

**Kyield Executive Briefing**

A Semantic Enterprise Operating System

# **Reduce risk and seize opportunities: How Business Managers can employ a Semantic Enterprise OS to Optimize Performance**



Unleash the innovation within <sup>™</sup>

## Overview

### Computer OS VS Organization OS

The history of computing dates back several thousand years to the invention of the abacus, yet the first computer operating system (OS) wasn't developed until 1955 at General Motors Research Laboratories (GM-NAA I/O). The rapid evolution since has been driven by vastly increased compounded complexity in computing.

The similarities between the computer OS and an organization was recognized as early as 1974:

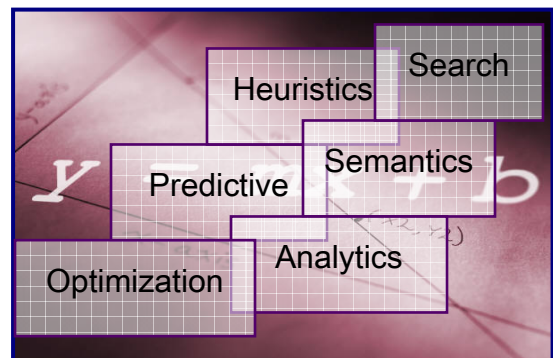
*It has been observed that the structure of extant operating systems bears a remarkable resemblance to that of the organization which created them.* — W Wulf, E Cohen, W Corwin, A Jones, R Levin, C Pierson, F Pollack <sup>1</sup>

While modern definitions of OS are limited to software applications, early basic research was focused more broadly on systems and resource allocation. Today it is well understood that operating systems are necessary to manage complexity, automation, and to optimize computing, yet innovation in organizational systems has lagged far behind despite increased complexity due to computing, environmental, scale, globalization and regulatory schemes.

### What is a Semantic OS, and why is it important?

A properly structured OS for organizations contains deep intelligence on people, places, and things, which enable automation, visualized

analytics, and predictive capabilities that are impossible to obtain otherwise. Decisions are only as good as the data they are based on; a semantic OS provides far more accurate data in real-time that is synthesized with adaptive algorithmic modules, which enables yield management of knowledge, crisis prevention, and optimization. Semantic simply refers to structure in data with sufficient detail about relationships to provide meaning for the purposes of machine to machine automation. A user friendly semantic enterprise OS requires a natural language interface that allows knowledge workers with sufficient permission to interact with the system.



### Real-time BI VS Agent-based Modeling

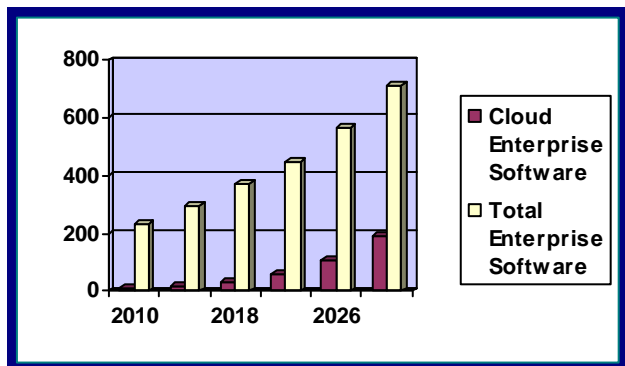
Among the more pragmatic applications made possible with a semantic enterprise OS is real-time human capital analytics, particularly in combination with mobile and cloud computing. While both practices are based on mathematical algorithms, the real-time data available within a highly structured semantic enterprise OS allows analysts and business managers to answer the query *what is* rather than *what if*, as well as automate appropriate responses accordingly.

<sup>1</sup> HYDRA: the kernel of a multiprocessor operating system

## Enterprise Software Market

The total enterprise software market is expected to grow by 6% (CAGR) to \$300 billion in annual revenue over the next five years, driven by key decision factors for spending that include: "Aging systems, as well as greater demand for security and aligning software with business requirements," – Joanne Correia, VP at Gartner.

Software as a service (SaaS) revenue within the enterprise application market is now approximately \$10 billion annually, growing by 16% per year, 75% of which is currently in the cloud, expected to reach 90% within a decade.



### Conflicts within Ubiquitous Computing

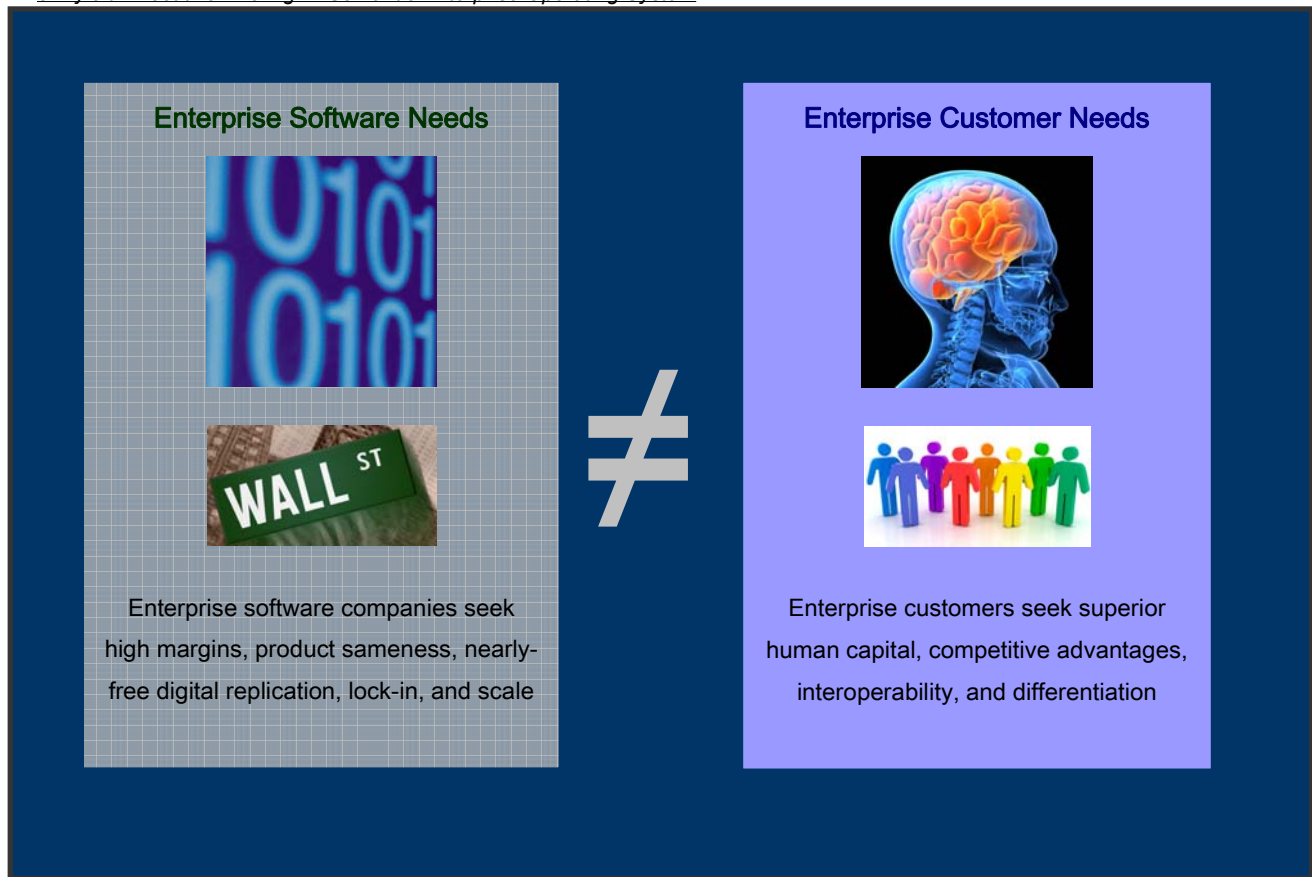
The competitive advantage for new innovation in enterprise software has often proven brief in duration, with exceptions limited to those with a high bar to entry, costly maintenance, and custom systems; benefiting primarily market leaders. For the vast majority of organizations, the combination of needing interoperability in network computing and the financial incentive for vendors to serve

low cost digital replication has resulted in proprietary standards, monopolies, and homogeneous digital work environments.

### Impact of Disruptive Technology

A key benefit of basic research investments in computing has been the emergence of potentially disruptive technologies such as the Web, the Semantic Web, cloud computing, and mobile computing. These innovations, particularly working in combination, provide the possibility for a realignment of interests between enterprise software and customers that was not occurring otherwise. Even revolutionary innovation like the Internet, however, has proven to have little impact on incumbents in the enterprise market or digital work environment.

While proprietary standards allow for functionality, ubiquitous computing has many negative impacts for organizations that are often overlooked and misunderstood, particularly relating to competitiveness. Those without dominant market power need product differentiability most, yet are the least likely to achieve same. The answer is a semantic enterprise OS designed as a holistic adaptive system based on non-proprietary standards, relatively low cost, tailored to actual needs of the organization, work group and individual knowledge worker, with sufficiently flexibility for continual improvement.



## Horizontal Applications with Semantic Enterprise OS

Table 1: Horizontal applications & integration with Semantic Enterprise OS

Human Resources	Financial / Accounting	Quality Control / Service	Engineering / Operations	Governance / Compliance	Marketing / Communications
<ul style="list-style-type: none"> <li>• Alignment</li> <li>• Accountability</li> <li>• Productivity</li> <li>• Compensation</li> <li>• IP / IC / HC</li> <li>• Recruitment</li> <li>• Education / training</li> </ul>	<ul style="list-style-type: none"> <li>• Risk Mgmt.</li> <li>• Crisis Prevention</li> <li>• Fraud Prevention</li> <li>• Forecasting / Predictive</li> <li>• M &amp; A analytics</li> </ul>	<ul style="list-style-type: none"> <li>• Product Integration</li> <li>• Logistics Integration</li> <li>• CRM Integration</li> <li>• Forecasting / Predictive</li> </ul>	<ul style="list-style-type: none"> <li>• Innovation</li> <li>• R &amp; D</li> <li>• BI Integration</li> <li>• IT / Cloud / Search</li> <li>• Planning</li> <li>• Inventory optimization</li> </ul>	<ul style="list-style-type: none"> <li>• Hard-wired Reporting</li> <li>• Automated Response</li> <li>• Enhanced Security</li> <li>• Managed Transparency</li> </ul>	<ul style="list-style-type: none"> <li>• Product Development</li> <li>• Social Network Integration</li> <li>• Sentiment Analysis</li> <li>• Sales Intelligence</li> </ul>

While applications can be tailored and integrated for specific needs, the basic semantic enterprise OS is agnostic and horizontal, encompassing design features that are essential to all types of organizations, providing rich intelligence on people, places, and things.

### Key Features of Semantic Enterprise OS:

- Crisis Prevention
- Enhanced Innovation
- Accurate Data / Intel / Decisions
- Improved Alignment / Meritocracy
- Higher Level Productivity
- Continual Improvement

## ROI Scenarios for Semantic Enterprise OS

Table 2. ROI Scenarios for Semantic Enterprise OS

Pharmaceuticals	Manufacturing	Regulatory	Energy	Consumer
<ul style="list-style-type: none"> <li>• Regulatory Risk</li> <li>• Culture Mgmt.</li> <li>• Quality Control</li> <li>• Product Intel</li> <li>• Probable ROI: \$1.1 billion</li> </ul>	<ul style="list-style-type: none"> <li>• Political Risk</li> <li>• Regulatory Risk</li> <li>• Missed Opportunity</li> <li>• Market Risk</li> <li>• Probable ROI: \$20 billion in market cap.</li> </ul>	<ul style="list-style-type: none"> <li>• Risk Global Stability</li> <li>• Loss of Credibility</li> <li>• Fiscal Sustainability</li> <li>• Realized Moral Hazard</li> <li>• Probable ROI to society: \$3 trillion+</li> </ul>	<ul style="list-style-type: none"> <li>• Scale disadvantage</li> <li>• Uncompetitive BI</li> <li>• Financial challenge</li> <li>• Technical challenge</li> <li>• Probable ROI: \$340 million</li> </ul>	<ul style="list-style-type: none"> <li>• Poor Data Tools</li> <li>• Data Overload Challenge</li> <li>• Uncompetitive Innovation</li> <li>• Probable ROI: \$680 million</li> </ul>

\* Hypothetical cases based on actual situational environments

In every major crisis studied over the past decade, a high ROI has been identified for a well-designed semantic OS for the impacted enterprise and/or their financial stakeholders. In addition to avoiding significant preventable costs and missed opportunity, enhanced innovation and operating performance can be expected. Given that most organizations today have global connectivity for installed network computing, the majority of deployment for a semantic OS is in leveraging existing assets. Let's look briefly at a sampling of substantial ROI that have been identified if a semantic enterprise OS were properly installed.

### Global Pharmaceutical Company

A recent high profile law suit revealed a flawed manufacturing process in a key plant for a global pharmaceutical company, resulting in high volume of error in regulated drugs. Mid-management was made aware of the situation, but details were either compartmentalized, and kept from senior management, or simply not acted upon. The result was a large law suit, and regulatory action, with total direct costs exceeding \$1 billion. A properly

designed semantic OS could have prevented this event by automated risk notification to the board, relationship metrics between people and products, process comparisons between plants, and notifications of warnings from experts.

### U.S. High-tech Manufacturer

A highly successful U.S. based technology company had expanded significantly in Asia during the previous decade to remain competitive with lower costs, and to gain access to one of the world's fastest growing markets. The company had long-considered the country to be among its primary risks and opportunities, yet management underestimated the strategic imperative the government placed on their industry. If the company had a semantic OS in place, with a fully integrated business unit module, concerns from analysts would have been automatically rated and integrated with their BI and risk management dashboards. Senior management and the board would not then have been blind-sided when the government orchestrated the company's eventual exit, costing global leadership and independence.

## **Financial Regulatory Agency**

The financial crisis of 2008 provides the highest ROI and strongest justification for deployment of the semantic enterprise OS to date. Multiple regulatory agencies failed to act on common knowledge and data that clearly demonstrated systemic risk to the global financial system in residential mortgages. A semantic OS in regulatory agencies sharing internal and external linked data would have resulted in identifying and calculating the systemic risk much earlier, as was the case with several hedge funds, substantially mitigating the most costly financial loss in generations.

## **Mid-market Energy Company**

A privately held energy company with diversified assets in oil, natural gas, and coal was facing depleting natural resource holdings and increased investment in extraction technology, requiring a near-future decision on whether to invest heavily or sell the company. Management believed that their IT systems were competitive with their larger rivals, eventually basing their sell decision on data that was less than optimized. The buyer was a global market leader that had invested in a fully integrated custom BI system with advanced analytics, strong KM, and one of the most advanced agent-based modeling systems ever deployed. The buyer's decisions and data on the subject as well as proprietary technology and deep knowledge about the natural resources, extraction techniques, and ROI modeling was vastly superior. The privately held company sold most of its assets undervalued by several hundred million dollars. While the mid-market company could not afford

the same IT systems of its suitor, today the company could invest in a cloud-based semantic OS tailored specifically to the company's needs, optimizing human, natural, and financial assets by populating new internal data while leveraging the increasingly valuable data available on the semantic web.

## **Consumer Brand Conglomerate**

A top twenty publicly traded consumer conglomerate with strong brands in foods and cleaning products had experienced a consistent business for decades with respectable growth in BRIC countries during the previous decade. Operating profit and revenue growth, however, were slowly eroding relative to leading competitors. Internal and external consultants, assisted by a leading BI platform, concluded that the key causal factors were increased adoption of green products combined with more competitive innovation in primary competitors. The company's legacy product mix contained a high percentage of ingredients that were not considered green, non-toxic, or all natural.

The culture of the company to include senior management had underestimated the power of the green trend, in part due to poor tools for managing data overload. If a strong semantic enterprise OS was fully integrated with BI, CRM, social networking, and sentiment analysis applications, management would have enjoyed more accurate data, upon which better decisions would have been made, perhaps creating a leader rather than a follower with sub-par performance.



A Semantic Operating System for Organizations  
An abbreviated Kyield White paper

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