6. Next Steps

We are exploring several possibilities to bring contextual discovery to the next level:

- *Cross-institution*. With NAS coming under NLB, we now have an expanded collection of digital resources on Singapore. We will be working on linking NAS and the National Library resources.
- *Cross-language*. There are 4 official languages in Singapore: English, Chinese, Malay and Tamil. We are considering the use of machine translation to provide cross-language recommendations.

12) MARK GLIKSON

Deploying a Semantic Operating System in a small financial services company

1. About the Case Organization

O-Pulse provides a portal for investment advisors to manage client relationships, compliance, and communications with portfolio managers. Currently in private Beta, O-Pulse was founded by a leading third party money management & financial advisory firm based in North Carolina.

2. About the Challenge

Typical of many conventional Enterprises today, the founders of O-Pulse, in their existing financial advisory firm, recognized the need to transform their traditional offline organization into a modern digital enterprise. Management faced increasing pressure, with a noticeable uptick in client attrition to competitors with even the most basic online client portals. O-Pulse was established to create an online portal better servicing their existing advisor clients, and the wider US-based independent investment advisor market.

The v1 O-Pulse portal was designed to facilitate complex targeted content distribution and syndication between portfolio managers, investment advisors and their clients. News, articles, portfolio commentaries and financial updates could be curated, shared and syndicated through one central dashboard with full compliance reporting. A key requirement was to enable white label deployment of the O-Pulse portal to any number of organizations under a SaaS subscription model.

O-Pulse engaged with multiple development firms only to be faced with exorbitant open-ended quotations. All proposals utilized a common "silo" build methodology; inflating costs throughout the development cycle with limited asset re-use and extensive

infrastructure configuration & maintenance.

Recognizing the need for agility to remain competitive in today's marketplace, O-Pulse also demanded a high degree of architecture flexibility and extensibility not possible in traditional modes of development, enabling freedom to deploy, test and iterate over time to grow a truly transformational product. O-Pulse did not have the financial and human resources to outsource the project under the traditional development model, recognizing this model would also fail to deliver their true agility requirements.

3. What We Did

Starting with a Semantic O/S, O-Pulse was able to leverage schematized data structures, defining real-world entities, things and objects semantically without the need for database setup or manipulation. A semantic operating system works natively with semantic details (about things and the relationships between them), enabling complex operations without the need to structure databases or build significant amounts of boiler-plate operating code to support them. User friendly Semantic OSes have natural language interfaces to allow users to interact with the system. By simply describing the model of each users journey and key interactions between them, O-Pulse had already designed their systems complex information architecture: Advisors and Clients become Contact nodes; market portfolios become Products; information & content become Articles. Connections between these nodes defined key relationships. A Client is connected to one or more Portfolio products; an advisor is connected to all of their clients.

The remaining application build involved assembly of a combination of pre-fabricated and custom-built modules, with the bulk of assembly work completed by a UX professional. Like all other assets, modules are represented semantically in the O/S, enabling re-use, extensibility and interoperability. V1 of the O-Pulse portal was assembled entirely with pre-fabricated modules, together with custom CSS styling.

Future versions of O-Pulse will require new custom modules to grow the available module library, including API integrations with financial institutions and custodians to pull portfolio data. Custom modules such as this will be isolated and passed to specialized developers for build, becoming permanent reusable assets upon completion.

Leveraging inbuilt platform capabilities, O-Pulse is able to deliver its white label portal to clients without having to engineer a subscription or deployment system. The entire O-Pulse portal was assembled with zero infrastructure or database setup, no IT Pro's or database administrators, and complete flexibility to modify and customize in future without refactoring.

4. Challenges and Lessons Learned

O-Pulse's seemingly unique workflows around content management and distribution required highly granular control over outcomes triggered by specific actions. Gumbuya's challenge was to implement a platform-level framework that supported the unique requirements of O-Pulse, yet remained applicable to a broad range of scenarios. By decomposing complex interaction flows to their core fundamentals, the key composite actions were identified. A decision framework was then constructed enabling triggering of these actions in a custom sequence, controlled by the end user through the platform's visual assembly environment. As a result, O-Pulse requirements were met and a key piece of platform functionality was delivered.

As a SaaS product, O-Pulse required a mechanism to deploy new user accounts, and display user-specific content within each client's portal. Gumbuya was able to achieve this by implementing a user-customizable rights-access framework in its graph-based environment, enabling role-driven access to specific groups of graph nodes.

5. Impact and Benefits

O-Pulse was able to deliver the initial version of their portal with 40% savings in both time and cost, when compared to alternative options using the traditional development process.

The Semantic O/S removed the need for any infrastructure setup, ongoing maintenance or associated IT Pro personnel. Combined with the use of pre-fabricated modules, built-in subscriptions and SaaS deployment capabilities, O-Pulse was able to significantly reduce cost, time & complexity. In addition, founders could remain directly involved with the assembly of their portal under a semantic build model using fundamental real-world concepts and language they understood.

Leveraging the underlying graph architecture, with a fundamental separation of content, styling and structure, O-Pulse achieved their goal of building a platform with a high degree of extensibility and flexibility to adapt & change to meet evolving client needs.

O-Pulse has already identified a number of areas for product expansion, which can be seamlessly integrated without reworking the underlying system architecture.

6. Next Steps

O-Pulse is currently in private beta, adding additional integrations and product features while collecting user feedback, with a phased release scheduled over the coming months.

O-Pulse is planning to continually grow the platform, with a number of significant product extensions scheduled in the post-release roadmap. The focus for v2 is on integrating portfolio aggregation and reporting, progressing towards creating a true "one-stop" dashboard for investment advisors.

13) NOR AZLINAYATI ABDUL MANAF

KRSTE.my: Using Linked Data and semantic search to build a one stop knowledgebase of Science and Technology R&D in Malaysia

1. About the Case Organization

The Malaysian Science and Technology Information Centre (MASTIC) was established in 1992. MASTIC is a division under Ministry of Science, Technology and Innovation Malaysia (MOSTI) located in the Federal Government Administrative Centre Putrajaya, Malaysia. MASTIC is responsible to provide reliable, up-to-date and comprehensive science, technology and innovation (STI) information through efficient information management system.

2. About the Challenge
  • KRSTE.my should be a knowledge management system, a hub for R&D in the domain of Science, Technology and Innovation in Malaysia.
  • KRSTE.my Portal should serve as a Single Point of Access to the wealth of knowledge artefacts from various internal and external systems sources.
  • KRSTE.my should organise the nation's research knowledge : collect all research results, funding, researchers, etc, in a national repository and classify them according to MRDCS (Malaysian R&D Classification System)
  • KRSTE.my inventory nation's research capability : Develop a national inventory of research capability (competence) of researchers and institutions
  • KRSTE.my instrument for effective research policy : Provide overall view of funding, research areas and accomplishment for policy making on innovation
  • KRSTE.my should turn information silos into an integrated knowledge resource

3. What We Did

KRSTE.my leverages on the power of Semantic Web Technology through the use of ontologies and structured knowledge bases, Linked Open Data (LOD) and knowledge graphs, graph search and graph databases. KRSTE.my is a collaborative tools:
  • to manage Science, Technology & Innovations project implementation
  • reduce project redundancy
  • preserving institutional to avoid "reinventing the wheel"

Innovations about this effort are:
  • Ability to perform Semantic Search based on concepts rather than keywords.
  • Ability to perform question answering using natural language.
  • Ability to perform Researcher Profile Analytics using the existing data in the knowledge base, such as analysis on Researcher Collaborations, Experts Identification and Researcher Conflict of Interest.
  • Provides user access to published knowledge base in the form of open linked data which goes beyond KRSTE.my knowledge base by linking KRSTE.my users to other publicly available knowledge repositories in the world within the Open Linked Data Cloud

4. Challenges and Lessons Learned

Challenges:
  • Increase researcher registration and participation
  • Continuous updating information from the researchers

During development of KRSTE.my, around 93 organizations were engaged to enquire relevant source of information on R&D activities in Malaysia. The information provider comprised of:
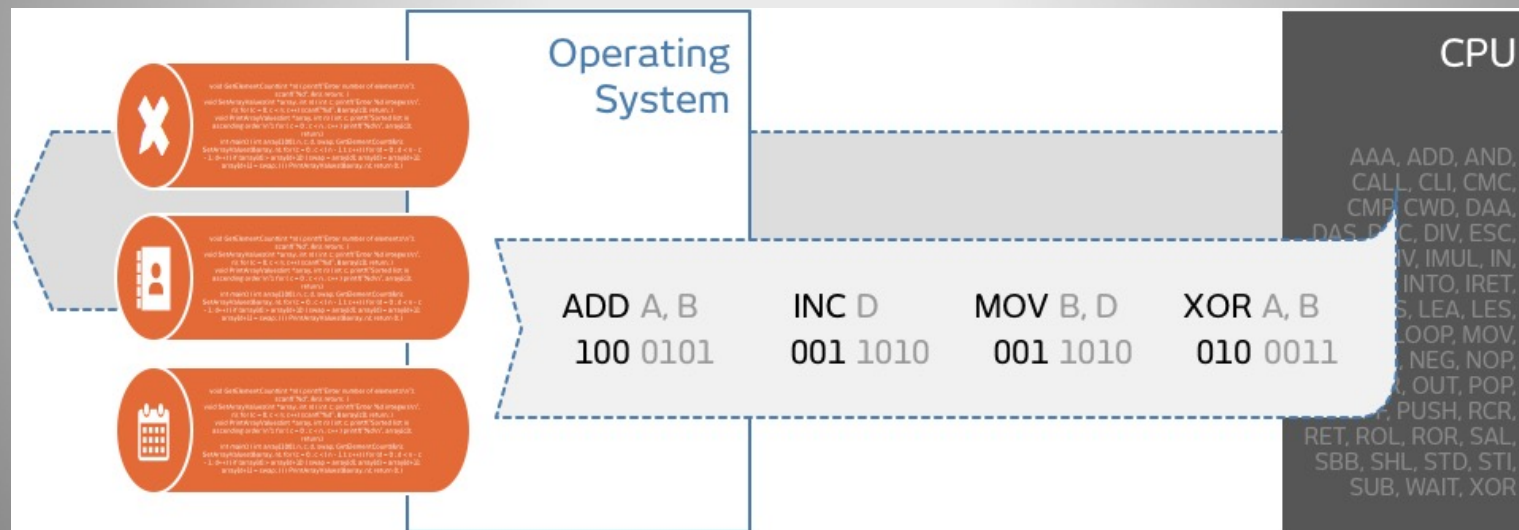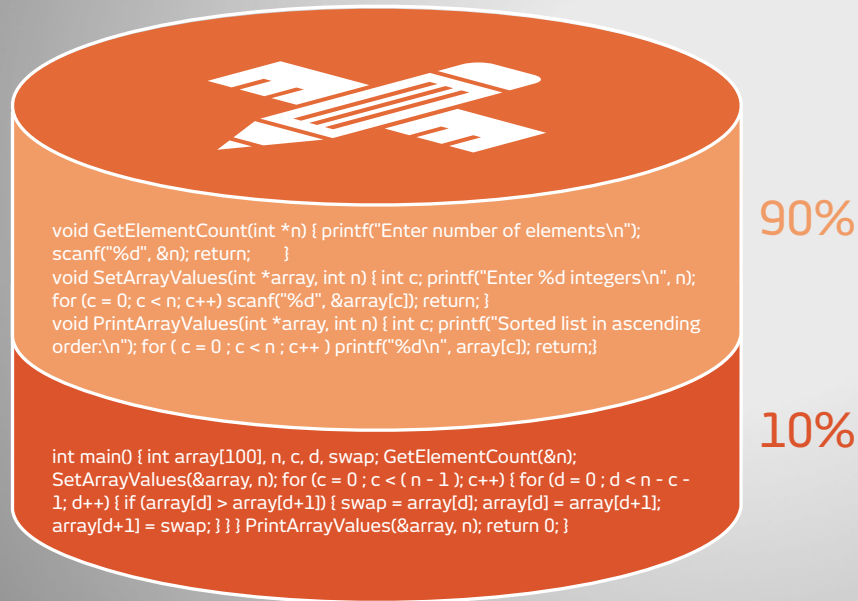 • Universities and other Institute of Higher Learning;

Traditional Computing

The O/S executes code which becomes a stream of standard operations processed by a CPU's instruction set - to do calculations.
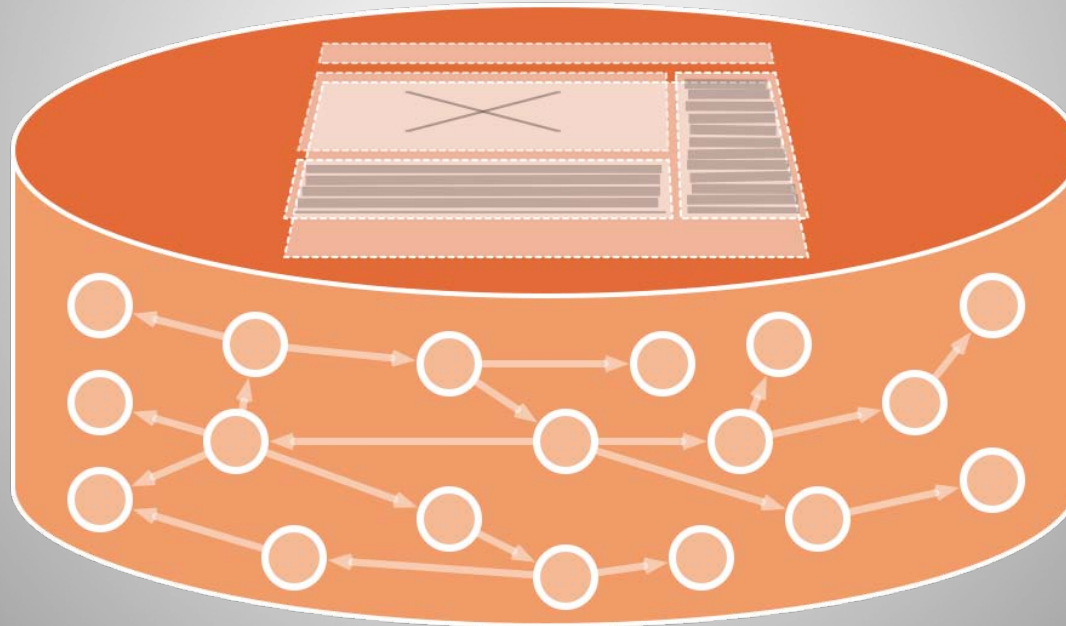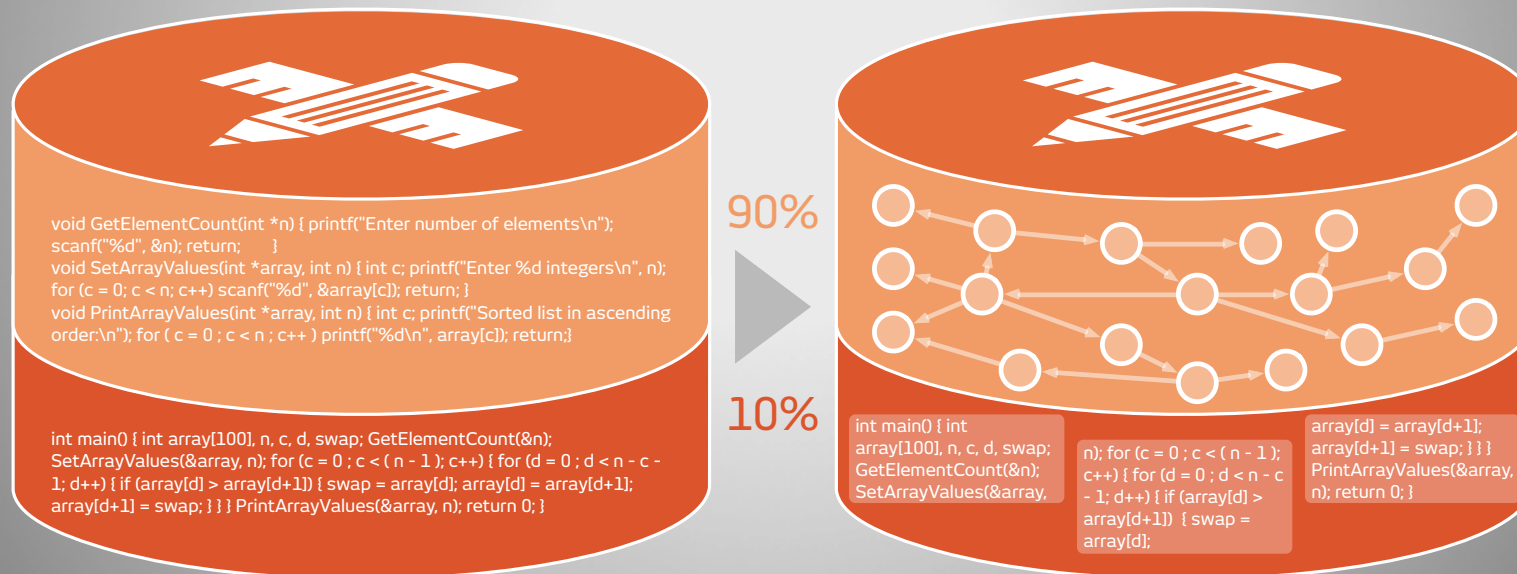
Traditional Applications

void GetElementCount(int *n) { printf("Enter number of elements\n"); scanf("%d", &n); return; }
void SetArrayValues(int *array, int n) { int c; printf("Enter %d integers\n", n); for (c = 0; c < n; c++) scanf("%d", &array[c]); return; }
void PrintArrayValues(int *array, int n) { int c; printf("Sorted list in ascending order:\n"); for (c = 0 ; c < n ; c++) printf("%d\n", array[c]); return;}

90% **Interaction & Achieving Outcomes**

int main() { int array[100], n, c, d, swap; GetElementCount(&n); SetArrayValues(&array, n); for (c = 0 ; c < (n - 1); c++) { for (d = 0 ; d < n - c - 1; d++) { if (array[d] > array[d+1]) { swap = array[d]; array[d] = array[d+1]; array[d+1] = swap; } } } PrintArrayValues(&array, n); return 0; }

10% **Calculations**

Code is the wrong model, we should be using graphs.

Semantic Computing

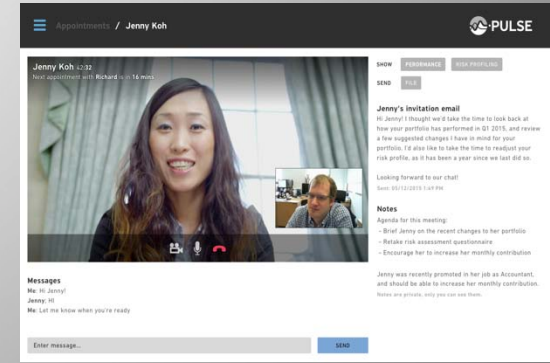**The Semantic O/S executes a graph which becomes a stream of standard operations processed by a Graph CPU's instruction set, to process experiences.**
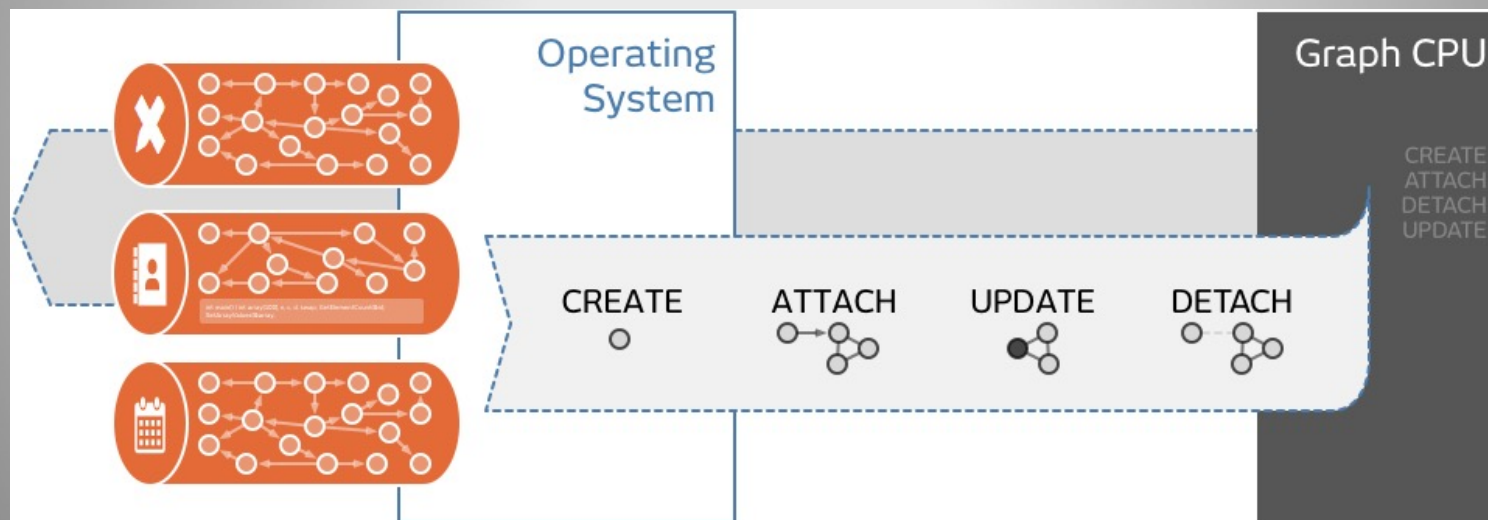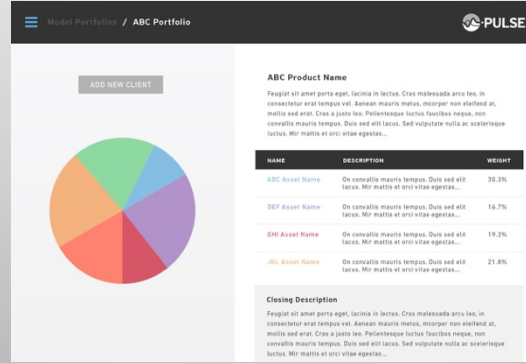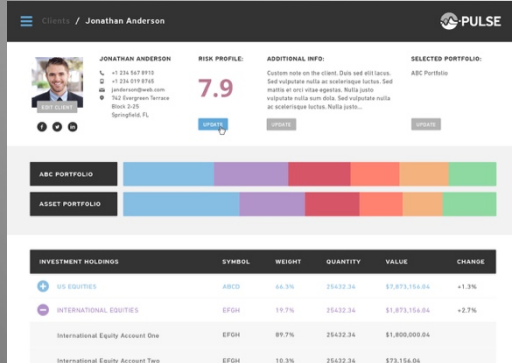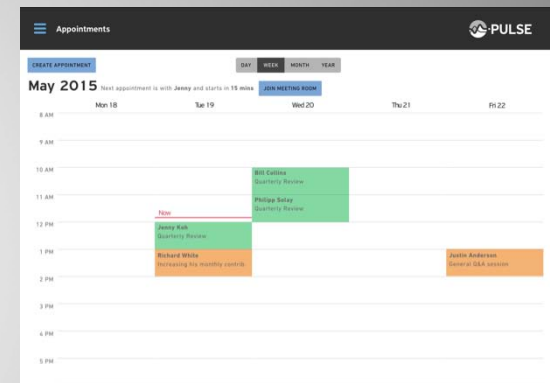
The Building Blocks : 6 + 1
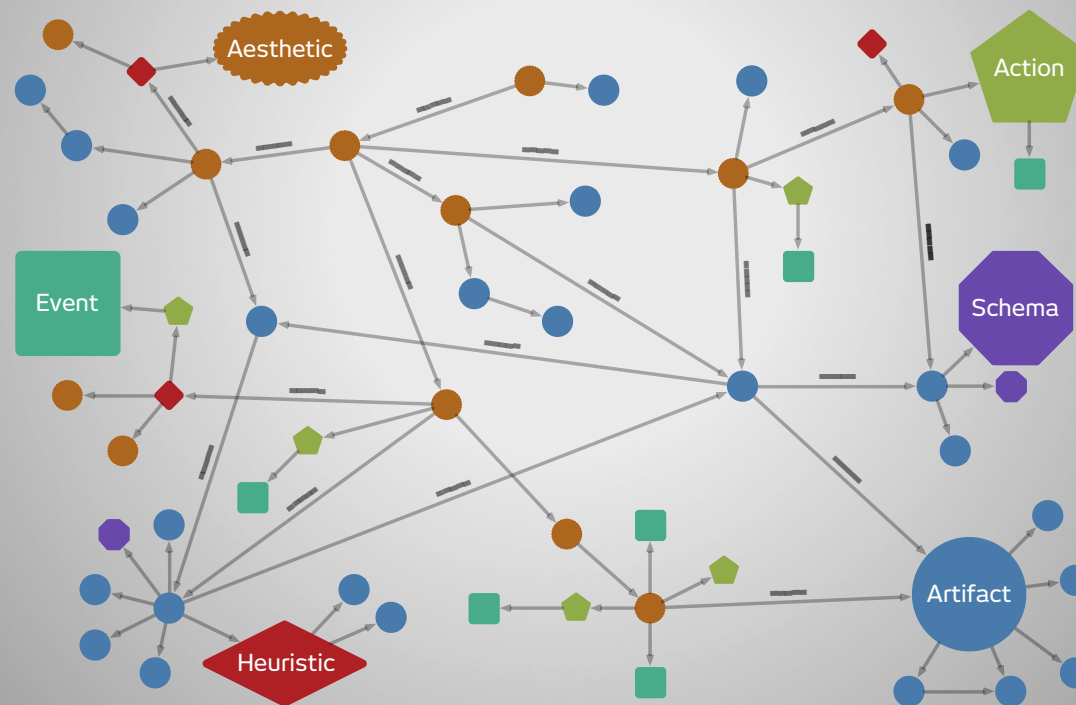
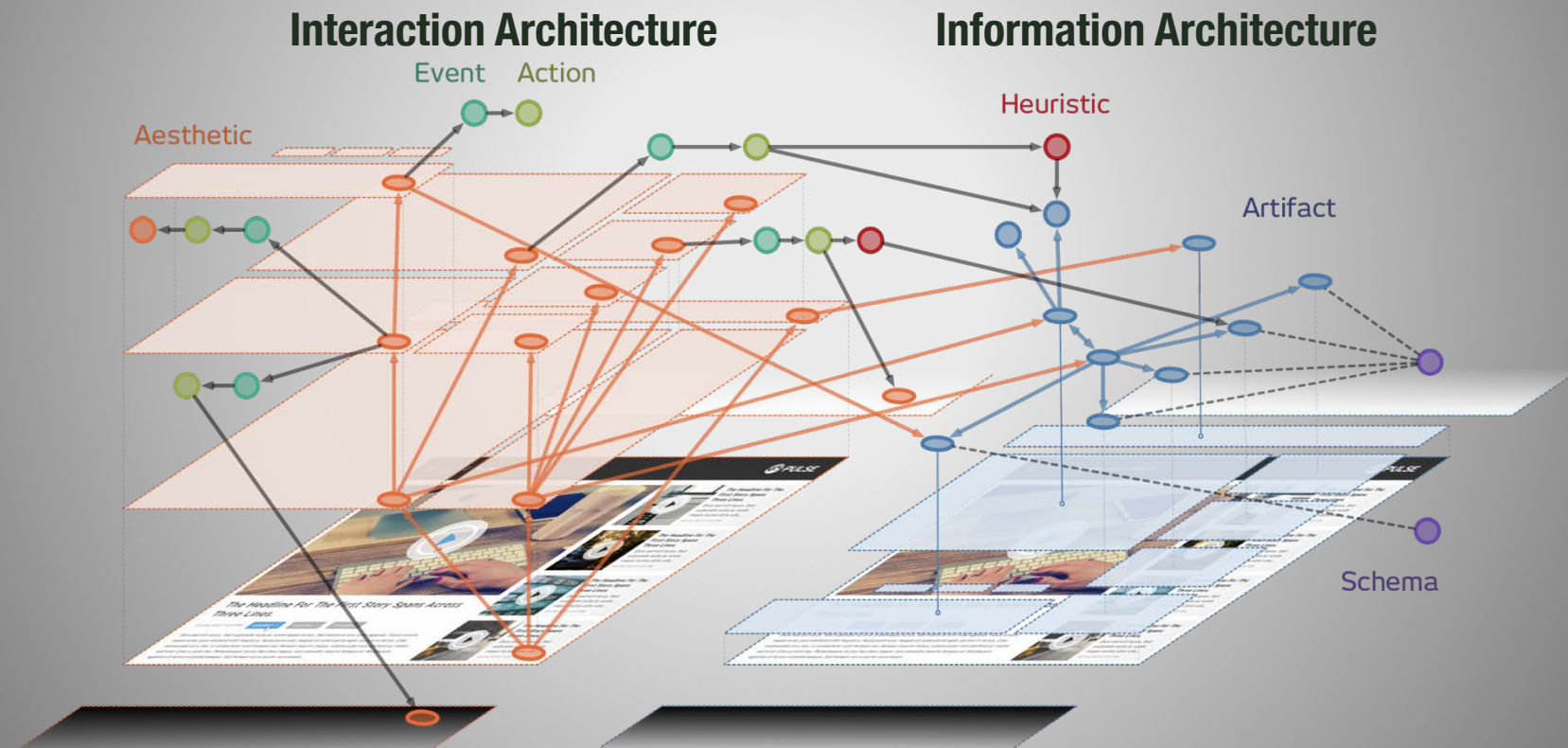# Wealth Management Portal

A modern experience between Financial Advisors, Compliance & their Customers

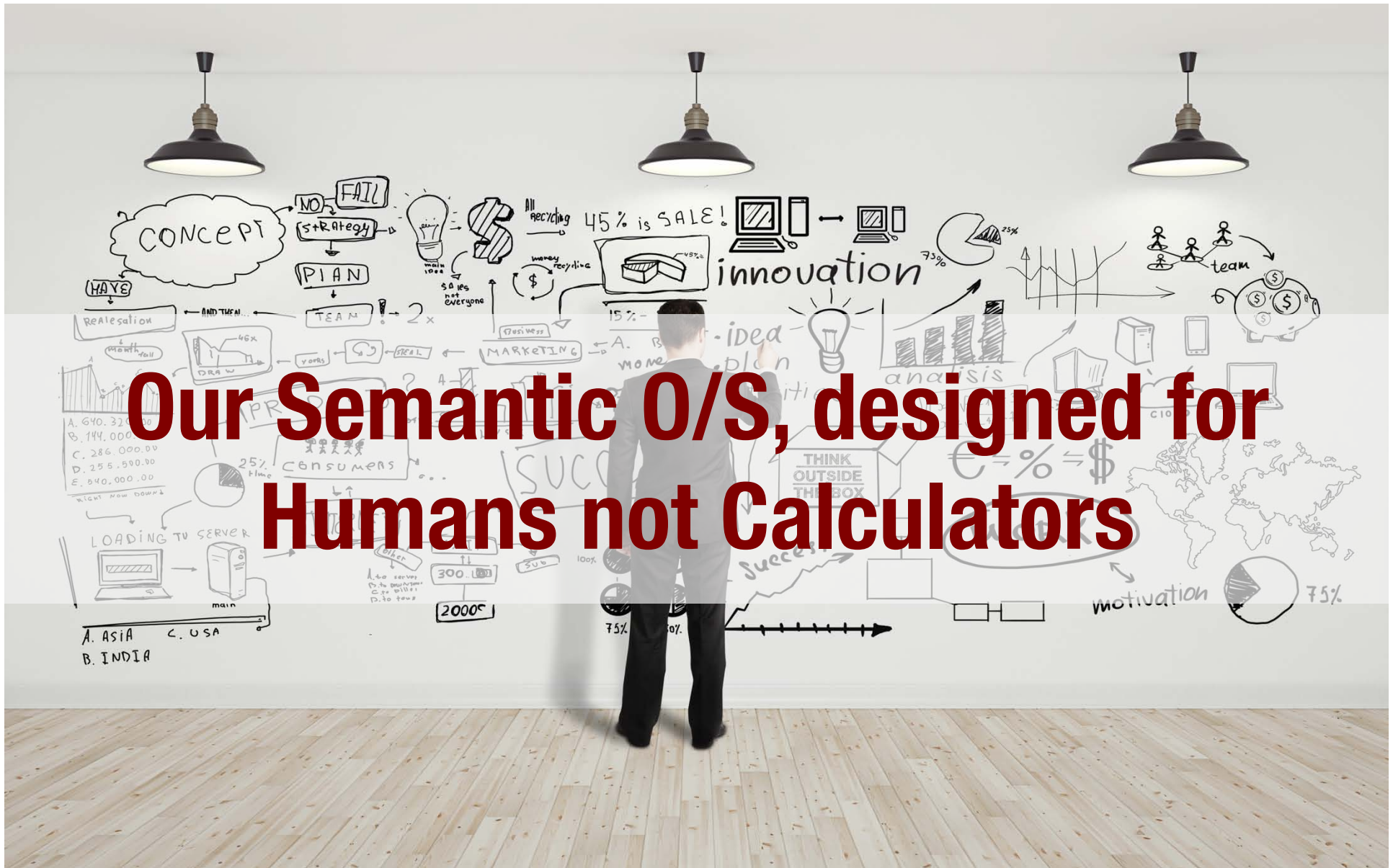# More efficient, more effective

①   **90% reduction in Infrastructure Implementation**

②   **60% reduction in Software Development**

③   **40% reduction in Cost & Time to Market**

④   **UX & Business Led, Agile by Nature**

⑤   **Meaningful Assets vs. Cryptic Code**

Our Semantic O/S, designed for Humans not Calculators

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