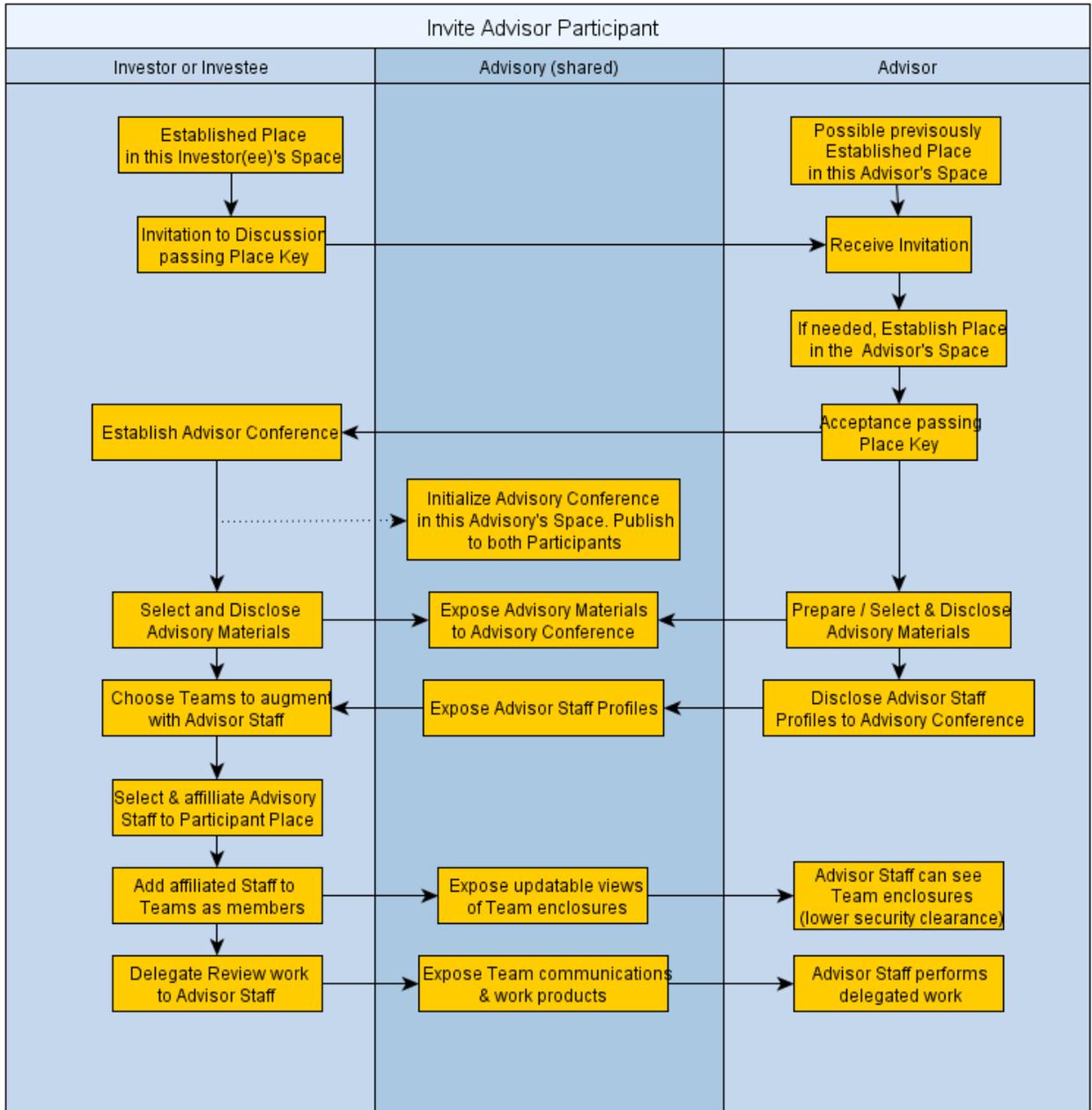
Actors:	
Description:	
Preconditions:	
Postconditions:	
Normal Course:	<p>This is more of a flow summary than a use case</p> <p>The Investment Review Process has to:</p> <ol style="list-style-type: none"> 1) get the review teams setup and populated and trained 2) ensure the teams are equipped with appropriate tools 3) manage the review itself which includes: <ol style="list-style-type: none"> 3a) managing the review material - locating, making accessible, sorting 3b) delegating specific review tasks across the team 3c) monitoring and adjusting the load balance across the team 3d) prioritizing some review tasks over others 3e) reporting on the review process
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.8. Use Case Narrative – Invite Advisor

Use Case ID:	Invite Advisor		
Use Case Name:	Invite Advisor to Participate		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	
Description:	
Preconditions:	Place Setup
Postconditions:	Conference Opened with Advisor
Normal Course:	<ol style="list-style-type: none"> 1. Exit: See sequence diagram in PRD
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.9. Use Case Diagram – Invite Advisor



7.10. Use Case Narrative – Monitor Deal Review Process

Use Case ID:			
Use Case Name:			
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	
Description:	
Preconditions:	Review Teams have been delegated their objectives and artifacts are available
Postconditions:	Review concludes
Normal Course:	<ol style="list-style-type: none"> 1. The Deal Lead received status of Teams progress by: 2. 1) artifacts reviewed 3. 2) accumulating identified Risk 4. 3) prioritized task 5. Deal Lead can adjust task priorities 6. Deal Lead publishes an overall monitoring report across Team Enclosures. The report data can be annotated with Deal Lead comments
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.11. Use Case Narrative – Load Artifact Catalog

Use Case ID:	Load Artifact Catalog		
Use Case Name:	Load Artifact Catalog		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	
Description:	
Preconditions:	Deal Conference is setup
Postconditions:	Artifacts are loaded into Investee storage; Catalog appears organized as mapped by Investor
Normal Course:	<ol style="list-style-type: none"> 1. Investor uses the default SwiftScale category structure (i.e. uses a null mapping) or creates a mapping over it. 2. The default category structure is based on the Business Function Hierarchy of Content Type Element as established by the location of the Investee Place 3. List of categories of Investor requested artifacts is shared in the Deal Conference from Investor to Investee 4. Investee admin selects the SwiftScale adapter to the 3rd party artifact repository 5. Investee provides secure connection info to the 3rd party repository as required by the adapter 6. If supported by the 3rd party adapter, 7. Investee admin uploads the SwiftScale canonical (default) Business Function Hierarchy as the document hierarchy in the 3rd party repository 8. otherwise the Investee admin sets up the 3rd party document hierarchy, 9. initiates a "Download document hierarchy" process from the 3rd party repository, 10. and then maps the repository document hierarchy to the SwiftScale canonical default Business Function Hierarchy 11. Investee admin loads the raw artifacts into a 3rd party artifact repository 12. Investee organizes the artifacts into the default SwiftScale category structure 13. Investee chooses the sets of requested artifacts to disclose and discloses them into the Deal Conference 14. Investor access the disclosed artifacts through their chosen category view of the artifacts
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	There are occasions when both Transactors supply artifacts for review

7.12. Use Case Narrative – Load Artifact Corpus

Use Case ID:	Load Artifacts Corpus		
Use Case Name:	Load Artifact Corpus		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

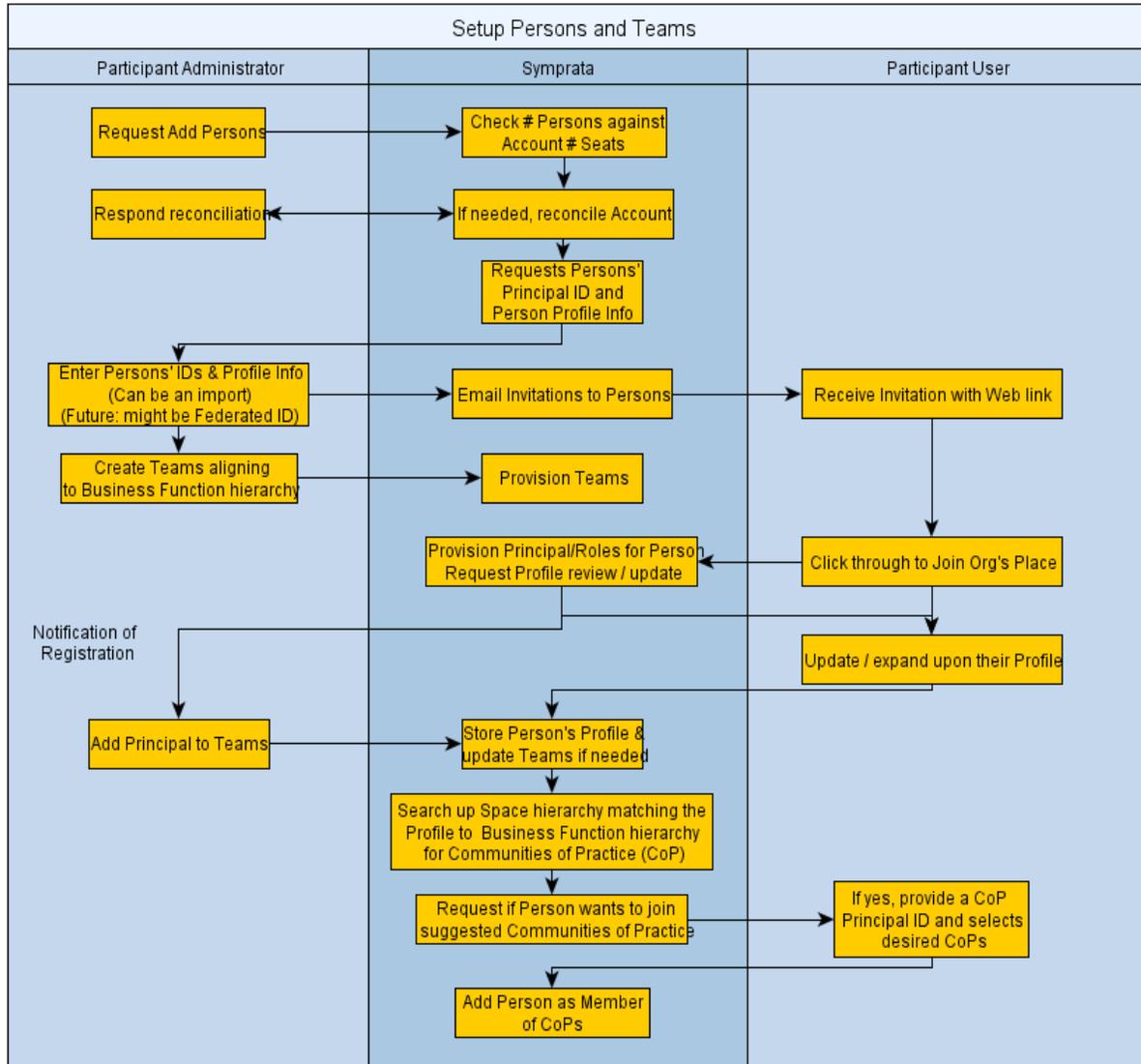
Actors:	
Description:	
Preconditions:	Deal Conference is setup
Postconditions:	Artifacts are loaded into Investee storage; Catalog appears organized as mapped by Investor
Normal Course:	<ol style="list-style-type: none"> 1. Investor uses the default SwiftScale category structure (i.e. uses a null mapping) or creates a mapping over it. 2. The default category structure is based on the Business Function Hierarchy of Content Type Element as established by the location of the Investee Place 3. List of categories of requested artifacts is shared in the Deal Conference from Investor to Investee 4. Investee loads the raw artifacts into their Place Artifact Repository 5. (Investee can reuse the artifacts and the default catalog structure across investors) 6. The ingestion process creates a catalog 7. Investee organizes the artifacts into the default SwiftScale category structure 8. Investee chooses the sets of requested artifacts to disclose and discloses them into the Deal Conference 9. Investor access the disclosed artifacts through their chosen category view of the artifacts
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	There are occasions when both Transactors supply artifacts for review

7.13. Use Case Narrative – Setup Persons and Teams

Use Case ID:	Setup Persons and BD Teams		
Use Case Name:	Setup Persons and Business Development Teams		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	
Description:	
Preconditions:	Organization set up done
Postconditions:	Subject Teams setup and ready to play
Normal Course:	See Setup Persons & Teams Diagram in PRD
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.14. Use Case Diagram – Setup Persons and Teams



7.15. Use Case Narrative – Monitor Team Review Process

Use Case ID:	Monitor Team Review Process		
Use Case Name:	Monitor Team Review Process		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Team Lead
Description:	
Preconditions:	<ul style="list-style-type: none"> Review Team have been delegated their tasks and artifacts are available
Postconditions:	<ul style="list-style-type: none"> Review concludes
Normal Course:	<ol style="list-style-type: none"> The Team Lead received status of Team Member progress by: <ol style="list-style-type: none"> artifacts reviewed accumulating identified Risk prioritized task Team Lead can adjust task priorities Team Lead can publish a monitoring report both within and outside of the Team Enclosure. The report data can be annotated with Team Lead comments
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	Team Lead can review progress of team members by the count of tutorials completed.

7.16. Use Case Narrative – Select Review Tools

Use Case ID:	Select Review Tools		
Use Case Name:	Select Review Tools		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Team Lead
Description:	
Preconditions:	<ul style="list-style-type: none"> Library is attached to Team Enclosure
Postconditions:	<ul style="list-style-type: none"> Specific Review Tools (e.g. Document Profile Types) are available in Reviewer Menus
Normal Course:	<ol style="list-style-type: none"> The Team Lead navigates to and opens the Team Enclosure Library The Team Lead reviews the Objectives of the Investment matching Review Tools to Objectives The Team Lead sets each matching Review Tool to Enable Team Lead saves or cancels the set of changed Enable settings If Saves, The Enclosure adds each Enabled Review Tool to all Team Members Review Tool menu (was "Add New" pulldown menu in the SwiftScale Live Mockup)
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.17. Use Case Narrative – Add / Refine Review Tools

Use Case ID:	Add / Refine Review Tools		
Use Case Name:	Add / Refine Review Tools		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Team Lead
Description:	
Preconditions:	<ul style="list-style-type: none"> Entry: Team Lead has author/edit entitlements to local Library attached to Enclosure
Postconditions:	<ul style="list-style-type: none"> New / modified tools in Local Library are candidates for contribution to the ancestor CoP
Normal Course:	<ol style="list-style-type: none"> In author/edit mode, Team Lead selects a Tool from the Local Library or selects New Tool. If New Tool, Team Lead chooses from the Metamodel hierarchy what Type Element to add, and follows a Type Element Editor Guide through the creation steps. The Guide may require creating or referencing other related Type Elements. If an existing Tool is selected, Team Lead navigates the Type Element to the component of the Type needing change. The Type Element Editor may require creating or referencing other Type Elements. Team Lead saves, cancels or commits changes. The Editor stores saved edits in the Local Library in a deactivate state. The Editor stores committed changes in the Local Library in an activate state. All storage uses "Fully Persistent Data Structure" copy-on-write semantics.
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.18. Use Case Narrative – Team Training

Use Case ID:	Team_Training		
Use Case Name:	Train a Team on required skills and tools		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Team Lead, Team Members
Description:	Setup the Organization in SwiftScale by establishing a SwiftScale Place of Business
Preconditions:	<ul style="list-style-type: none"> Team is established; Tools are prepared
Postconditions:	<ul style="list-style-type: none"> Team review and tool skills exceed minimum threshold and are normalized across the team
Normal Course:	<ol style="list-style-type: none"> Team Lead selects the review tutorials for training If review tutorials require refinement, Team Lead refines the review tutorials Team Lead selects the tool tutorials for training If tool tutorials require refinement, Team Lead refines the tool tutorials Team members are notified of their training requirements and blocked from any actions Team members sequence through the selected tutorials as their testing success allows Team member completion of the tutorial set unblocks action enabling execution of review tasks Team Lead can review progress of team members by the count of tutorials completed.
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	Each Business Function subject domain of each Investment
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.19. Use Case Narrative – Delegate Review Tasks

Use Case ID:	Delegate_Review_Tasks		
Use Case Name:	Delegate Review Tasks		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Team Lead, Team Members
Description:	Team Lead delegates review tasks out to Team Members
Preconditions:	<ul style="list-style-type: none"> Teams are setup and trained; Artifact Catalog is loaded; Review tools are selected
Postconditions:	<ul style="list-style-type: none"> Team members start review tasks
Normal Course:	<ol style="list-style-type: none"> Team Lead navigates to the Team's location in the Business Function hierarchy Team Lead associates Review Tools to specific Content Types, e.g. a specific Risk Profile to a specific type of Artifact Team Lead selects review content through enumeration or description (rule) Team Lead assigned the selected content to a Team Member Content selections for different Team members will overlap enabling testing of "Observer Reliability" Team Lead can prioritize work items within each Team Member's assigned content by enumeration or description (rule).
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	Each Business Function Subject domain of each Investment
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.20. Use Case Narrative – Profile Risks

Use Case ID:	Profile_Risks		
Use Case Name:	Profile Risks of the Investment		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Review Team Members
Description:	Create Profiles from the evidence in Artifacts of the Investment Risks
Preconditions:	<ul style="list-style-type: none"> Review tasks are delegated to Team Members
Postconditions:	<ul style="list-style-type: none"> All delegated review tasks have been performed
Normal Course:	<p>Method (performed by each Team Member):</p> <ol style="list-style-type: none"> Team Member iterates the following steps: <ul style="list-style-type: none"> Team Member selects a review tool Team Member associated review content which may be one or a set of artifacts Team Member performs the review against the content using the Tool Team Member checks for more delegated review tasks During the iteration, several <ul style="list-style-type: none"> Notifications are posted to the Team Enclosure for changes in delegated task state The Team Member can broadcast or narrowcast questions or remarks to others who have authorization to receive the messages. The others can respond to those messages if authorized
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	Each requested document (artifact) for each Business Function subject domain for each Investment
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	<p>Note: Remember that team members will overlap on profiles to establish "reliability", i.e. consistency of reviews across team members</p> <p>Note: "Negative" Risks can serve as calculations of Risk on Positive Impacts / Opportunities (substitute "loss" with "gain")</p> <p>Note: Risks will be represented as Fuzzy Sets established by taking best case, worst case and most likely case value</p>

7.21. Use Case Narrative – Report on Review Results

Use Case ID:	Report_on_Review_Results		
Use Case Name:	Report on Review Results		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Deal Lead, Team Leads
Description:	Reporting of the Review Results
Preconditions:	<ul style="list-style-type: none"> Review Tasks are completed
Postconditions:	<ul style="list-style-type: none"> Reviewed Risk Impact is computed and ready to be incorporated into the Valuation
Normal Course:	<ol style="list-style-type: none"> Deal Lead receives notification from each Team Lead that the review tasks are complete Deal Lead runs the Review Risk Impact Rollup report and examines the report for outliers or inconsistencies, if encountered, the Deal Lead inquires back to the Team lead to reconcile the mismatch between expectation and reported values. If the Deal Lead inquires about a Team's reported risks, a resolution dialog ensues When the Deal Lead is satisfied, the Reviewed Risks are posted to the Valuation Model by the Deal Lead and the Team Reviews are Locked.
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.22. Use Case Narrative – Investment Valuation Process

Use Case ID:	Investment_Valuation_Process		
Use Case Name:	Investment Valuation Process		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Financial Team Lead
Description:	
Preconditions:	<ul style="list-style-type: none"> Deal Conference has been initiated; minimally Selling Memorandum or some document with financials has been shared
Postconditions:	<ul style="list-style-type: none"> Valuation Iteration terminates upon Deal Closure
Normal Course:	<p>This is more of a flow summary than a use case:</p> <ol style="list-style-type: none"> Method (performed in interative approximations): <ol style="list-style-type: none"> The latest set of Investee Financials are shared Investor Financial Lead selects most suitable Valuation Tools based on Investment Characterization <ol style="list-style-type: none"> Valuation Tools are refined if necessary Valuation Tools are used to generate a Valuation Model Financials Team enters Financial information <ol style="list-style-type: none"> Assessed Risk values are incorporated into the Valuation The current iteration of Valuation Estimate is posted to the Deal Team Enclosure
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.23. Use Case Narrative – Select Valuation Tools

Use Case ID:	Select_Valuation_Tools		
Use Case Name:	Select Valuation Tools		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Financial Team Lead
Description:	
Preconditions:	<ul style="list-style-type: none"> Investment Conference initiated; Financial Team Enclosure setup with Library attached
Postconditions:	<ul style="list-style-type: none"> Specific Valuation Tools (e.g. Valuation Model Generators) are available in Valuator Menus
Normal Course:	<ol style="list-style-type: none"> Financial Team Lead navigates to and opens the Team Enclosure Library Fin Team Lead reviews the Objectives of the Investment matching Valuation Tools to Objectives Fin Team Lead sets each matching Valuation Tool to Include Fin Team Lead saves or cancels the set of changed Include settings If Saves, The Enclosure adds each Included Valuation Tool to the set of Tools to be used in Valuation Model Generation. Each Tool is also listed on the Team Member menus as appropriate.
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.24. Use Case Narrative – Add / Refine Valuation Tools

Use Case ID:	Establish_Place		
Use Case Name:	Establish SwiftScale Place of Business		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Administrator of Organization to use SwiftScale
Description:	Setup the Organization in SwiftScale by establishing a SwiftScale Place of Business
Preconditions:	<ul style="list-style-type: none"> Fin (ancial) Team Lead has author/edit entitlements to local Library attached to Enclosure
Postconditions:	<ul style="list-style-type: none"> New / modified tools in Local Library are candidates for contribution to the ancestor CoP
Normal Course:	<ol style="list-style-type: none"> In author/edit mode, Fin Team Lead selects a Tool from the Local Library or selects New Tool. If New Tool, Fin Team Lead chooses from the Valuation Metamodel hierarchy what Type Element to add, and follows a Type Element Editor Guide through the creation steps. The Guide may require creating or referencing other related Type Elements. If an existing Tool is selected, Fin Team Lead navigates the Type Element to the component of the Type needing change. The Type Element Editor may require creating or referencing other Type Elements. Fin Team Lead saves, cancels or commits changes. The Editor stores saved edits in the Local Library in a deactivate state. The Editor stores committed changes in the Local Library in an activate state. All storage uses "Fully Persistent Data Structure" copy-on-write semantics.
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.25. Use Case Narrative – Valuation Model Creation

Use Case ID:	Valuation_Model_Creation		
Use Case Name:	Valuation Model Creation		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Financial Team Lead, Members
Description:	
Preconditions:	<ul style="list-style-type: none"> The selected Valuation Tools are identified
Postconditions:	<ul style="list-style-type: none"> The Valuation Model is ready for use.
Normal Course:	<ol style="list-style-type: none"> Fin Team Lead navigates to and opens the Team Enclosure Library Fin Team Lead invokes the Valuation Model generator The Model generator performs a check on the selected Valuation Tools to determine if the toolset is inconsistent or incomplete That is, some Tools needed for generation may be missing or some selected may be incompatible. If the check fails, the Fin Team Lead reconciles incompatibilities by altering Tool selections Upon successful completion of Model generation, Fin Team Lead posts notification to the Team that the Model is ready for use. Financial Modelers can start using the Model. Included Tools will be Enabled by the Model on the basis of their dependencies on the state of other Tools in the Toolset being met.
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.26. Use Case Narrative – Establish Community of Practice

Use Case ID:	Establish_CoP		
Use Case Name:	Establish Community of Practice		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Administrator of Organization to use SwiftScale
Description:	Setup the Organization in SwiftScale by establishing a SwiftScale Place of Business
Preconditions:	<ul style="list-style-type: none"> Practitioner signs up to SwiftScale; Practioner selects "Propose a Community"
Postconditions:	<ul style="list-style-type: none"> Exit: A new Community of Practice is published
Normal Course:	<ol style="list-style-type: none"> Practioner answers form questions gathering information about the industry, geography, occupation and business function related to the community. Practioner supplies some descriptive information and a community mnemonic. The communnity proposal is published for others to vote their support for the community creation. Once five practioners have voted their support, the community infrastructure is created (mailing lists, blogs, etc.) and the community is announced. At that point, practioners may join the community and get started. The community nominates their own chair and institutes their process preferences. Balloting tools are provided to assist the coordination in the community.
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.27. Use Case Narrative – Run and Refine the Valuation Model

Use Case ID:	Valuation_model		
Use Case Name:	Run and refine the Valuation Model		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Financial Team Lead / Members
Description:	
Preconditions:	<ul style="list-style-type: none"> Valuation Model is assembled and consistency checked from selected Valuation Tool
Postconditions:	<ul style="list-style-type: none"> Valuation is computed
Normal Course:	<ol style="list-style-type: none"> Financial Team Members instantiate Enabled Valuation Tools capturing information drawn from shared Financial artifacts and Comparable Deals. E.g. Cash Flow generating Assets are enumerated and vetted. Growth rates, Risks and Financing Costs are estimated and justified as the Tools progressively become Enabled due to fulfillment of prior dependencies. If appropriate to the Investment type, Synergy identification tools activate and Team Members enumerate and estimate synergies. The modelers can freely move back and forth across the Tools that have been Enabled to adjust and refine their inputs.
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.28. Use Case Narrative – Standardize “New” Tool

Use Case ID:	Standardize “new” tools		
Use Case Name:	Standardize a new tool		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Community Practitioner
Description:	Setup the Organization in SwiftScale by establishing a SwiftScale Place of Business
Preconditions:	<ul style="list-style-type: none"> Community of Practice to perform the standardization has been formed.
Postconditions:	<ul style="list-style-type: none"> Community adopts the Tool as a standard; The Tool is promoted in the Library to be the preferred Tool fit for that purpose
Normal Course:	<ol style="list-style-type: none"> The Practitioner submits a new or refined Tool for standardization to the Community of Practice. The Community follows the process established for standardization to decide if the submission is accepted. The Community ballots the standardization of the Tool. If the balloting succeeds, the Tool is promoted in the Library associated with the Community of Practice to be the standard.
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	The Practitioner should in general submit the Tool for standardization to the "most general" (highest in the Business Function hierarchy) community that would stand to benefit from the Tool.

7.29. Use Case Narrative – Report on Valuation Results

Use Case ID:	Report_Valuation_Results		
Use Case Name:	Report on Valuation Results		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Financial Team Lead
Description:	
Preconditions:	<ul style="list-style-type: none"> Valuation Model is complete and run.
Postconditions:	<ul style="list-style-type: none"> Reviewed Valuation Model is computed and ready for use in the Go/No Go decision.
Normal Course:	<ol style="list-style-type: none"> Financial Team Lead runs the Valuation Model report and examines the report for outliers or inconsistencies, if encountered, the Financial Team Lead reconciles the mismatch between expectation and reported values. When reconciled, the Deal Lead receives notification from the Financial Team Lead that the valuation tasks are complete If the Deal Lead inquires about a Valuation Model result, a resolution dialog ensues When the Deal Lead is satisfied, the Reviewed Valuation Model is posed by the Deal Lead to the Deal Team Enclosure and the Valuation Model is Locked.
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.30. Use Case Narrative – Negotiate Deal Issues

Use Case ID:	Negotiate_Deal_Issues		
Use Case Name:	Negotiate Deal Issues		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Transactor Deal Leads
Description:	Process of negotiation
Preconditions:	<ul style="list-style-type: none"> Risk and/or Valuation Results available; Deal Team identified Deal Issues
Postconditions:	<ul style="list-style-type: none"> Deal Issues are resolved or Deal Failure
Normal Course:	<ol style="list-style-type: none"> Transactor Deal Lead notifies other Transactor of Deal Issues Iterate until all issue statuses are finalized: <ul style="list-style-type: none"> Transactors' Deal Leads confer with their respective Deal Teams Responding Transactor Deal Lead proposed Issue resolutions Originating Deal Lead notifies other Transactor of proposal acceptance status
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.31. Use Case Narrative – Deal Success

Use Case ID:	Deal_Success		
Use Case Name:	Deal Success		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Deal Lead
Description:	
Preconditions:	<ul style="list-style-type: none"> • Risk and/or Valuation Results available; Deal Lead conferred with Deal Team;
Postconditions:	<ul style="list-style-type: none"> • Deal status is set to Success
Normal Course:	<ol style="list-style-type: none"> 1. Investor Deal Lead sends a certified notification to the Investee of Review and Valuation approval 2. [The contract is submitted and signed] 3. Investee Deal Lead response with a certified notification of Investor of Deal approval
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	* Take on more functionality in the contract process?

7.32. Use Case Narrative – Deal Failure Closeout

Use Case ID:	Deal_Failure_Closeout		
Use Case Name:	Deal Failure Closeout		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Deal Lead, Deal Team Members
Description:	
Preconditions:	<ul style="list-style-type: none"> Risk and/or Valuation Results available; Deal Lead conferred with Deal Team
Postconditions:	<ul style="list-style-type: none"> Deal is closed
Normal Course:	<ol style="list-style-type: none"> Deal Lead notifies other Transactor of Deal Failure Disclosures of sensitive information to other Transactor are Enclosed Deal Team members are notified of Deal Closure and re-informed of confidentiality responsibilities Access is revoked from Deal Team Members Optionally <ul style="list-style-type: none"> Deal Lead can archive Deal information Deal Enclosures are marked disabled Deal is marked Closed with Status Failure Public knowledge Deal data is aggregated into the central statistical pool De-identified private Deal data is aggregated into the central statistical pool
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.33. Use Case Narrative – Integration Process

Use Case ID:	Integration_Process		
Use Case Name:	Integration Process		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Deal Lead, Integration Team, Remediation Teams
Description:	
Preconditions:	<ul style="list-style-type: none"> Risk Remediations are available; Deal status has been set to Success
Postconditions:	<ul style="list-style-type: none"> All delegated review tasks have been performed and Deal Status is set to Complete
Normal Course:	<ol style="list-style-type: none"> Deal Lead sets Deal Status to Integration Deal Enclosures of both Transactors are disclosed bidirectionally Deal Enclosures provide options to Merge Transactor Enclosures Deal Lead sets up an Integration Team Deal Lead sets up Remediation Teams Review tasks are delegated to Team Members Each Team Member iterates the following steps until all remediation statuses are finalized: <ul style="list-style-type: none"> Team Member selects a remediation tool Team Member examines associated remediation content which may be one or a set of artifacts Team Member performs the remediation against the content recording the result using the Tool Team Member checks for more delegated remediation tasks During the iteration, several <ul style="list-style-type: none"> Notifications are posted to the Team Enclosure for changes in delegated task state The Team Member can broadcast or narrowcast questions or remarks to others who have authorization to receive the messages. The others can respond to those messages if authorized
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.34. Use Case Narrative – Deal Success Closeout

Use Case ID:	Deal_Success_Closeout		
Use Case Name:	Deal Success Closeout		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Deal Lead
Description:	
Preconditions:	<ul style="list-style-type: none"> Risk and/or Valuation Results available; Deal Status has been set to Success or Integration
Postconditions:	<ul style="list-style-type: none"> Deal is closed
Normal Course:	<ol style="list-style-type: none"> Optionally <ul style="list-style-type: none"> Deal Lead can archive Deal information Deal Enclosures are marked disabled Deal is marked Closed with Status Success Public knowledge Deal data is aggregated into the central statistical pool De-identified private Deal data is aggregated into the central statistical pool
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7.35. Use Case Narrative – Decommission Place

Use Case ID:	Decommission_Place		
Use Case Name:	Decommission Place		
Created By:		Last Updated By:	
Date Created:		Date Last Updated:	

Actors:	Administrator of Organization to use SwiftScale
Description:	Decommissions the Organization in SwiftScale by establishing a SwiftScale Place of Business
Preconditions:	<ul style="list-style-type: none"> • All Deals are marked Closed.
Postconditions:	<ul style="list-style-type: none"> • SwiftScale Service is terminated for customer
Normal Course:	<ol style="list-style-type: none"> 1. All Customer user access is revoked 2. Private Customer data is deleted 3. Public knowledge Customer data is aggregated into the central statistical pool 4. De-identified private Customer data is aggregated into the central statistical pool 5. Resources are released
Alternative Courses:	
Exceptions:	
Includes:	
Priority:	
Frequency of Use:	
Business Rules	
Special Requirements:	
Assumptions:	
Notes and Issues:	

7. Business Requirements

The following sections document the various business requirements of this project.

Requirement Type	ID – Prefix ??	ID – Number	Function – Feature - Requirement	Use Case Reference	Required	??	??	??	Comments
Business User Requirements									
	F	0001	Deal Leader must have the ability to create a Due Diligence List						
	F	0002	Deal Leader must have CRUD support for the Due Diligence List						
	F	0003	Deal Leader must have the ability to Disclose the Due Diligence List to another Deal Transactor.						
	F	0004	Deal Leader must have the ability to Track the status of a Disclosed Due Diligence List.						Need to define a set of status, eg. Disclosed, read, etc.
	F	0005							
	F	0007							
	F	0007							
	F	0008							
Deal Management Requirements									
	F	0001	Ability to create and manage a Deal						
	F	0002	A Deal should have an associated Place						
	F	0003	Ability to define and manage Roles for a Deal						
	F	0004	Ability to locate a Deal in a market Space						
	F	0005	Select Profile Subjects and Types to be used in a Deal						
	F	0007	Specify decision participation roles and assign principals						
	F	0007	Historical comparison to similar deals and deal outcomes						
	F	0008							
Place and Space Requirements									
	F	0001	Ability to define a Place						
	F	0002	Ability to associate a Location with a Place						
	F	0003	Ability to define and associated Roles with a Place						
	F	0004	Ability to define Entitlements for Roles of a Place						
	F	0005	Segregation of investor and investee access						
	F	0007	Restricted decision support views based on roles						
	F	0007							
	F	0008							
Persons, Users and Organizations Requirements									
	F	0001	Ability to define Persons						
	F	0002	Ability to define Teams						
	F	0003	Ability to define Organizations						
	F	0004	Ability to define a Principal						
	F	0005	Ability to assign Principal to a Team						
	F	0007	Ability create a Place for a Team						
	F	0007	Ability to create a Place for an Entity						
	F	0008	Define a team space - multiple entity						

	F	0009	participation in team Ability to export team space member information							Should this be dropped – don't understand it
Profiles and Risks Requirements										
	F	0001	Define entitlement on Profiles							
	F	0002	Ability to support multiple Profile Types in a Subject							
	F	0003	Assign roles permissions to operations on profiles & types							
	F	0004	Define new Observations							
	F	0005	Define new profiles							
	F	0007	Crowd source, refine and review new profiles							
	F	0007	Workflow for standardizing new profiles and/or items							
	F	0008	Ability to identify a Risk in a Profile							Just at the Profile level or at the Observation level?
	F	0009	Ability to impute a Risk value in a Profile							
	F	0010	A Risk value should be represented by a Fuzzy Set							
	F	0010	Ability to define a Mitigation to a Profile Risk							
	F	0011	Ability to define a Remediation to a Profile							
	F	0012	Ability to compute a Mitigation value reducing a Risk value							
Valuation Requirements										
	F	0001	Ability to determine Transactor class (young growth, growth, mature, declining)							Turbo-tax style interview one possible method
	F	0002	Ability to determine the type of investment (venture, M&A, PE, IPO)							
	F	0003	Ability to generate spreadsheet-based valuation model							
	F	0004	Ability to factor profile data into valuation model							
	F	0005	Ability to define / extend valuation model rules and component templates							
	F	0007	Ability to generate models from standardized, canonical components							
	F	0007	Ability to guide the generation in an Expert mode							
	F	0008	Ability to incorporate market, industry and financial data to supply model constraints and estimates							
	F	0009	Models will be based on standardized spreadsheet formats							
	F	0010	Ability to show and document the model assumptions							Allow for quick review and adjustment
	F	0011	Ability to manage the version, lineage and change control of models							
	F	0012	Support workflow for standardizing model components and generation rules							
	F	0013	Support to manage access controls for access to models							Would this require anything further than the LBAC?
	F	0014	Ability to feed comparable data to models from 3 rd party sources							
	F	0015	Ability to tune the weights and adjustments of profile risks and costs upon a model							
	F	0016	Support for workflow for model review by a Transactor and the Transactor's Advisors							
	F	0017	Support for workflow to review model inputs and sign-off							
	F	0018	Generation of reports and charts from a model							
	F	0019	Voting support for authorized (Decision Maker) Principals							
Reporting Requirements										
	F	0001	Export profiles to PDF, Excel w/in subject/type							

F	0002	Create a report within a subject/type							
F	0003	Create a report against profile master for all types							
F	0004	Saving reports to be run later							
F	0005	Extend profile master reporting to include cost and risk metrics							
F	0007	Export of Profiles in support of a Reps and Warranties schedule							Will need to detail the specific content and format
F	0007								
F	0008								
User Access/Security Requirements									
F	0001	System should authenticate users before enabling access							
F	0002	System should check user entitlements before servicing a request							
F	0003	Ability to assign and manage Principles to Roles							
F	0004	Support a user's authorization to different subjects/types - teams/deals							
F	0005	Each organization should have a central administration for authentication to their Place							
F	0007	A Person is has a principal to an organization must also be able to have a principal to one or more Communities.							
F	0007								
F	0008								
Service Level/Performance Requirements									
F	0001	System should have 99% availability (down 3.65 days/yr).							
F	0002								
F	0003								
F	0004								
F	0005								
F	0007								
F	0007								
F	0008								
Scalability Requirements									
F	0001	System deployment should be able to scale horizontally							
F	0002								
F	0003								
F	0004								
F	0005								
F	0007								
F	0007								
F	0008								
Post Deal Planning Requirements									
F	0001	Risk tracking within the Decision Analysis							
F	0002	Apply mitigations to deal risks and assess valuation impact							
F	0003	Users define and/or extended mitigation templates associated with risks							
F	0004	Branch the valuation model based on different assumptions from alternative decision scenarios - Scenarios include no-go option and contingency plans for both investor / investee							
F	0005	Process to converge on go/no go decision with tracking of decision criteria and results							
F	0007	Commonly encountered business risks can be addressed by reusable mitigation pattern. For the reuse to be realized, an existing mitigation must be discoverable. This requirement calls for workflow allowing existing mitigation to be							

	F	0007	discovered. The workflow should allow for attribution support for reputation-based mitigation template authoring																	
	F	0008	Distribute decision follow-through across the combined team																	
	F	0009	Consolidated reporting on follow through status																	
	F	0010																		
	F	0011																		
Post Deal Integration Requirements																				
	F	0001	Support workflow to track remediation resolution																	
	F	0002																		
	F	0003																		
	F	0004																		
	F	0005																		
	F	0007																		
	F	0007																		
	F	0008																		
Demographic Requirements																				
	F	0001	System should be Internationalized																	
	F	0002	The system should be localized to the United States																	
	F	0003	System should conform to American Disabilities Act																	
	F	0004																		
	F	0005																		
	F	0007																		
	F	0007																		
	F	0008																		
Communications Requirements																				
	F	0001	Ability to create, track and answer secure questions messages between Transactors																	
	F	0002	Ability to route cross Transactor messages for response within Transactor Teams																	
	F	0003	Ability to track status of Remediation topics																	
	F	0004	Support communications of Messages between Principals																	
	F	0005																		
	F	0007																		
	F	0007																		
	F	0008																		
Compliance Requirements																				
	F	0001	Investigate regulatory compliance requirements – E.g. SOX, Dodd-Frank																	
	F	0002																		
	F	0003																		
	F	0004																		
	F	0005																		
	F	0007																		
	F	0007																		
	F	0008																		
Data Mining Requirements																				
	F	0001	Anonymize data for analytical use																	
	F	0002	Pool data for analytical use																	
	F	0003	Ability to compute what Risks are correlated with Valuation																	
	F	0004	Ability to compute what combination of Risks are correlated with Valuation																	
	F	0005	Ability to compute what Risks are inversely																	

			correlated with Valuation						
F	0007		Ability to compute what combination of Risks are inversely correlated with Valuation.						
F	0008		Ability to support computations based on time series on Profile of Business Events						
F	0009		Ability to compute operating ratios for an org						
F	0010		Ability to compute aggregate statistics of operating ratios for a sub-Space						e.g. Average, Median, etc
External Document Management Requirements									
F	0001		Connected out to external document management services						
F	0002		Authenticated and authorized access to external document management services						
F	0003		Encrypt access to external document management services						
F	0004		Extract of document index of external document management service						
F	0005		Maintenance of a document reference identifier into a document of external document management service						
F	0007		Refresh the document index of external document management service to maintain a current and consistent inventory of documents						
F	0007		Invalidate document references identifiers of removed documents						
F	0008								
Internal Document Management Requirements									
F	0001		Provide file storage for documents						
F	0002		DM must have a durable document identifier						
F	0003		Documents must be encrypted at rest						
F	0004		DM must be able to represent a directory hierarchy						
F	0005		DM must be able to create indices over the documents under management						
F	0007		DM must be able to store, retrieve, delete and update a document						
F	0007		DM must provide a container that can logically be enclosed in an Enclosure						
F	0008		DM must provide document status tracking						Need to define a set of statuses
F	0009		DM must provide ability to destroy copies of documents in the case of Post Deal Failure.						
F	0010		DM must provide ability to retain or export documents in the case of Post Deal Success.						
Integration Requirements									
F	0001		Support for a Place provisioning API						
F	0002		Support for a Place Administration API						
F	0003		Support for a Place security policies API						
F	0004		Support for a Place metadata Definitions API						
F	0005		Support for a Place Access/CRUD API						
F	0007		Support for a Place Messaging API						
F	0007		Support for a Place Event model (outbound) API						Necessary for integration to customer operational systems
F	0008								Need to define a set of statuses
F	0009								
F	0010								
Operations, Support and Maintenance Requirements									
F	0001		System deployment should be automated						
F	0002		System deployment should be revertable						
F	0003		System deployment should be monitored						
F	0004		Data in the System should be backed up every						

			4 hours						
F	0005	Import / Export a Place for backup & restore							
F	0007	Archive transaction specific Team Enclosure information							
F	0007								
F	0008								

8. 8. Appendixes

8.1.8.1 Appendix A – Business Process Flows

8.2. Appendix B – Application Programming Interfaces

Underlying APIs – these are cross cutting APIs in support of the REST APIs.

Place

Provisioning

Place Lifecycle

Coordinate with Accounting

Administration

Enclosure Lifecycles

Enclosure Membership

Enclosure Membership Security Defaults

Conference Lifecycles

Security Policies

Security Levels

Security Classifications

Disclosures

Definitions (Metadata)

Define Object Types

Discover Object Types

Categorize Object Types by Subject

Access

Object Lifecycle

Messaging

Mail

Posting / Comment

Request / Response

8.1.1 As Is Diagrams

8.2.2 To Be Diagrams

8.3. Appendix B – Business Rules Catalog

<Instructions: Use the following template for each business rule. >

Business Rule Name:	<The name should give you a good idea about the topic of the business rule.>
Identifier	<Defines unique identifier.> <i>EXAMPLE: BR1</i>
Description	<Defines the rule in detail.> <i>EXAMPLE: "All employee labor is tracked, reported and billed in 15 minute increments."</i>
Example	<(Optional) An example of the rule>
Source	<Source of the rule. E.g. stakeholder>
Related Rules	<List of related rules, to support traceability>

8.4. Appendix C- Models

<Insert models here>

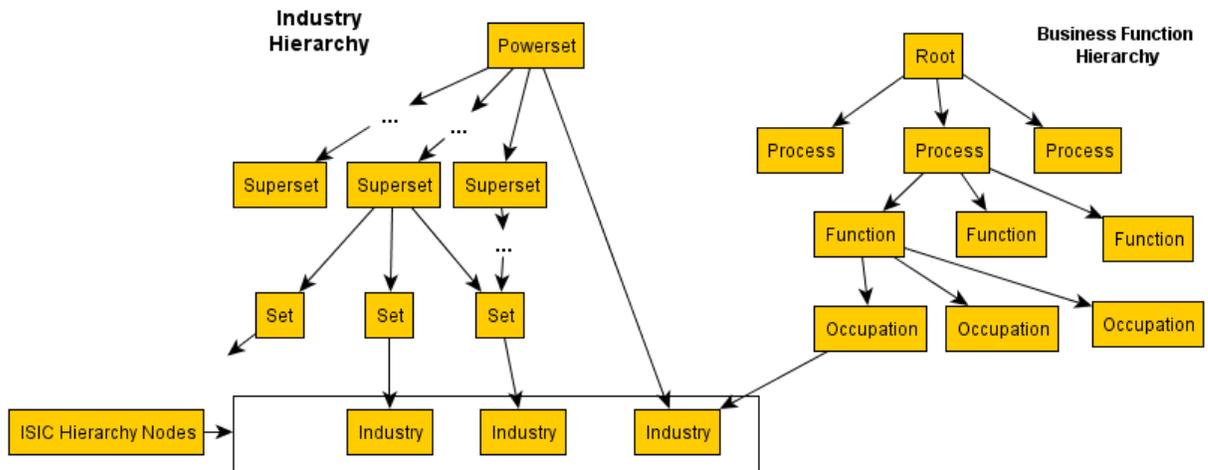
8.5. Traceability Matrix

<Insert traceability matrix here>

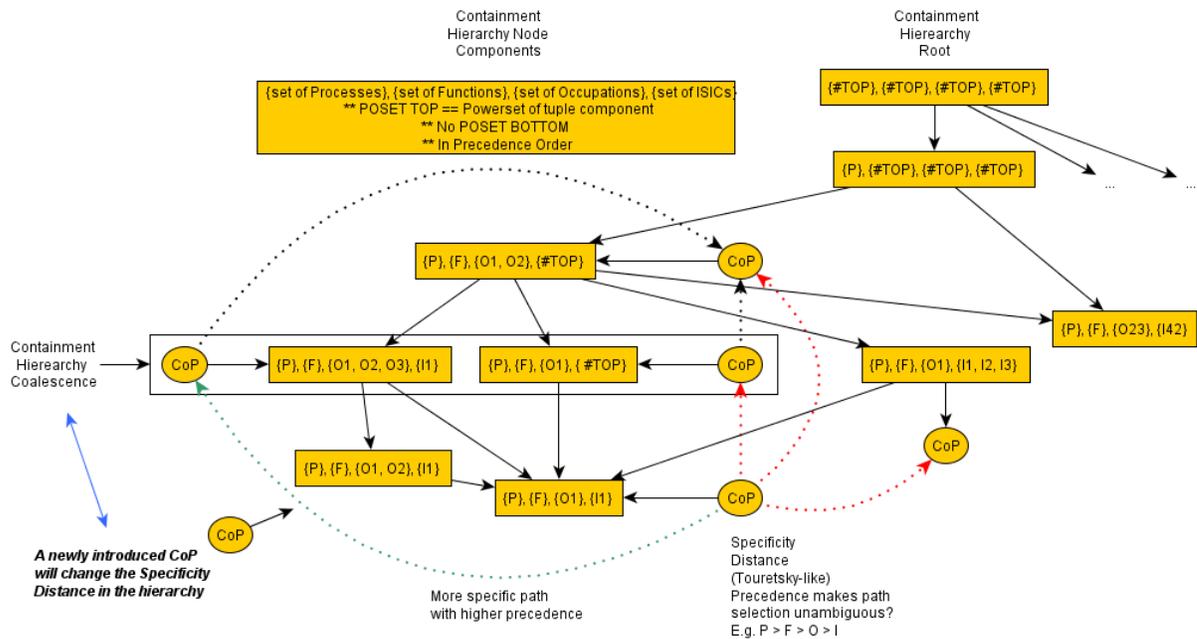
8.6. Appendix D – Content Type Inheritance

SwiftScale uses two related hierarchies to organize content relating to businesses and the corporate transactions between them. The Industry Hierarchy builds upon the ISIC Rev4 Industrial Classification hierarchy creating a new hierarchy capturing the fact that many business operate in multiple industries. This "containment" hierarchy co-locates businesses that operate in the same industries. Radiating out from that location will be businesses that have progressively less overlap in the industries in which they operate, i.e. business which have less resemblance. Two refining attributes are also used to cluster businesses – Geography and Revenues. This kind of spatial distribution increases the opportunity for like businesses to find comparable practices and outcomes.

A second underlying Business Function Hierarchy captures patterns of practice within the same Business Process and Function, but across industries. The upper part of the hierarchy treats practices that are part of Business Processes and Functions as commonized across industries. The lower part of the hierarchy affords the opportunity to capture practices specialized to specific occupations and industries. Some Business Processes and Functions are highly commonized across industries. Finance, Legal and Human Resources functions share many practices regardless of industry. Other functions, such as Operations and Product / Service development, have more divergence in their practices and can be represented by the lower part of the hierarchy.



Much like with the need to represent business operating in multiple Industries, the business practice activities must also deal with the issue of how to share similar practices across multiple Processes, Functions, Occupations and Industries. Again the technique of overlaying a containment hierarchy over the components of the Business Function hierarchy is used. This overlaid hierarchy provides support for a measure of “nearness” or “resemblance”. This measure is used to construct a strict tree hierarchy through which content can be both inherited and overridden.



Each of the nodes in this overlaid hierarchy can be addressed by combining into a four tuple a set for each of the following components: Process, Function, Occupation and Industry. Each “real” activity within a “real” business operates within some set of Business Processes and Functions, with some set of Occupations involved within some set of Industries. So if we are looking to organize information about “like” practices in “like” activities, it would be useful to have all information about

such practices and activities co-locate in the same place. Further, if we do not have any specific practice information about an activity addressed by that location in the hierarchy, it would be helpful to be able to default to any practice information that is of a more general nature (less specific) in lieu of the missing, more specific, information. This defaulting to the nearest, more general practice information is what is meant by “inheriting” information. Of course, if in fact an activity does have some more specific practices, we would want to be able to “override” the more general practice with the more specific.

At the top of the containment hierarchy is a root node designated to include all possible subsets of Processes, Functions, Occupations and Industries. This so-called “powerset” of our four tuple would correspond to universal practices that occurred in activities spanning all possible combinations of Process, Function, Occupation and Industry. This abstraction is introduced as a convenient place in the hierarchy to identify practice content solely intended to be overridden in more specific contexts. This allows the same identifiers for content elements to be used for practices universally needed, but differing in specifics during actual use. The same content element identifiers defined at the abstract root are used throughout the hierarchy. Additional content element identifiers can be introduced lower in the hierarchy to represent less universal practices. The distinguished symbol, “#TOP” is introduced to represent all elements of the set of one of the tuple components. E.g. If the Business Process component set is composed of eight elements, then “#TOP” is the (improper) subset of those eight elements.

The leaf nodes of the hierarchy are the most specific. Each leaf node tuple component has a set composed of only one element and that element is not #TOP. To provide the strict tree hierarchy to support a simple notion of inheritance, each node of the tree hierarchy can have only one parent. As the full containment hierarchy is based on a partial order, a given node can be contained by multiple containers leading to multiple parents. So to create the strict tree, we need to select which will be the unique parent for each node.

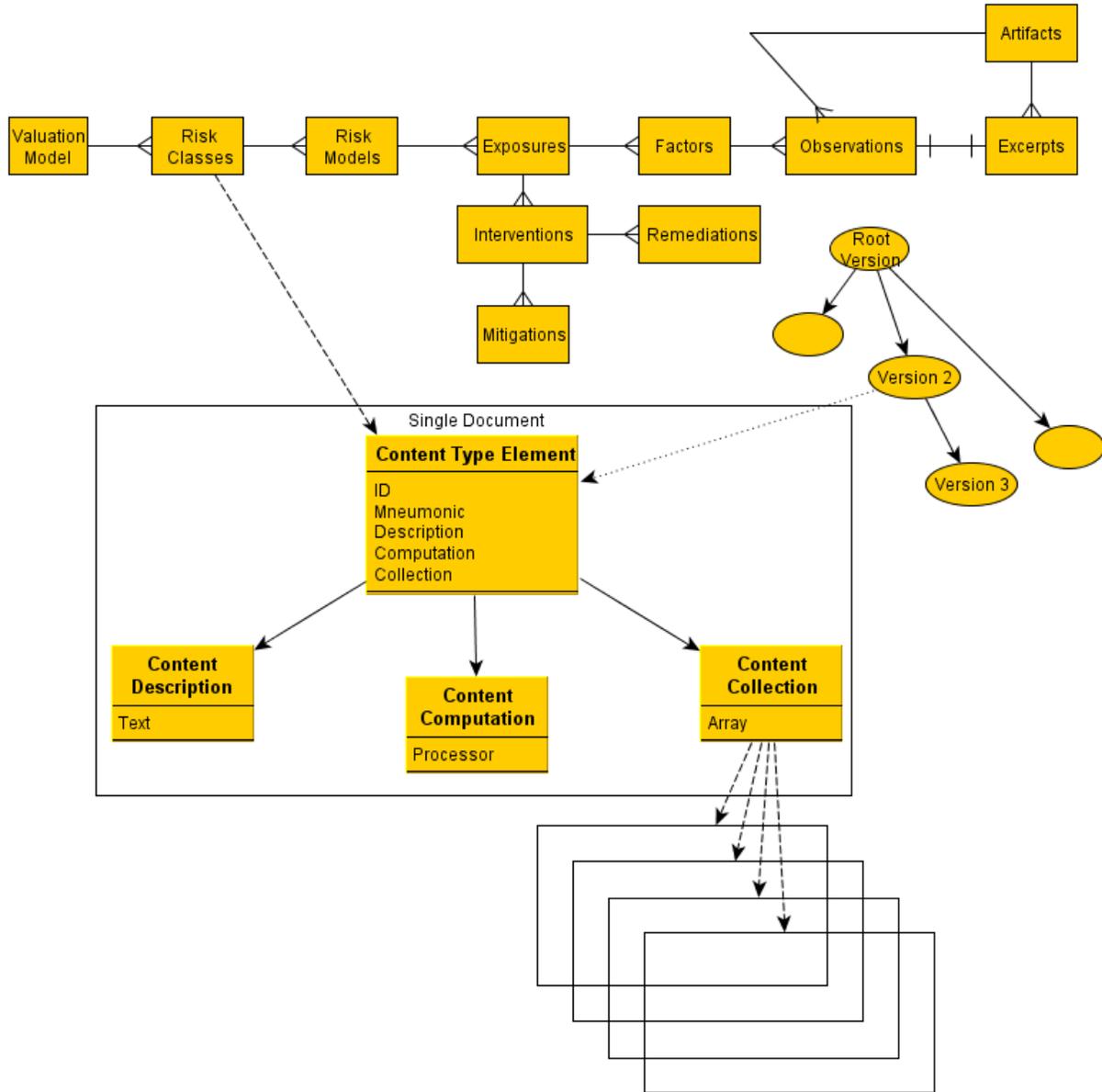
This will be achieved through a combination of a Specificity Distance and Component Precedence. The Specificity Distance looks at each containing parent and removes all elements for each component that are also elements in the child for that component, i.e. the set difference of the parent minus the child is computed for each component. Those parents with the least number of difference elements are chosen as candidates for the unique parent. The candidates are then ordered by the count of difference elements by component in order of component precedence from Process down to Industry. So a candidate with Process Component with 2 difference elements and an Occupation Component with 4 difference elements would be chosen over a candidate where the reverse was true. This procedure prefers greater resemblance in the higher Process / Function part of the tuple to resemblance in the lower Occupation and Industry part.

Earlier we noted that SwiftScale provides a library associated with Enclosures place into the Business Function containment hierarchy. When SwiftScale looks for relevant content to populate into the library, it uses the strict tree hierarchy to find content describing practices pertaining to the library location. When looking for a content element defining a practice, SwiftScale starts in the most specific library. If in that library, it finds that content element with specific content that has been overridden for that library, it stops there. If no such overrides exist there, it looks up to the strict tree parent and looks to see if any overrides exist there and so on until it reaches the top, and most general, parent where it will use the most general, least specific, practice content to populate the library for that content element.

8.7. Metamodel Decomposition into Content Type Elements

The metamodel content requires inheritance, overriding of inheritance and an underlying versioning semantic with reasonable efficiency that off loads the developer from managing the internals of

inheritance to a SwiftScale subsystem. To achieve this capability, metamodels must be decomposed into “units of overload”, i.e. the smallest metamodel data structure that either shared or overridden. We decompose the risk metamodel into the components see below and store them in a common “Content Type Element”. (The valuation metamodel is decomposed in the same fashion). A Content Element is a unit of storage in the SwiftScale storage system with a Content Type Element specialized to hold versionable metamodel information.



The initial Content Types are versioned in the abstract root of the strict tree hierarchy representing the space of Business Functions. A descendent tree node seeking to specialize the semantics of a Content Type to a more specific context such as an occupation or industry does so in the context of a new library created for that tree node. The creation of that library creates a new associated version for the Content Type Elements. All modifications to Content Types within the new version will be made as a Fully Persistent Data Structure. That is, all updates will be performed as path-copying copy-on-write updates that preserve the versions of Content Types higher in the hierarchy.

Upon creation of a new Library to be attached to a tree node, the tree is searched from that node up to find the first ancestor with an existing Library. The abstract root will provide a terminal Library in that search. The new Library with its own version is populated with content using the copy-on-write semantics. Subsequent updates to this Library (within its version) will update content elements only associated with that version.

A new Library to be inserted between a parent and child Library, the new Library is versioned and populated off the parent and then the parent references of the child are adjusted to be references to the new Library.

8.8. Market Efficiency and Orders of Ignorance

Phillip Amour observed (Amour, Oct 2000) (i) that there are historically five knowledge storage media with software the most recent, and (ii) there are five orders of ignorance. Amour's five media are DNA, brains, hardware, books and software. Though perhaps a stretch, we can reasonably think of communities as being a knowledge media as well. A reductionist example of a community storing knowledge would be the ant colony – the necessary knowledge for the colony to prosper is not retained in any single brain, but spread across many coordinating brains – brains that interact in a cooperative fashion – a community.

Amour sees the primary challenge of creating stored knowledge as knowing knowledge what to build in to the medium, more so than the task of actually building it in. Specifically referencing software, Amour states:

‘It’s rather easy to produce software. It’s much more difficult to produce software that works, because we have to understand the meaning of “works.”’

Amour goes on to say:

“So if our job is to acquire knowledge, what can we assert about the knowledge we must gain? For everything we know, we also have a certain amount of ignorance. Ignorance being simply the other side of the knowledge coin. If we view systems development as the acquisition of knowledge, we can also view it as the reduction or elimination of ignorance. We would hope that, at the end of the project, we are less ignorant than we are at the start. So what kinds of ignorance might we exhibit?”

From that observation Amour cites his Fiver Orders of Ignorance:

0th Order Ignorance (0OI)— Lack of Ignorance.

I have 0OI when I know something and can demonstrate my lack of ignorance in some tangible form, such as by building a system that satisfies the user. 0OI is knowledge. As an example, since it has been a hobby of mine for many years, I have 0OI about the activity of sailing, which, given a lake and a boat, is easily verified.

1st Order Ignorance (1OI)— Lack of Knowledge.

I have 1OI when I don't know something and can readily identify that fact. 1OI is basic ignorance. Example: I do not know how to speak the Russian language—a deficiency I could readily remedy by taking lessons, reading books, listening to the appropriate audiotapes, or moving to Russia for an extended period of time.

2nd Order Ignorance (2OI)— Lack of Awareness.

I have 2OI when I don't know that I don't know something. That is to say, not only am I ignorant of something (for instance I have 1OI), I am unaware of this fact. I don't know enough to know that I don't know enough. Example: I cannot give a good example of 2OI (of course).

3rd Order Ignorance (3OI)— Lack of Process.

I have 3OI when I don't know a suitably efficient way to find out I don't know that I don't know something. This is lack of process, and it presents me with a major problem: If I have 3OI, I don't know of a way to find out there are things I don't know that I don't know. Therefore, I can't change those things I don't know that I don't know into either things that I know, or at least things I know that I don't know, as a step toward converting the things I know that I don't know into things I know. For system development, the “suitably efficient” proviso must be added, since there is always a default 3OI process available: try and build the system. Whereupon the customer can be relied on to inform me of all the things I did not know.

4th Order Ignorance (4OI)— Meta Ignorance.

I have 4OI when I don't know about the Five Orders of Ignorance. I no longer have this kind of ignorance, and now, neither, dear reader, do you.

Making a successful purchase of a good, service or other asset requires knowledge of the opportunities and risks that the purchase affords. In order to assess if exchanging a currently held asset (such as cash) for the new asset creates a net increase of value, we need to know how the asset will benefit us, what alternative assets are available, and what possible downsides we might encounter with that asset.

So much like Amour's problem of storing knowledge onto media, selling or purchasing assets, i.e. participating in a market, requires dealing with the problem of knowledge acquisition. And knowledge acquisition proceeds more briskly where there is a balanced, free flow of information. It is a common economic theme that information asymmetries, e.g. a seller knows more about their asset than a potential buyer, can negatively impact a market [[Market for Lemons](#)]. The corporate transaction market has many of the hallmarks of a Lemon Market, and even during sustained market activity driven by non-pecuniary private benefits of control [[SY Kang](#)], ensuing resource allocations are often not Pareto efficient. Deals often don't "create value" because participants lack process, awareness and knowledge of how to assess suitability of a deal, what should be taken into consideration and what are reasonable norms to be expected for that considered.

How can we reduce the Order of Ignorance in corporate transactions? We can introduce information created and held by communities to provide Process, Awareness and Knowledge into corporate transaction settings. SwiftScale provides process to harness communities of practice, i.e. expertise, to create standards of assessment as to what should be examined and what are the norms to be expected. With trusted standards of assessment, not all details of an assessment need be disclosed, allowing a summary level of assessment to signal the quality of a potential investment earlier in the deal cycle providing greater confidence in the deal participants in the prospects of the deal. Of course, a full due diligence review is still completed before closing a deal, but the summary assessment reduces current information asymmetries in early stages of deal consideration. That confidence in a "fair" assessment will draw more participants into the market and at lower participation (transaction assessment) cost.

9. Bibliography

Amour, P. G. (Oct 2000). The Five Orders of Ignorance. *Communications of the ACM*, 17-20.

Capability-based security. (n.d.). Retrieved from Wikipedia:

http://en.wikipedia.org/wiki/Capability-based_security

Christopher J. Alberts, A. J. (2009). *A Framework for Categorizing Key Drivers*. Hanscom AFB, MA: Software Engineering Institute.

Damodaran, A. (2011). *The Little Book of Valuation*. Hoboken, NJ: John Wiley & Sons, Inc.

Herbert, P. K. (1984). An augmented capability architecture to support lattice security and traceability of access. *Proceedings of the 1984 IEEE Symposium on Security and Privacy*, (pp. 2-12).