

# NIWOT RIDGE CONSULTING

MISSION CRITICAL SOFTWARE  
ARCHITECTURE, SYSTEMS DESIGN,  
&  
BUSINESS AND SOFTWARE  
PROCESS IMPROVEMENT

+ 1.720.406.9164

[galleman@niwotrdige.com](mailto:galleman@niwotrdige.com)

[www.niwotridge.com](http://www.niwotridge.com)

*Never undertake a project unless it is manifestly important and nearly impossible.*

— *Edwin Land*

4347 PEBBLE BEACH DRIVE  
NIWOT COLORADO, 80503

Niwot Ridge Consulting provides a broad set of services for the analysis, design, development, and deployment of mission critical software products for business and industry, including:

- Information Technology strategies for small to medium sized enterprises, software based business process improvement, web-based commerce solution analysis, design and deployment of client/server and web-based technologies.
- Technical system architecture, strategic technology decision processes, *Chief Information Officer* services to a wide variety of industries, ranging from discrete manufacturing, publishing and information providers, process industries, and service based providers.
- Product design, system development, vendor selection and management, application deployment management, and overall project management.

*A ship on the beach is a lighthouse to the sea*

– Dutch Proverb

Designing, managing, and deploying successful software projects is one of the most significant challenges encountered by a modern business organization. Never before has Information Technology (IT) played a more important role in bringing competitive advantage to an organization. <sup>[1]</sup> Yet, IT has never before been more complex. In the past, the mainframe paradigm provided turnkey solutions to complex business problems. The functionality of this centralized system was provided by the software vendor, which may have also been the hardware vendor. The business processes were adapted to this functionality. As these processes evolved it was discovered that the centralized system was not sufficiently flexible or adaptable to meet the new demands of business. The introduction of web-based distributed processing not only provides the means to deal with the inflexibility and monolithic nature of these legacy applications, it also provided a completely new set of technical and management problems not found in the legacy environment.

The consequences of this new, flexible, adaptable technology is that the comfort provided by the turnkey nature of the previous generation software systems is no longer available. The deployment of the web-based distributed processing paradigm requires careful analysis, planning and execution. These behaviors were required for the previous generation software systems; but now disparate systems, applications and databases need to talk to each other – across the Internet as well as within the organization and its supply chain infrastructure. A *System Architecture* is needed to assemble these components into a functioning system that

provides improved productivity across the enterprise, while maintaining the desirable attributes of the trustworthy, reliable, and manageable legacy environment.

Themes form the foundation of all strategic and tactical processes. For *mission critical architectures*' these themes are:

- *Business improvements* – are enabled by Information Technology that is integrated not disintegrated. This integration must be horizontal not vertical. Horizontal systems remove islands of information and build bridges between the business units. Vertical systems isolate system components. In this integrated system, multiple data sources are made transparent to the end users as well as the applications that utilize them.
- *Information Technology requirements* – are always growing, changing, and being extended. The Information Technology is no longer static, but dynamic, adapting to the changing business requirements.
- *Information Technology is about abstractions* – if hardware, software and data were the only foundations of a system, then Information Technology would not be able to keep pace with the business requirements. Instead, business processes, objects and services are the foundation of the system, which then drive the business processes in their adaptation of the changing market forces.

### CAPABILITIES OVERVIEW

This paper describes the philosophical and practical aspects of our consulting practice – Niwot Ridge, <sup>[2]</sup> as well as the technical and managerial skills used during a consulting engagement.

- *System Integration* – a thorough understanding of system integration in the domains of large and small-scale business applications, e-commerce services, federated databases, XML-based document management systems, enterprise resource planning, CAD systems, multi-media publishing systems, product data management.
  - *Analytical knowledge* – of how a system can be applied in the dynamic business domain. Knowing about the static behavior of the system is necessary, but not sufficient to deliver a successful project. Knowing the dynamic behavior of the system requires an understanding of performance models, fault and failure models, as well as the business process model of the system.

- *Economic knowledge* – of how to make money with the system. Only by modeling the cost and the benefits in a dynamic manner, can the economic value of the system be determined. The benefit stream is usually non-linear since the labor and process costs come in quantum units and cannot be subdivided into fractional units.
- *Sales and marketing knowledge* – of how to identify, engage, and gain closure from the client in both commercial and internal environments. Without some means of acquiring customers, identifying the needs of these customers, identifying the risks associated with satisfying these needs, and managing the deployment of technology, the technology alone will not be sufficient to satisfy the customer.
- *Technical knowledge* – of how these systems work. This knowledge is at the detailed software and business strategy level. Without this knowledge, anyone providing answers to clients' questions is simply echoing the vendor's brochures or worse; guessing. Both result in erroneous decisions.
- *Information Technology Strategy* – which asks the question, how can the information technology components of an organization be aligned with the business structure to maximize economic profit? The development of an IT strategy is fundamentally a business process. The technology aspects of the strategy are secondary until the economic, operational, and personnel impacts of any proposed change are understood.
- *System Architecture* – experience in the manufacturing, petrochemical, electric utility, process control and publishing domains. The role of the system architect is key to the success of any enterprise project. The architecture of the system forms the framework for the decision making process. Architecture is more than just arranging the system components in a nice form of a presentation. This is usually called *market-ecture*.

**GOOD SYSTEM ARCHITECTURE IS THE FOUNDATION OF SUCCESS**

- *Architecture* – is the foundation of any successful system deployment and involves:
  - Identifying the impact of each architectural element on other elements of the system..

- Assuring the long-term sustainability of the design decisions, in the presence of ever changing business and technology needs.
- Identifying an *exit strategy* for each architecture element to assure that technology migration has the desired effect on the business and operational goals of the enterprise.
- Building static and dynamic models of the architectural elements in the presence of known and unknown business processes.
- Identifying the *abilities* associated with the architecture, reliability, maintainability, availability, sustainability, performance, replaceability, etc.
- *Requirements Analysis* – using a variety of formal and informal methodologies.
  - Formal system architecture decomposition based on sound academic and practical experiences in client / server, n-tier, and web centric technologies.
  - System design and deployment plans for traditional as well as object-oriented systems using state of the art methods.
  - Data models of the business processes and internal system designs using ERD notation as well as UML extensions. This modeling process is usually focused on developing relational database tables. In many instances though, the data modeling is focused on object relationships and their instantiation in relational database tables. This is referred to an Object Oriented to RDBMS mapping.
  - Business case and economic justification focused on economic profit of the resulting system.
- *Software Development Management* – includes nearly twenty-five years of software development experience in a variety of commercial and industrial environments.
  - Small to medium teams using a variety of development environments for both commercial and internal development projects. The management of software development projects is distinctly different from the management of other business-centric projects. This includes:

- Identification of the *soft* risks associated with technology selections. These include risks normally encountered during the development process, as well as risks created by market and technology forces, outside the development process.
- Management of the *creative* process, while maintaining good engineering discipline and high levels of staff retention.
- Elicitation of system requirements in the presence of changing client and market needs.
- *Software Process Improvement* – how can the software development organization become a *best in class* operation while continuing to produce products? There are many approaches that can be applied to specific situations.
  - Management of the development process, either *in house developers*, subcontractors, or solution providers requires careful consideration to requirements, deliverables, and business performance metrics. In the same way building construction management is a profession, the management of software development requires experience, skill, and technical know-how to assure the outcome meets the needs of the client.
- *Knowledge of Analysis, Design, and Construction Techniques* – which is distinctly different from traditional software development contracting processes.
  - Simply having software development skills is necessary but not sufficient to deliver a modern software product. Knowledge of the business, marketing, quality, management, testing, performance analysis, reliability analysis, aspects of the final system is also required.
  - Combining all these abilities with *state of the art* technological skills forms the foundation of an *architecture-centric* design and development process.

**CAPABILITIES SUMMARY**

Niwot Ridge provides,

- Process focused
- Technologically competent
- Commercially sound

Consulting for,

- IT strategies
- Product and system architectures
- Commercial product marketing and sales strategies
- Software development processes improvements

Targeted to a variety of applications, including:

- Workflow based business process reengineering
- Web-based electronic commerce enablers
- Electronic publishing systems
- Federated systems design and development

in a variety of industrial and business domains, including:

- Web-based e-commerce (Business to Business, advertising delivery)
- Publishing and media (pulp, web, and other repurposed content environments)
- Continuous process (brewing, specialty chemicals)
- Discrete manufacturing (furniture, semiconductors)
- Pharmaceuticals (plant construction, NDA submission)
- Petrochemicals (refining, gas production)
- Pulp and paper (engineering and construction, mill operations)
- Electric utilities (nuclear, conventional power)