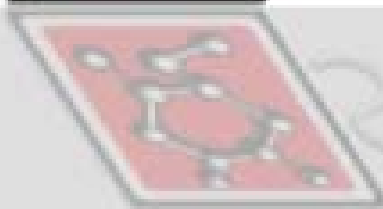


Substructure



Substructure

Design Solution

Lauren Taylor White

# Problem Statement

- New design problems continuously emerge that require designers to search for additional expertise
- We need to capture design solutions
  - Easy to share
  - Easy to discover
  - Easy to get help implementing the solution
- Process cannot disrupt daily workflow

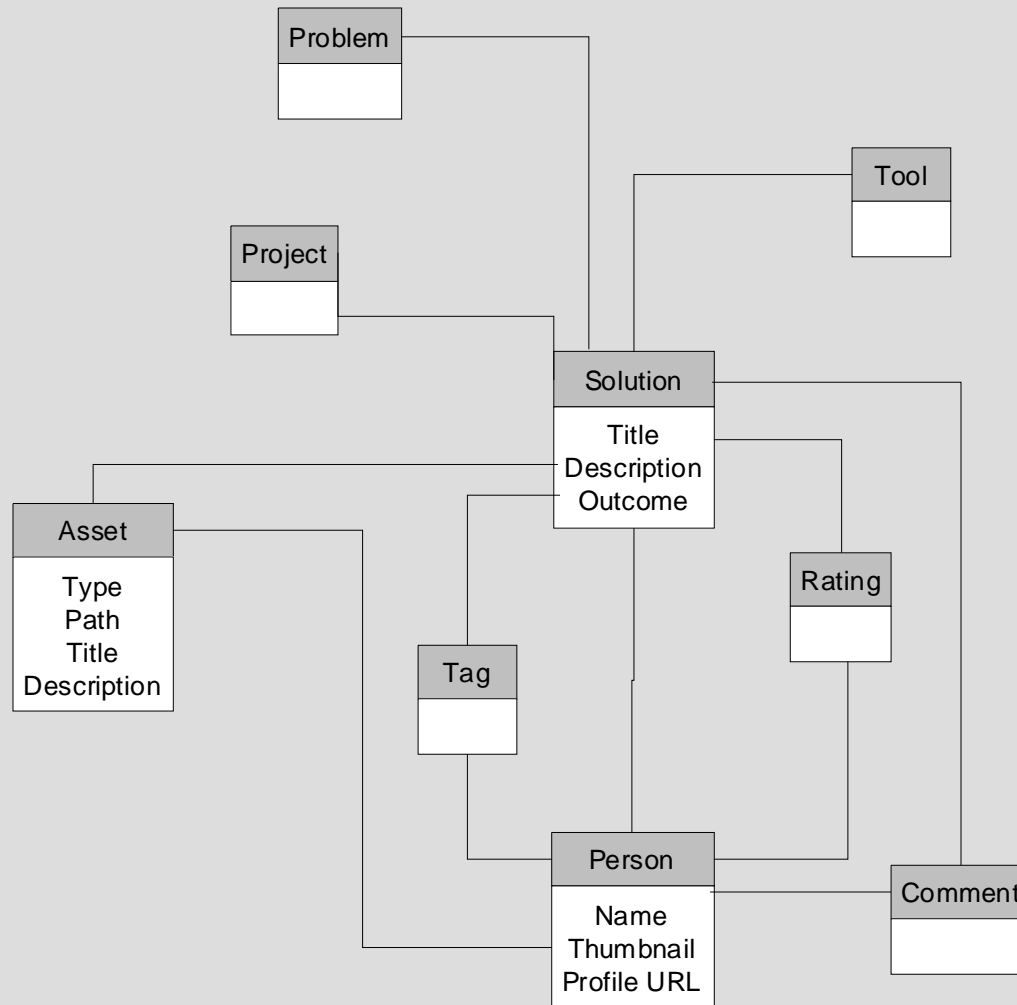
# Brief Description

- Substructure is a tool which allows users to **search and share design solutions**
- Rapidly **update, access** and **store** project data and share between architectural, structural and all other integral disciplines.

# Design Solution

- Solutions are composed of:
  - Metadata
  - Relationships
  - Links
    - Assets
    - Portal User Profile
    - Portal Project Pages
  - Feedback
    - Tags, Comments, Ratings

# Design Solution Data Model



# Solution Relationships

- Owner
- Project
- Assets
  - Source files, documentation or media
- Tool
  - Rhino, Revit, ParaCloud, Ecotect, etc.
- Problem
  - Panelization, Search, Optimization, etc.

# Social Relationships

- Users comment, rate and tag design solutions
- Popular items bubble to the top of search queries
- Social functionality drives engagement of Portal apps

# Overlay, Not Overlap

- Substructure is not saving files, it is saving a link to the files.
- This app does not propose to create user profiles or project pages, it is set up to engage solution creators to add content by linking these Portal items to design solutions and vice-versa .
- It pulls metadata from design solution creators in and transfers the data back to the Portal, adding to the Portal, tagged design solutions that can be linked to from personal pages.



# Integration

- The application runs off data exposed off the Portal as XML feeds.
- Substructure is about creating an easy and fun social storing of metadata in our database. We use that metadata to drive the app, which can run as a desktop app and also have a small design solutions search box on the Portal page.

# Integration

- People are recreating solutions to problems others have already solved.
- There is no way to easily share solutions with annotations and tags so they can be easily discovered by others.

# Benefits To The Portal

- Custom design solution data model for saving references to where design solutions are located that can be leveraged by Portal personal pages.
- Tags to accompany design solutions to increase search relevance of design solutions in the Portal.
- Adding graph traversal and social tagging with a focus on promoting Portal pages by focusing on a skin that easily integrates into people's normal workflow patterns.
- This is done to increase Portal presence, tagging and solution saving during deadlines.

# Problem Statement

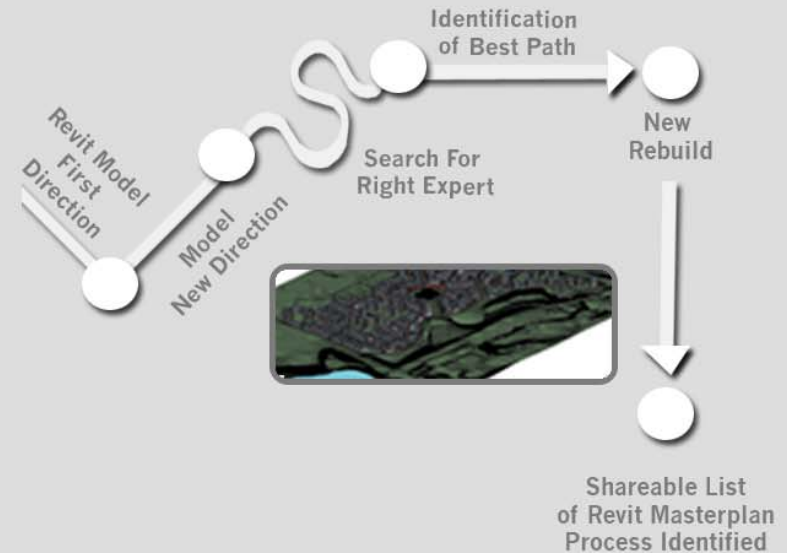
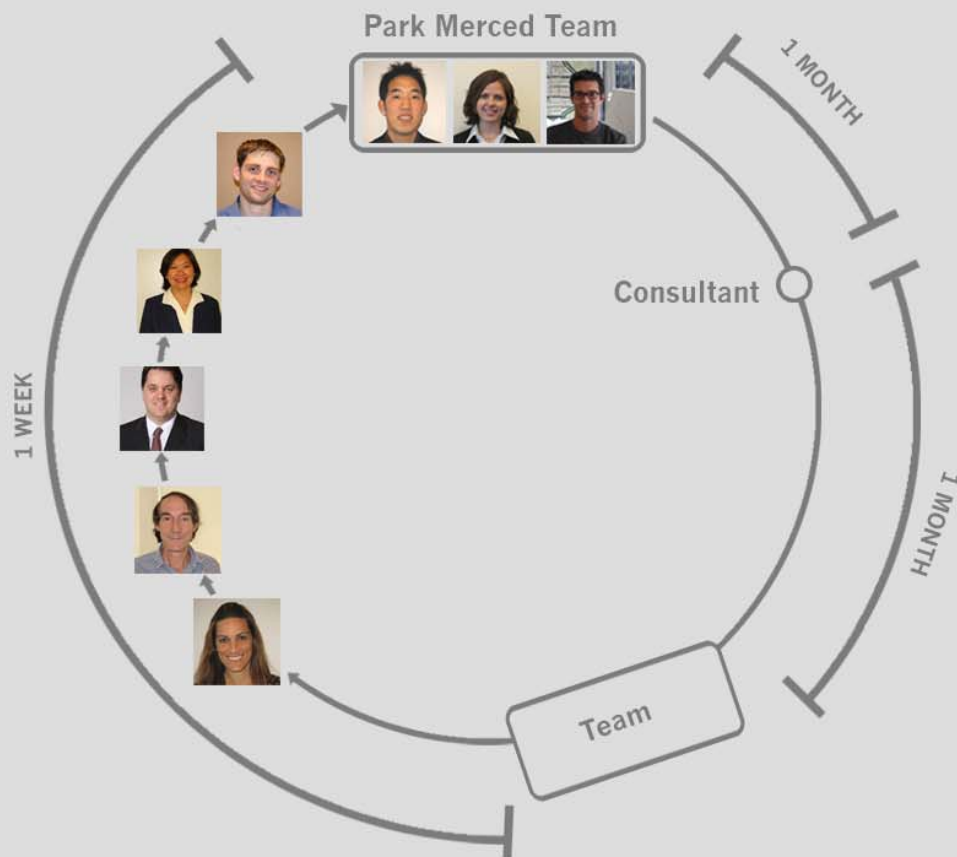
- People are recreating solutions to problems others have already solved.
- There is no way to easily share solutions with annotations and tags so they can be easily discovered by others.

# Knowledge Capture Strategy

- We need to capture where the relevant invention occurs, which is in the digital design techniques and best practices that we have created – that is what is valuable.

# Case Study-Time To Right Path

## Time To Expert & Informed Process



We need to build on lessons learned rather than reinvent the wheel.

- Share Lessons Learned
- Decrease Time To Right Expert
- Promote independent Resourcefulness
- Facilitate collaboration

# Brief Description

- **Substructure** is a desktop application that enables users to easily find and share digital design solutions.

# Solution Overview

- Provides intuitive discovery mechanism maps people to projects, content and the solutions they've developed.
- Promotes tagging and easy drag & drop saving that adds depth to our search initiatives.



# Integration

- The application can be an overlay for existing knowledge initiatives or can act as a stand alone application that is pulling content into and pushing tags out to the shared content initiatives.

# Context Efforts

- **Portal** – Brings together all central information through a common interface – to track the entire project workflow process from accounting to project managers, etc.
- **Wiki** – User generated content by software package.
- **Newforma** – Software designed to streamline the aec project execution process, ie design review, accountability, and ca.
- **Google Apps** – Online collaborative Cloud Computing multi-user simultaneous update collection. Including docs, calendar.
- **Software Share** – Software community for collaborating on software projects. Share info on code, bugs, progress, etc.
- **Forums** – Web applications for holding discussions and posting user-generated content.

# Differentiating Factor

- Other initiatives focus on creating very streamlined ways to capture and retrieve the vast amount of content we store.
- **Substructure** focuses on increasing the relevance of content by attaching a container of knowledge and lessons learned to the solutions shared.

# Core Functionality

- Share
  - Save your work to a central repository that anyone can access
  - Annotate solutions with standard metadata and freeform tags
- Discover
  - Browse for solutions to problems that co-workers have already addressed
  - Learn more about people and technology in the firm
- Engage
  - Follow the work of individuals, teams or projects
  - Rate and comment on solutions
  - Gain exposure and respect

# Discover Solution

## Substructure - Discover Solutions

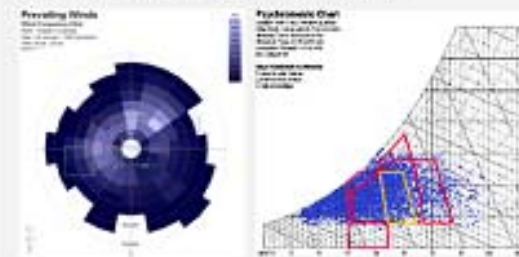
Search

Group By:



### San Francisco Wind Data

Hourly weather data and related prevailing winds and psychrometric chart used for 680 Folsom.



Project: 680 Folsom

Tags: wind analysis, ecotect, prevailing winds, psychrometric

#### Assets

- [psychrometric chart](#)
- [prevailing winds](#)
- [wind data points](#)

#### Comments



James

This was a successful attempt at producing a psychrometric chart for a project in SF. SF is a difficult area because of variation. Here's a tool.

Posted 12 months ago

Add Tag

# Share Solution

## Substructure - Share Solution

Title	San Francisco Wind Data	
Description	Hourly weather data and related prevailing winds and psychrometric chart used for 680 Folsom.	
Success	Positive ▼	
Select File(s)	Browse	Add
Tag(s)	ecotect	Add
Project(s)	680 Folsom ▼	Add
Group(s)	Sustainable ▼	Add
Program(s)	Ecotect ▼	Add
	Save	

### San Francisco Wind Data

Hourly weather data and related prevailing winds and psychrometric chart used for 680 Folsom.

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Tags: wind analysis

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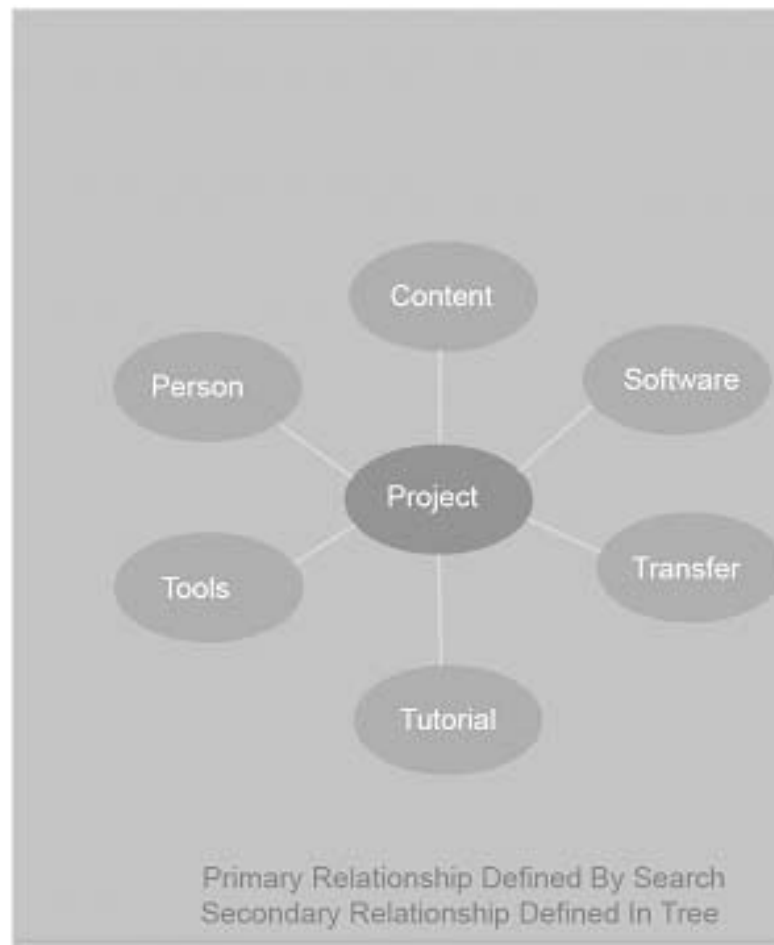
# Workflow Friendly

## Substructure - Expandable Concept

The image displays a software interface for a structural analysis tool. The main window shows a 3D model of a building's substructure, with a grid of cables and concrete elements. The text "Normal Workflow" is overlaid on the model. The left sidebar contains a hierarchical tree view with items like "CABLE-SPOT", "CABLE-DIV", "CABLE-REC-BODY", "CABLE-REC-BASE", "CONCRETE", "SUPPORTS", "Animation Set 1", "Views", and "Applications". The right sidebar, titled "(Expandable - Results)", shows search results for "SOM Substructure". It includes a search bar with "Genetic Algorithms" entered, a "Group By" section with buttons for "Project", "Software", "Type", and "Result", and two search results. The first result is "Genetic Algorithm - Al Sharq" by David Shook, Chung Soo Do, with a comment "This is a great tool for algorithms with Etabs" and tags "genetic algorithm, success, al sharq". The second result is "Genetic Algorithm - Al Sharq" by Josh Cotton, BlackBox, with a comment "Not genetic algorithm tool for cable analysis" and tags "genetic algorithm, success, al sharq". Below the results is a "Share" section with a "QUICK DRAG" area and a "Tag" field containing "Al Sharq, algorithm, tutorial, avi, net, visual basic, script". A "Comment" section follows, with a user profile picture and a comment text. At the bottom, there is a progress indicator for "Complete" (25%, 50%, 75%, 100%), a "Results" section with a plus sign, and an "Add Tutorial" button with a "Browse" dropdown. A "Save" button is located at the bottom right.

# Expandable View

Substructure - Expandable Concept



(Expandable - Results)

SOM substructure

Search Genetic Algorithms

Group By

Genetic Algorithm - Al Shang  
By: Dawd Shook, Chung Soo Do

 Comments  
This is a great tool for algorithms with Etabs

Tags  
genetic algorithm, success, al shang

Genetic Algorithm - Al Shang  
By: Josh Cotton, BlackBox

 Comments  
Not genetic algorithm tool for cable analysis

Tags  
genetic algorithm, success, al shang

Share

QUICK DRAG



Tag  
Al Shang, algorithm, tutorial, avr, net, visual basic, script

Comment  
The first version of this tool was introduced...  
Posted 10 minutes ago

Complete  25%  50%  75%  100%

Results

Add Tutorial



# Summary

- Identify needed resources and skill sets immediately
- Leverage solutions others have created to save time and money
- Increase productivity and communication between teammates
- Greater visibility helps build relationships and cross pollinate creativity and ideas firm wide

# Project Timeline

# Project Timeline

- Identify an oversight committee
- Define scope and technology method
- Identify technical team
- Refinement of concept
- Timeline to alpha test

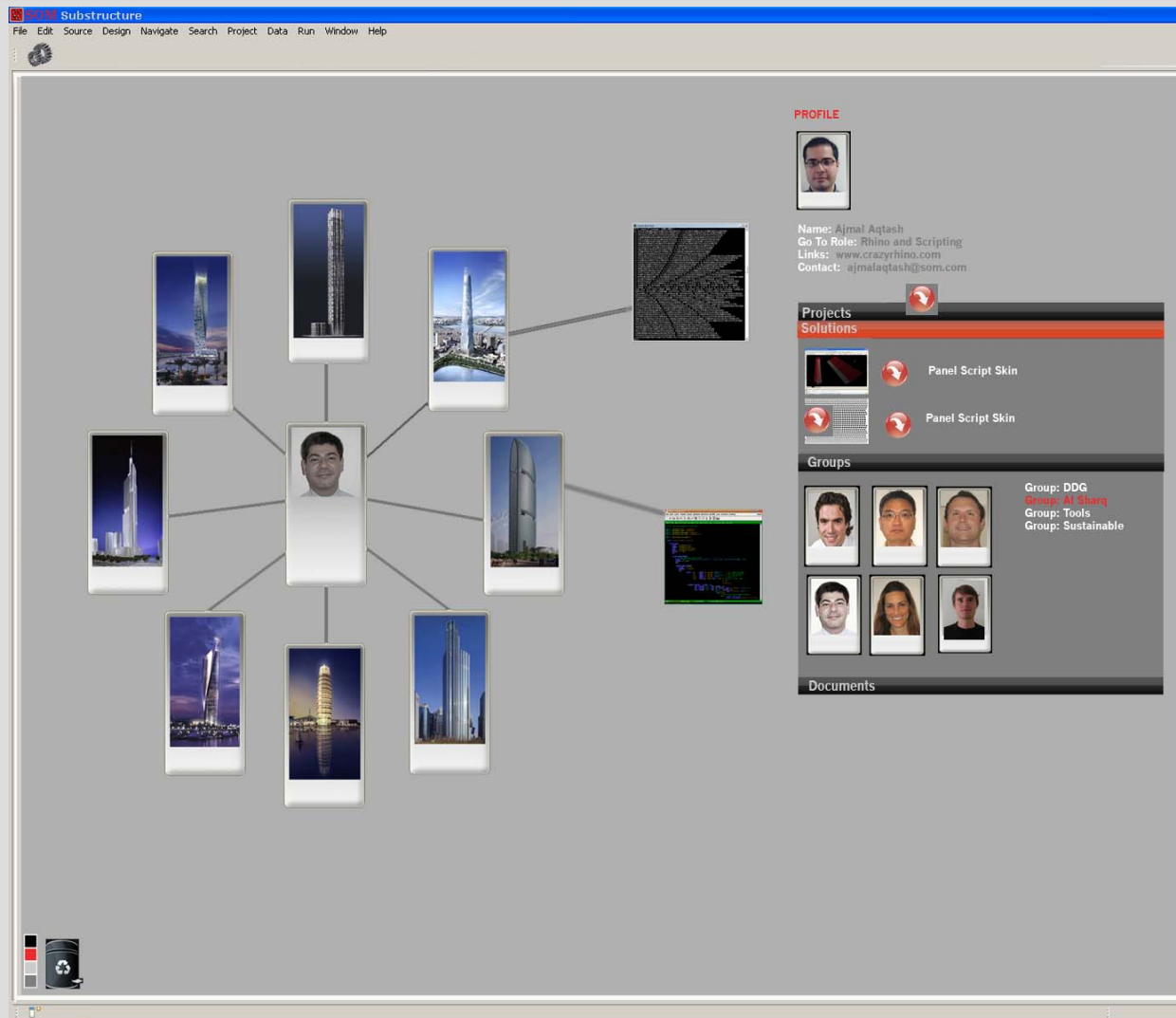
# Concept Screens

# Concept Screen



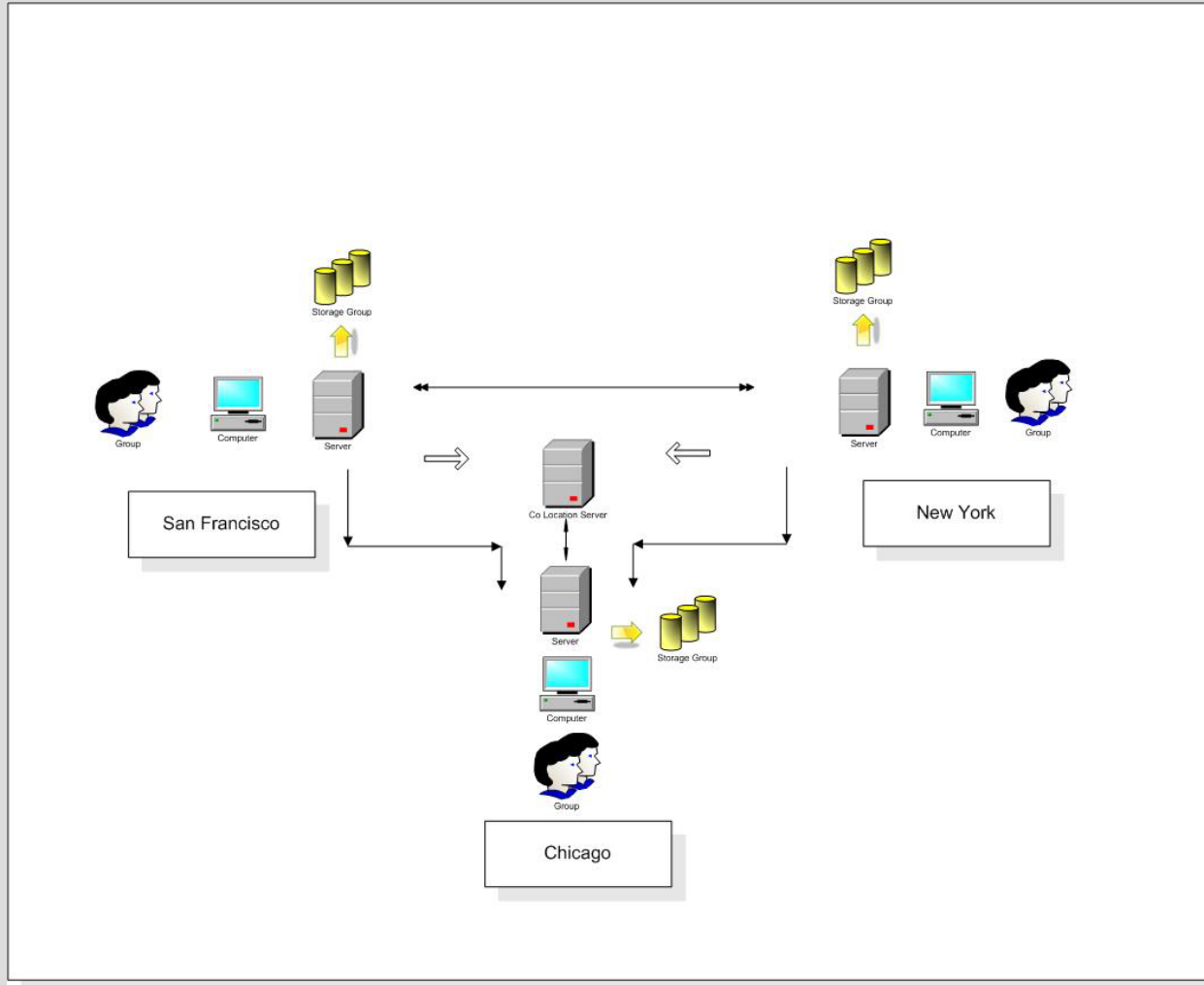
- Example - Search Environmental Analysis Done By Project

# Concept Screens



- Example - Search By Person To Project and Scripts

# Map



**Technology**



# Software Components

- Desktop AIR application
  - Simple drag and drop mechanism makes it easy to save and share your work
  - Browse for existing solutions through standard search or interactive graph view
  - “Recent activity” feed keeps you up to date on the work created by interesting people, teams or projects
- Web Service API
  - Provides an extensible platform that allows Substructure functionality to be integrated into SOM Google site or internal web applications

# Resources Needed

- Project Coordinator
  - Interface between user community and application developer
- Lead Developer
  - RIA Rich Internet Applications Developer
  - Actionscript3, Flash, Flex / Air expertise
  - Webservices expertise
  - Social media application expert
  - Experience with social functionality Facebook, etc.

# Support and Maintenance

- Handoff to IT Technology team
- Core functionality is built into web service API, running on Google App Engine
- WS API is platform agnostic
  - Adobe AIR desktop component can be easily ported to Windows technology

# **Deliverables Schedule**

# Development Plan

- Series of two week iterations
- Functional product can be evaluated by stakeholders each development cycle
- Continuous user feedback informs each subsequent iteration
- 2 months to initial Alpha for early testers
- 3 months to Beta Release firm wide

# Initial Prototype - Share

- Desktop application that allows users to upload a file to Google Docs and annotate with specific metadata and tags
- Basic search functionality with results displayed in a list view

# Prototype II – User Profile

- Allows users to create their own profile and add information about their role, skills, teams and projects they've worked on and solutions they've developed
- Dependencies:
  - Project data feeds from database
  - Employee data feeds from database

# Pre-Alpha - Discovery

- Allows users to browse a graph of themselves, their projects and solutions
- Allows users to “follow” other users, projects or teams and receive “vitality” updates about related solutions which get added



# Alpha - Platform

- Initial product release to internal testers
- Introduces a web service API that allows web app developers to integrate Substructure data into their work
- Core functionality feature complete
- All subsequent releases will automatically upgrade when an update is available

# Pre-Beta – User Interface

- Refine the user interface design
- Improve user experience based upon feedback from alpha testers

# Beta Release

- Initial product release firm wide
- Final UI tweaks
- Incorporates bug fixes from previous releases

# Rollout Plan

- Initial rollout targets the SF office
- Present concept to everyone
- Identify installation issues and solutions
- Subsequent rollout firm wide based upon lessons learned from the SF release

