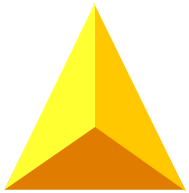
Object Technology

Opportunities & Caveats

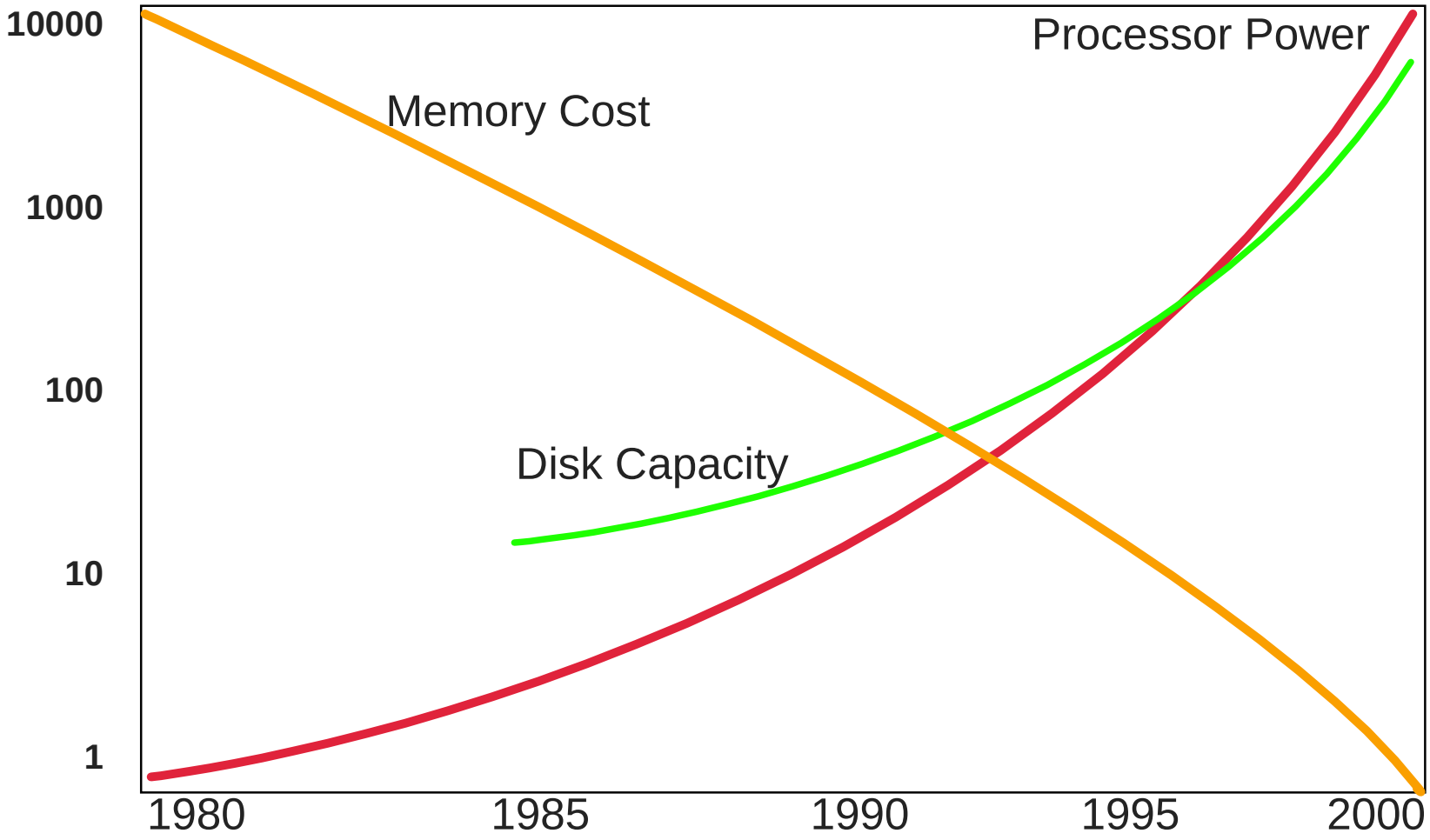
A presentation by
Graham McLeod
Managing Partner, Inspired
Senior Lecturer, University of Cape Town
April 1997



Agenda

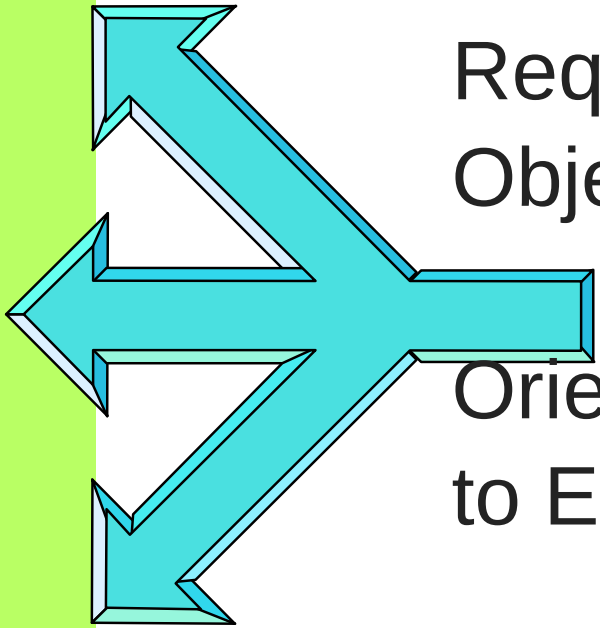
- Technology Trends
- Business Trends
- Opportunities
- Business Objects vs Widgets
- Classes, Frameworks, Components, Patterns
- Architectures, Models and Prototypes
- CASE and Round Trip Engineering
- Relational vs Object Database
- Web Object Computing
- Quality Focus
- Architectures and Strategies
- CSFs
- Managing Transition

Hardware Trends



Implications

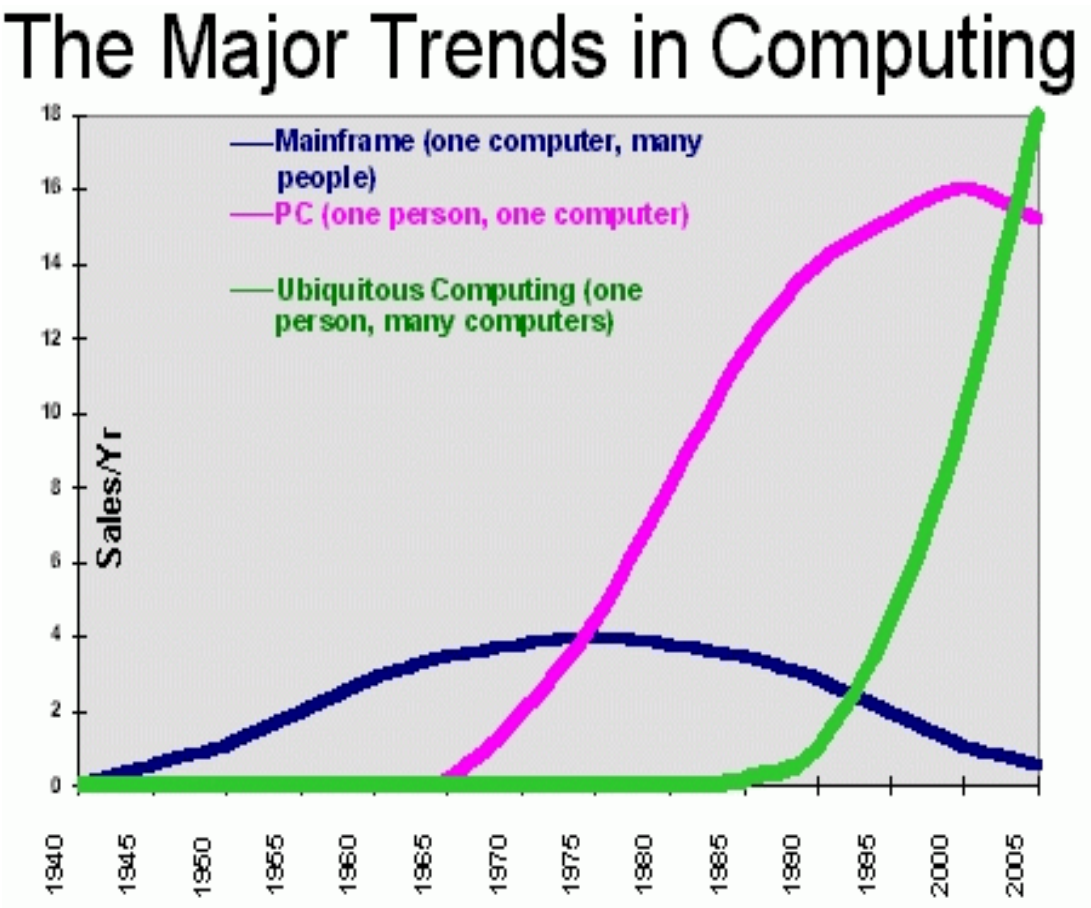
- Massive Power
- Multimedia/ Virtual Reality
- Voice Input/ Output
- Imaging
- Video integration
- Analysis / Simulation
- Realtime
- Network computing
- Ubiquitous computing



Require Object Orientation to Exploit

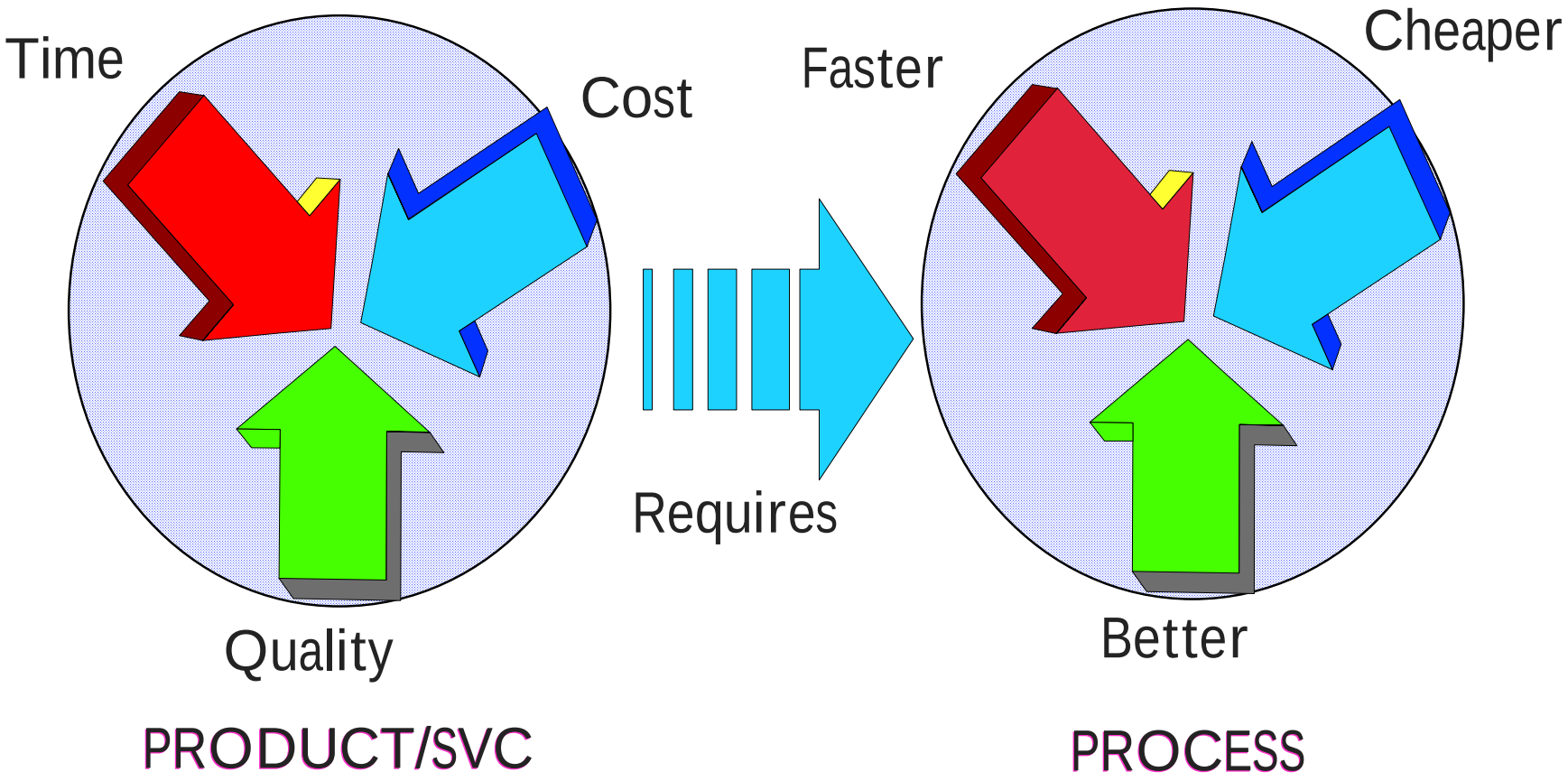
Ubiquitous Computing

- Xero Palo Alto Research Centre (PARC)
- Mark Weiser
- Opposite of virtual reality
- Next wave of computing



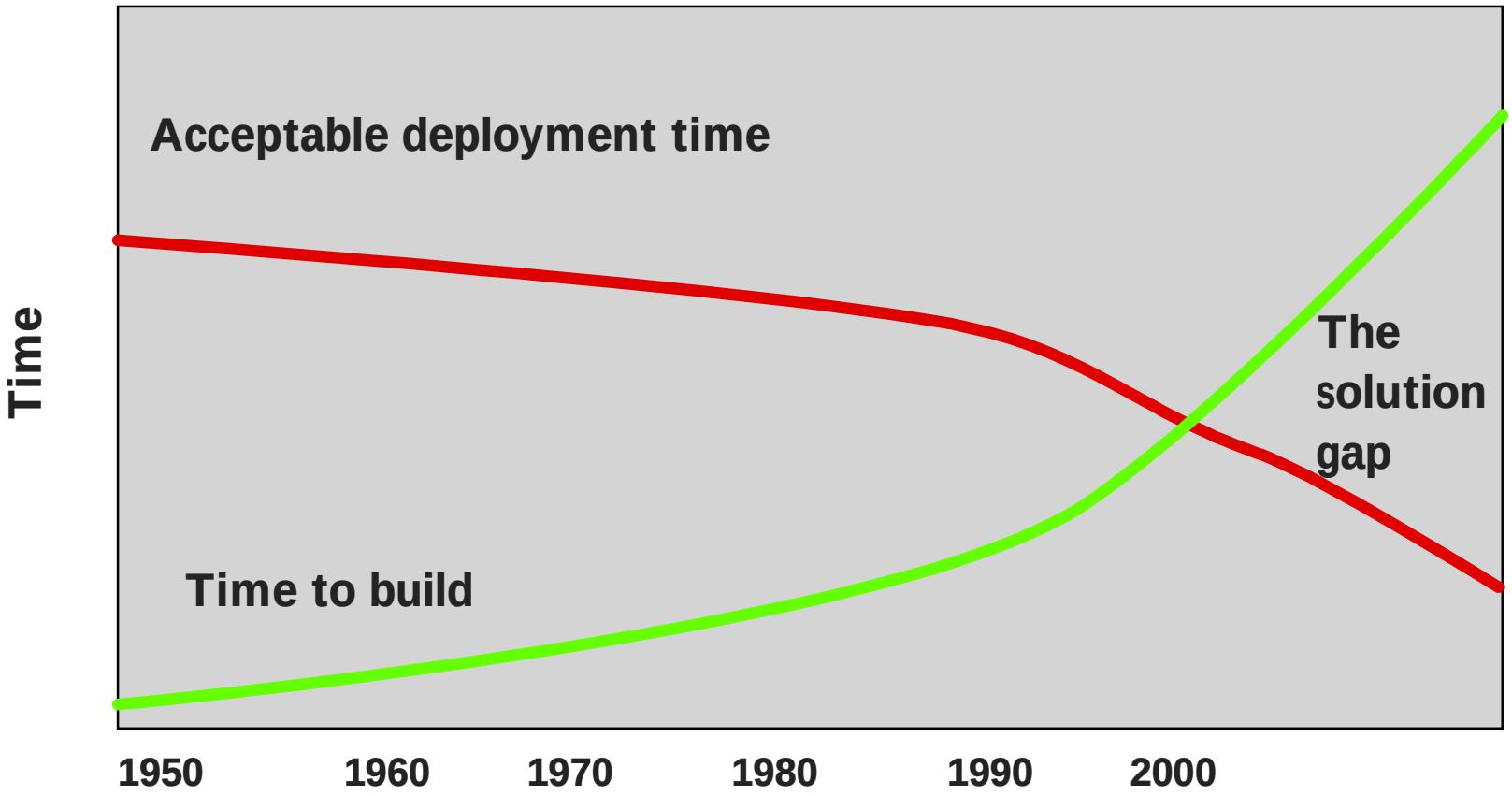
INSPIRED
I.T. Consulting ● Training ● Research

Global Pressures - Local Problems



INSPIRED
I.T. Consulting ● Training ● Research

The Solutions Gap

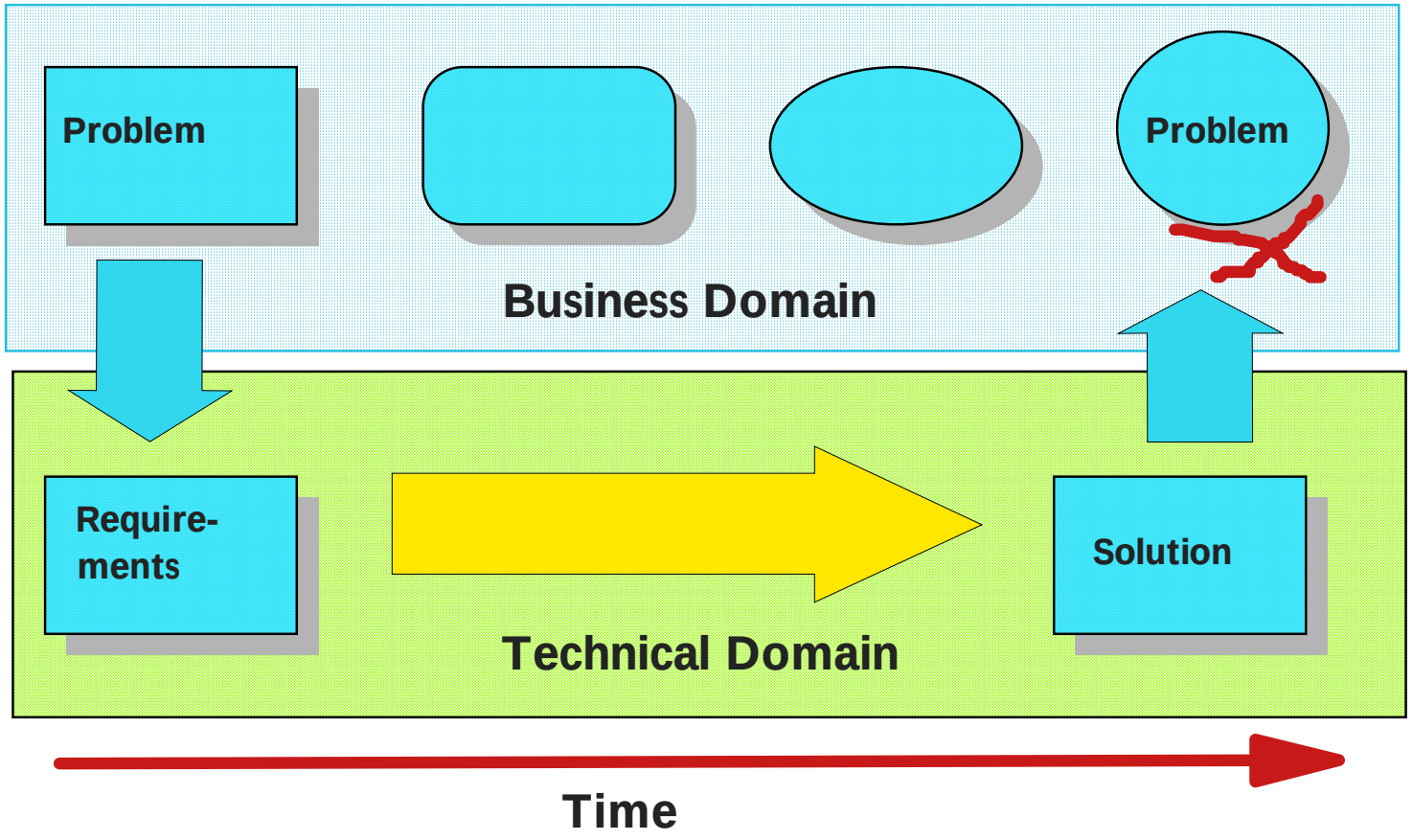


INSPIRED
I.T. Consulting ● Training ● Research

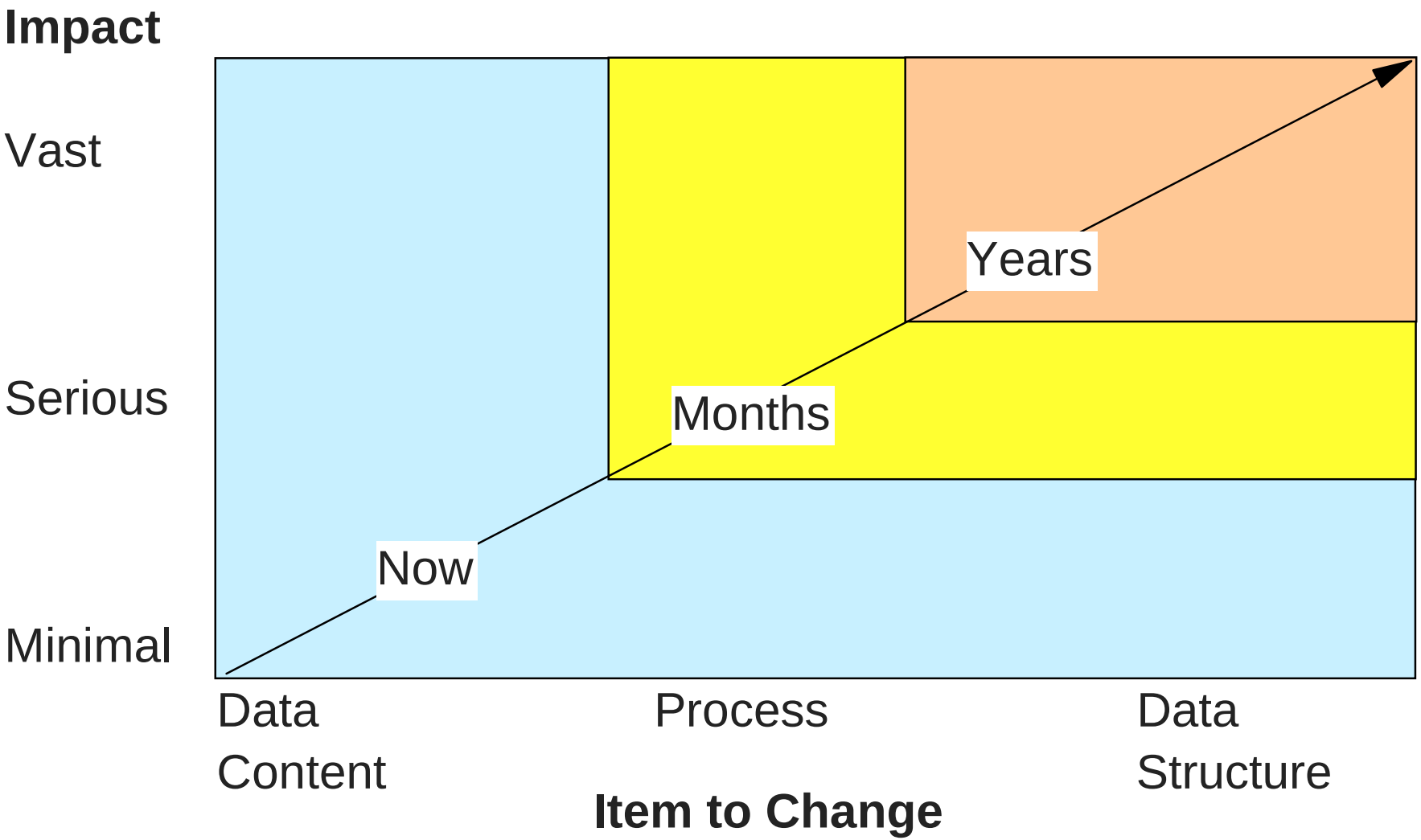
Opportunities

- Restructuring & BPR
  - Efficiency
  - Effectiveness
  - Customer Focus
- Empowerment
  - Job Enrichment
- Value Chain (suppliers, clients)
- New Services
- Flexibility & Responsiveness
- Media Rich Applications
- Quality, Reliability, Productivity

Conventional Software Development

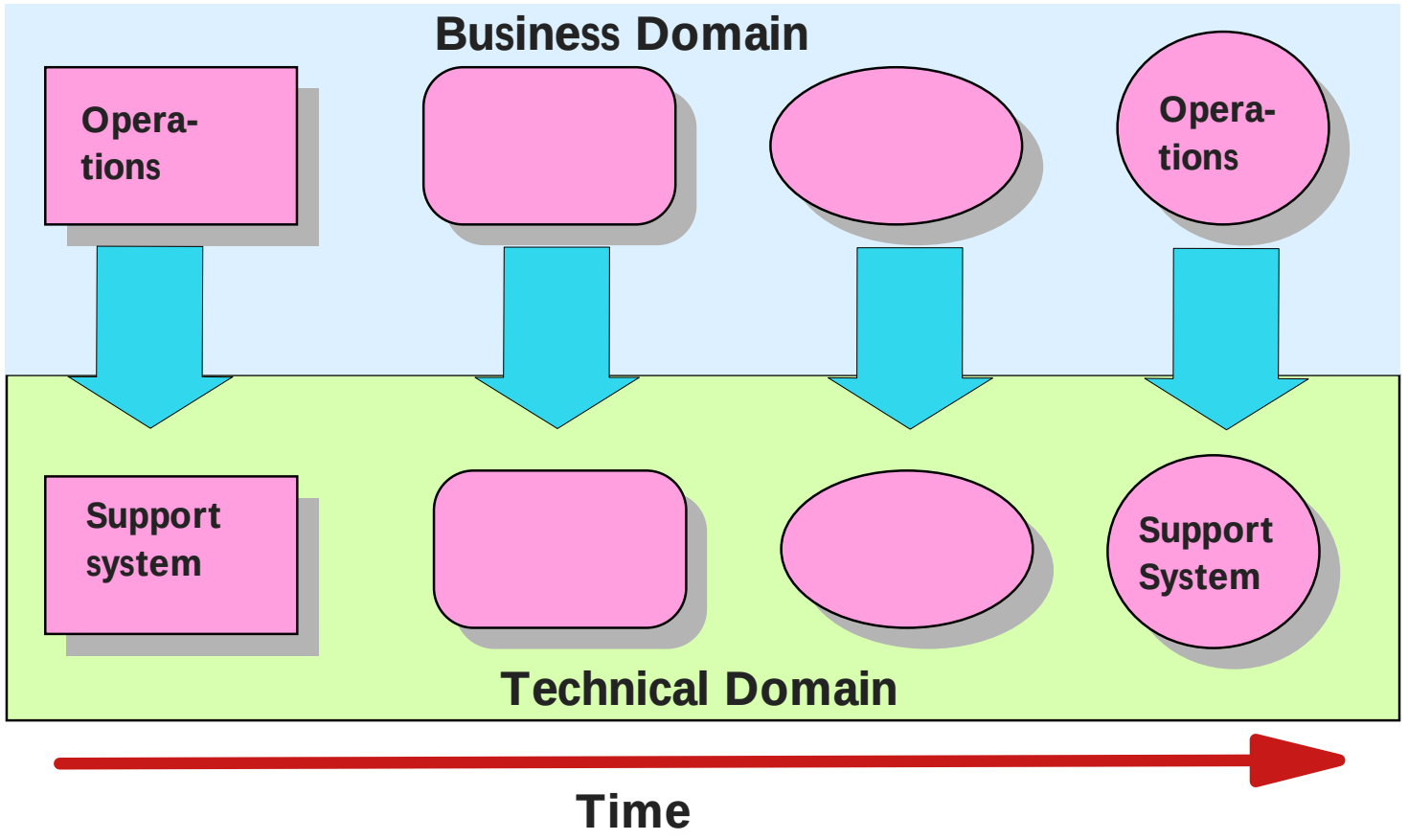


I.T. Constraints on Change



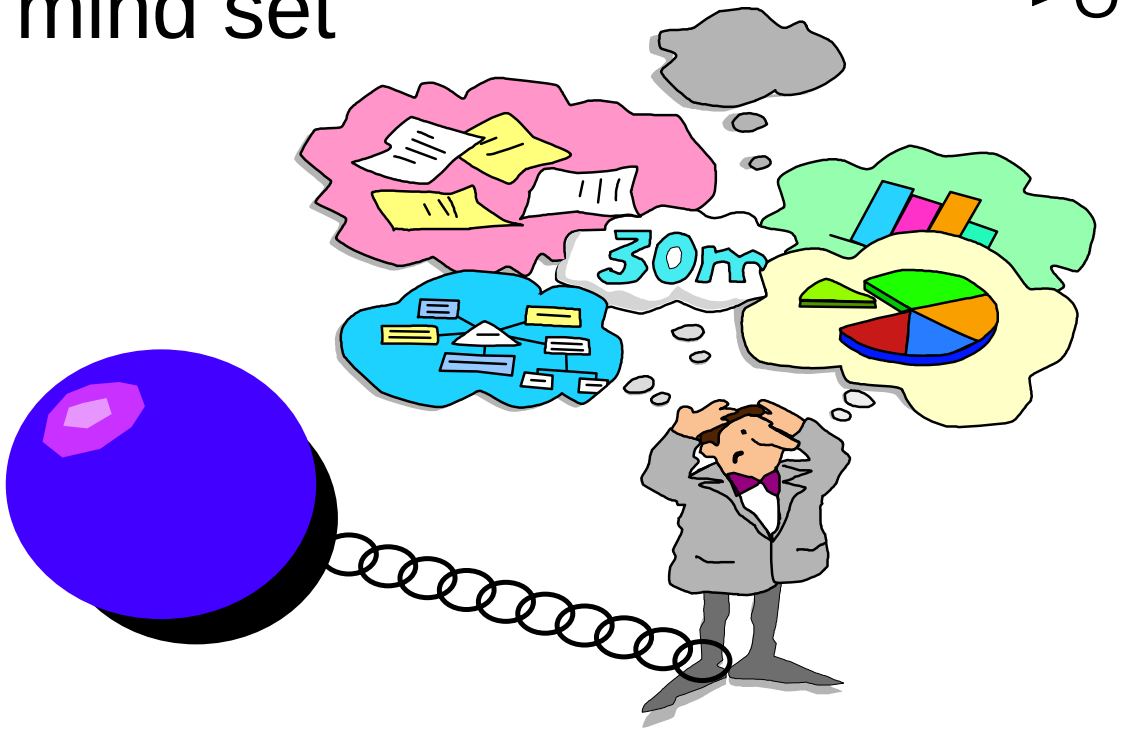
INSPIRED
I.T. Consulting ● Training ● Research

Adaptive Software Development



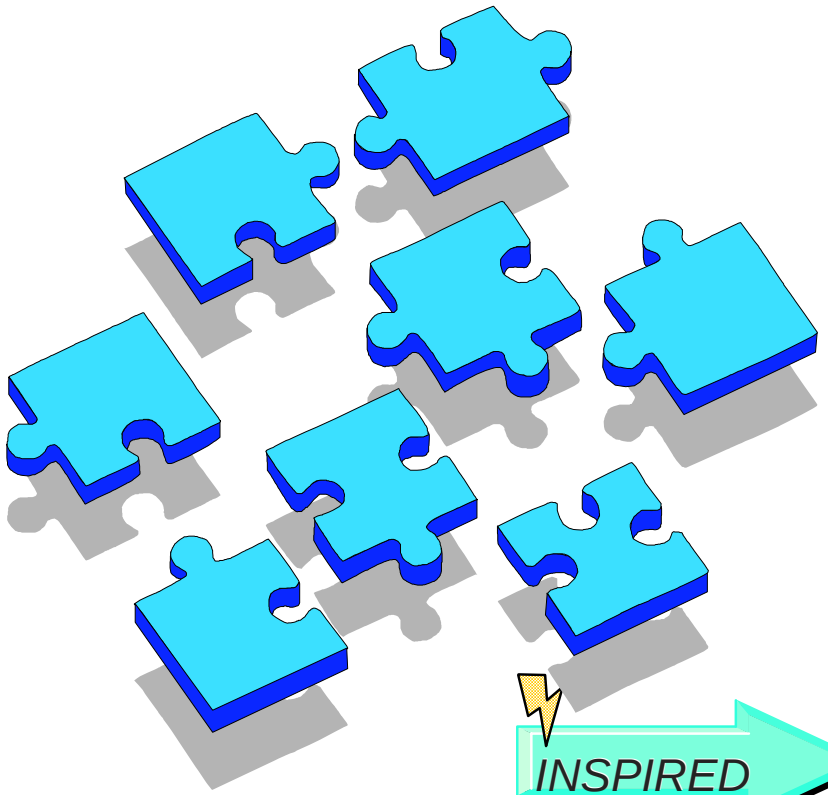
Difficulties

- Legacy
  - skills
  - applications
  - technology
  - mind set
- Developer - Quintuple Whammy!
  - GUI
  - Events
  - Client Server
  - Internet
  - Objects

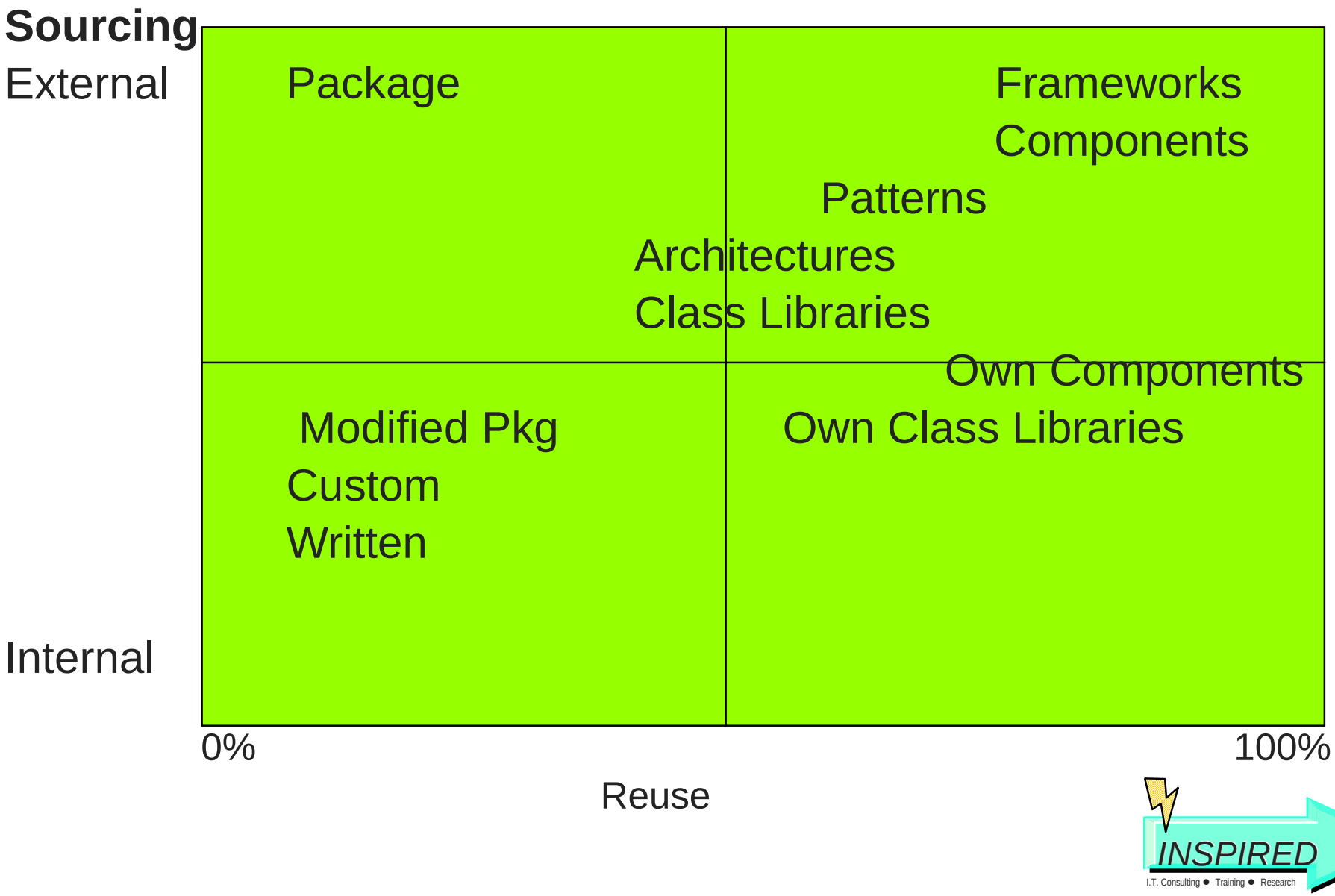


Object Technology

- Via Quality, Reuse can increase productivity
- Rapid Development - later
- Construction with Components - but few business components available now
- Use at the business level
  Not the widget level
- Business Domain Objects should be a simulation of real world objects

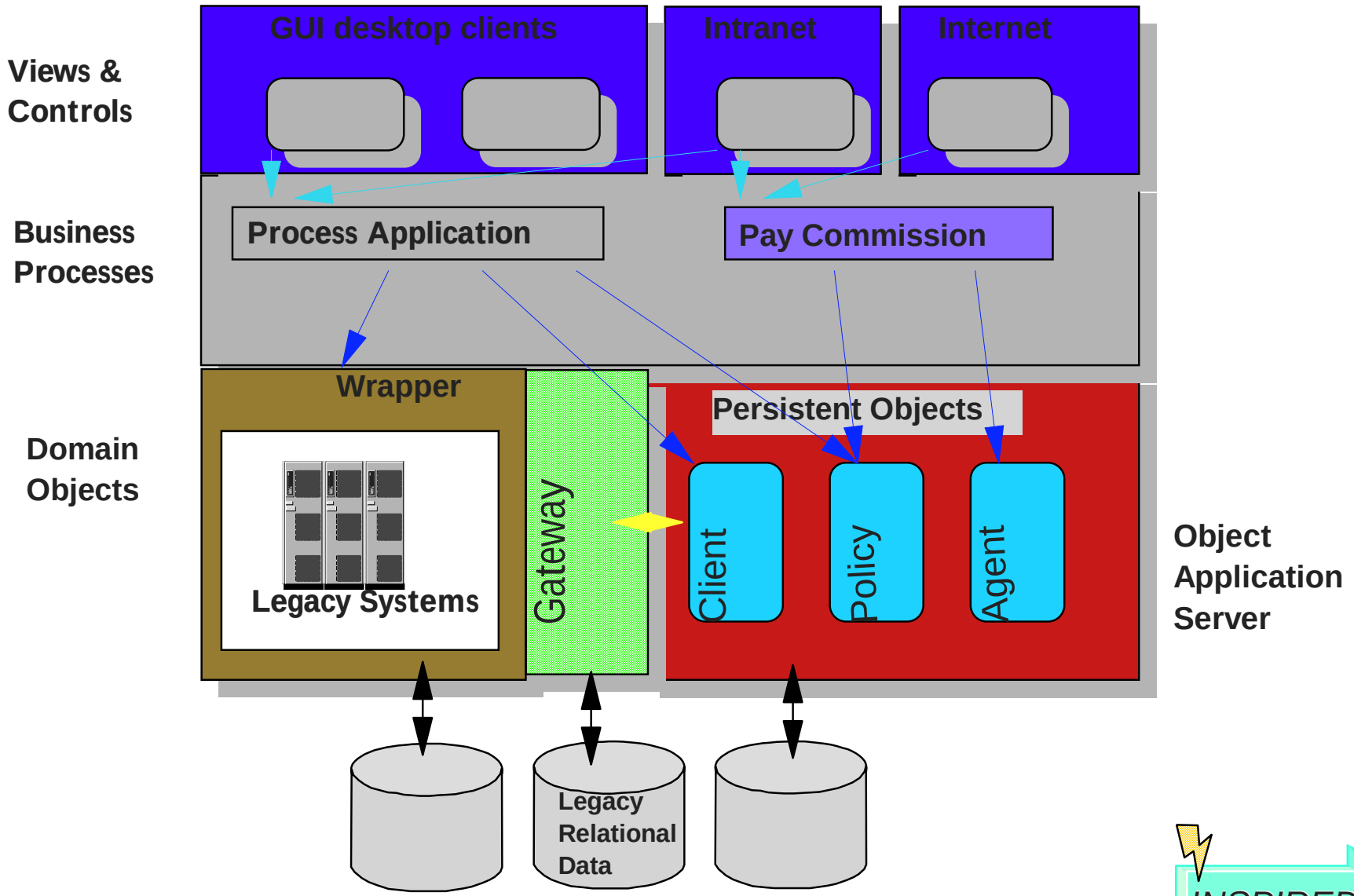


Increasing Productivity



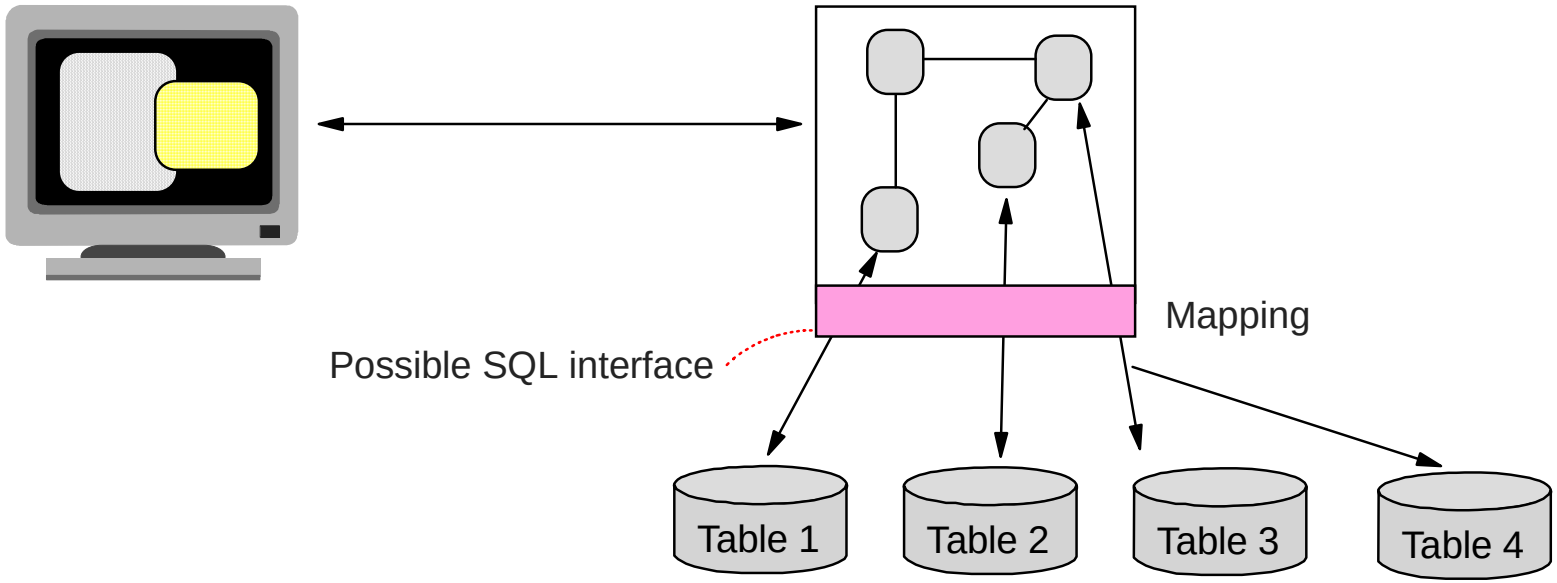
INSPIRED
I.T. Consulting ● Training ● Research

Likely architecture of future applications



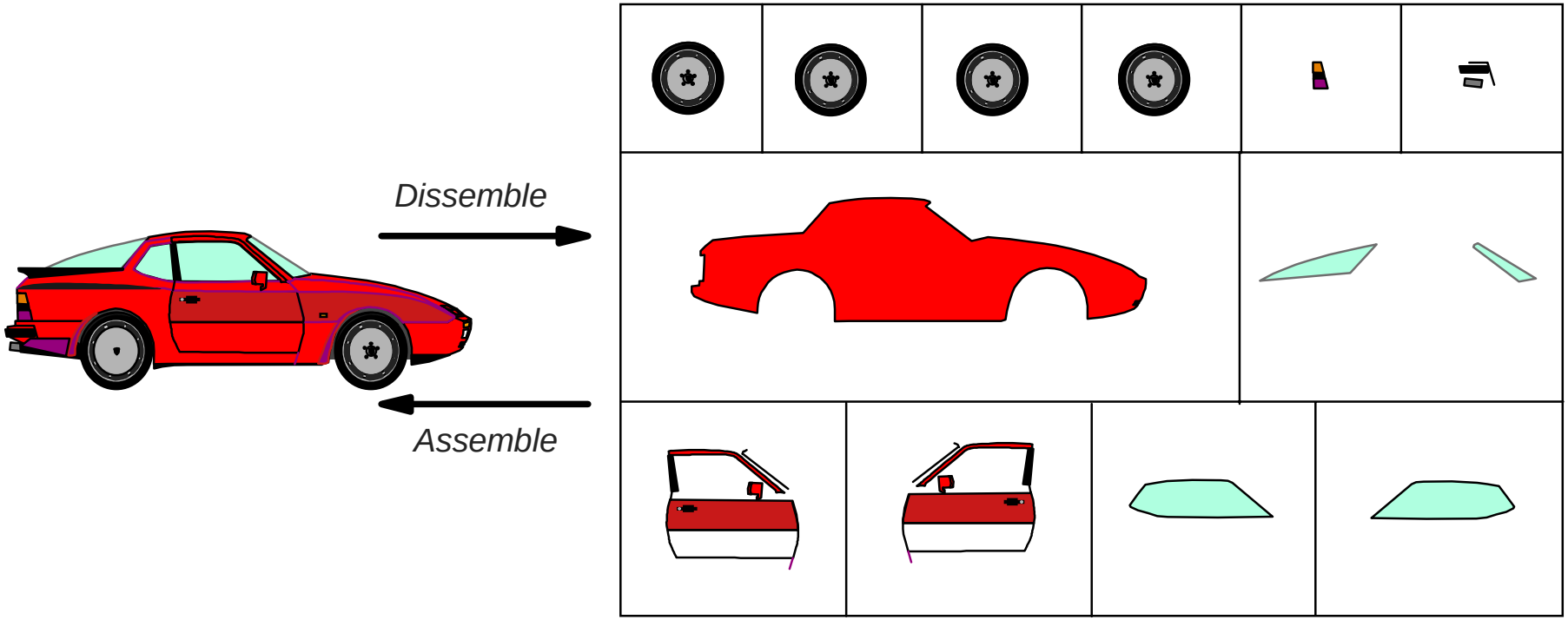
INSPIRED
I.T. Consulting ● Training ● Research

Using a Relational Database



- Allows use of industrial strength relational DBMS engines with full recovery, integrity, security, etc.
- BUT...
- Requires expensive and complex translation between relational model (storage) and object model (memory).
- Thickness increases with complexity of data

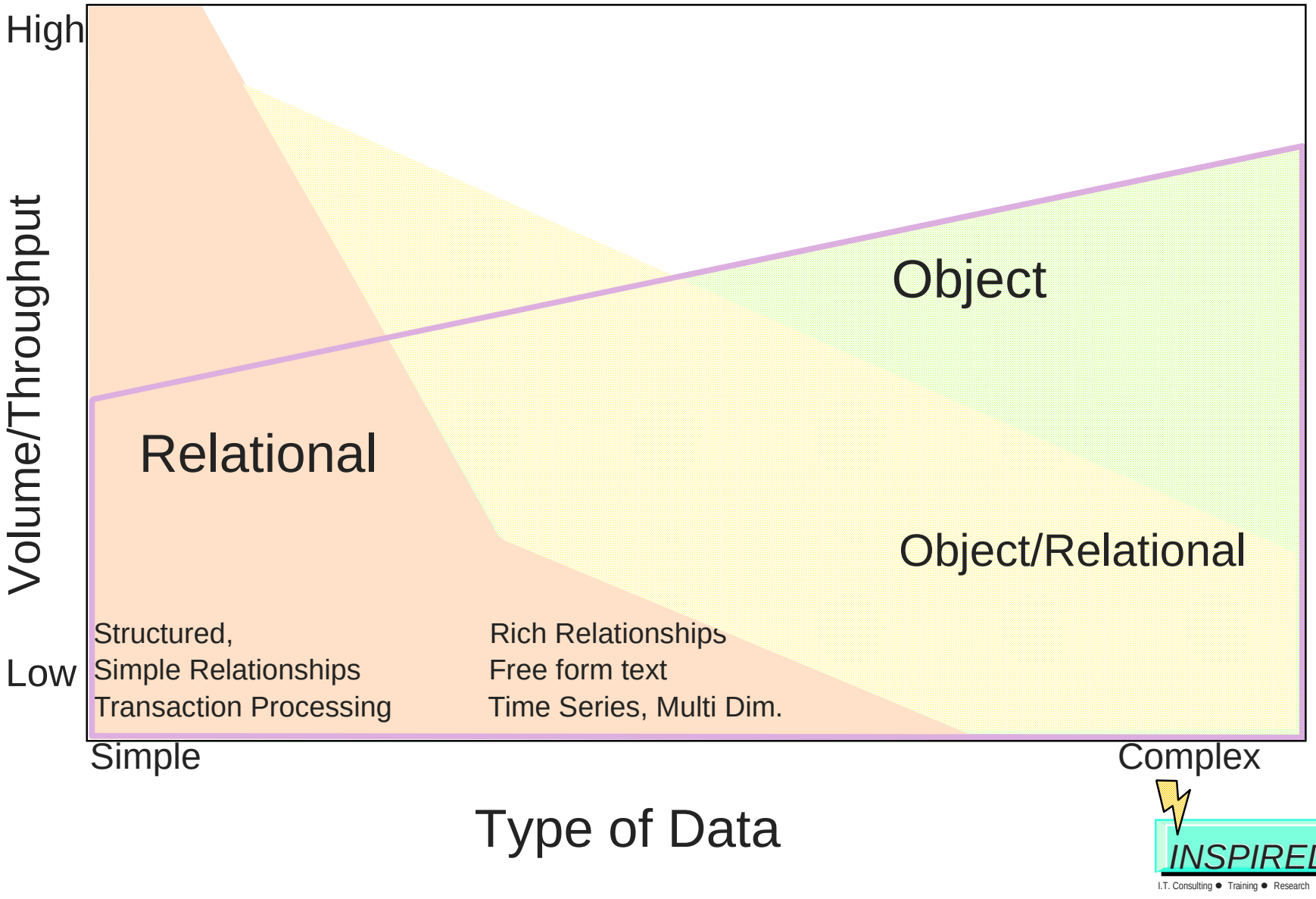
Parking the *Car* Object in a Relational Garage



- Requires either:
  - Specialists to assist the driver
  - An extremely technically competent driver
- And lots of time...!

INSPIRED
I.T. Consulting ● Training ● Research

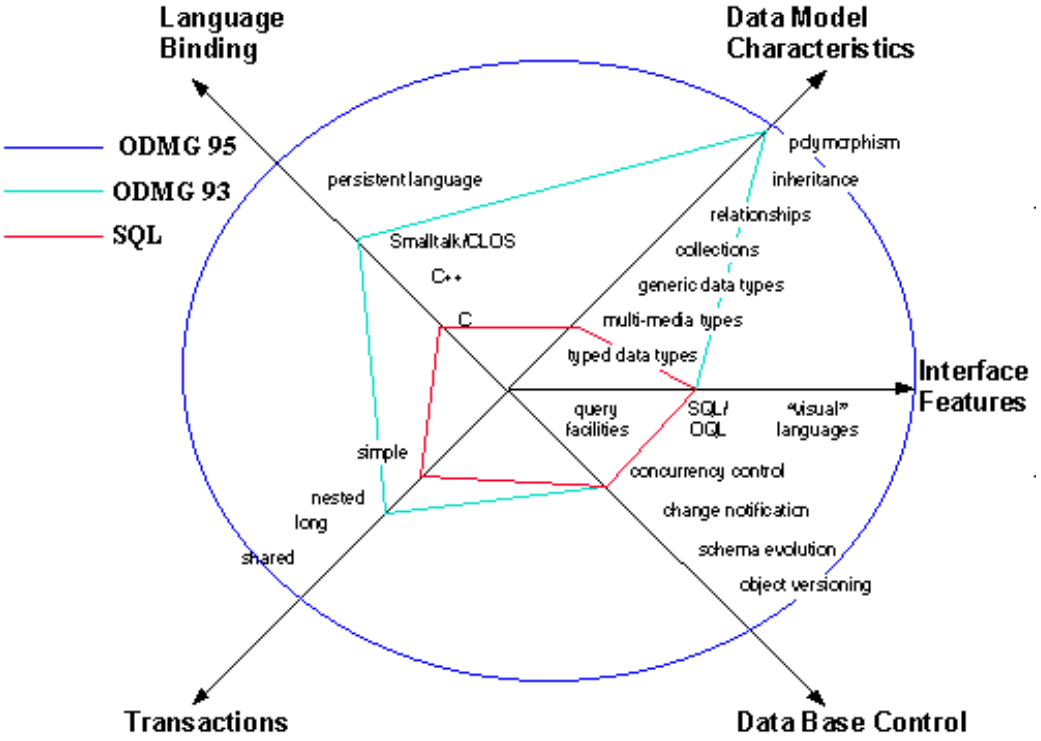
Suitability to Task



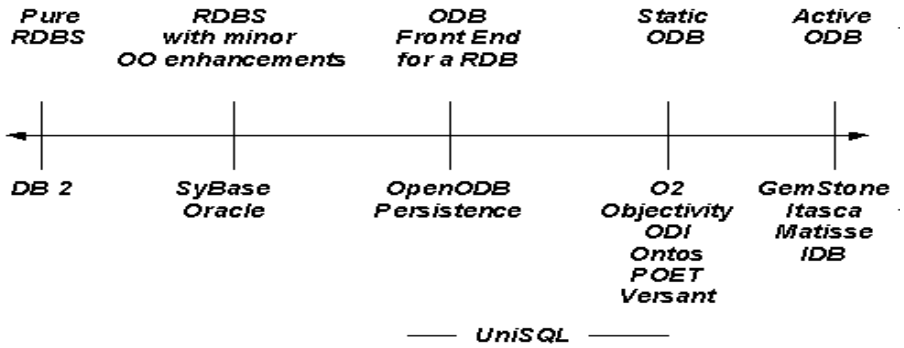
INSPIRED
I.T. Consulting ● Training ● Research

Database Capabilities Compared

- Diagram at right compares the ODMG'95, ODMG'93 and SQL 2 standards



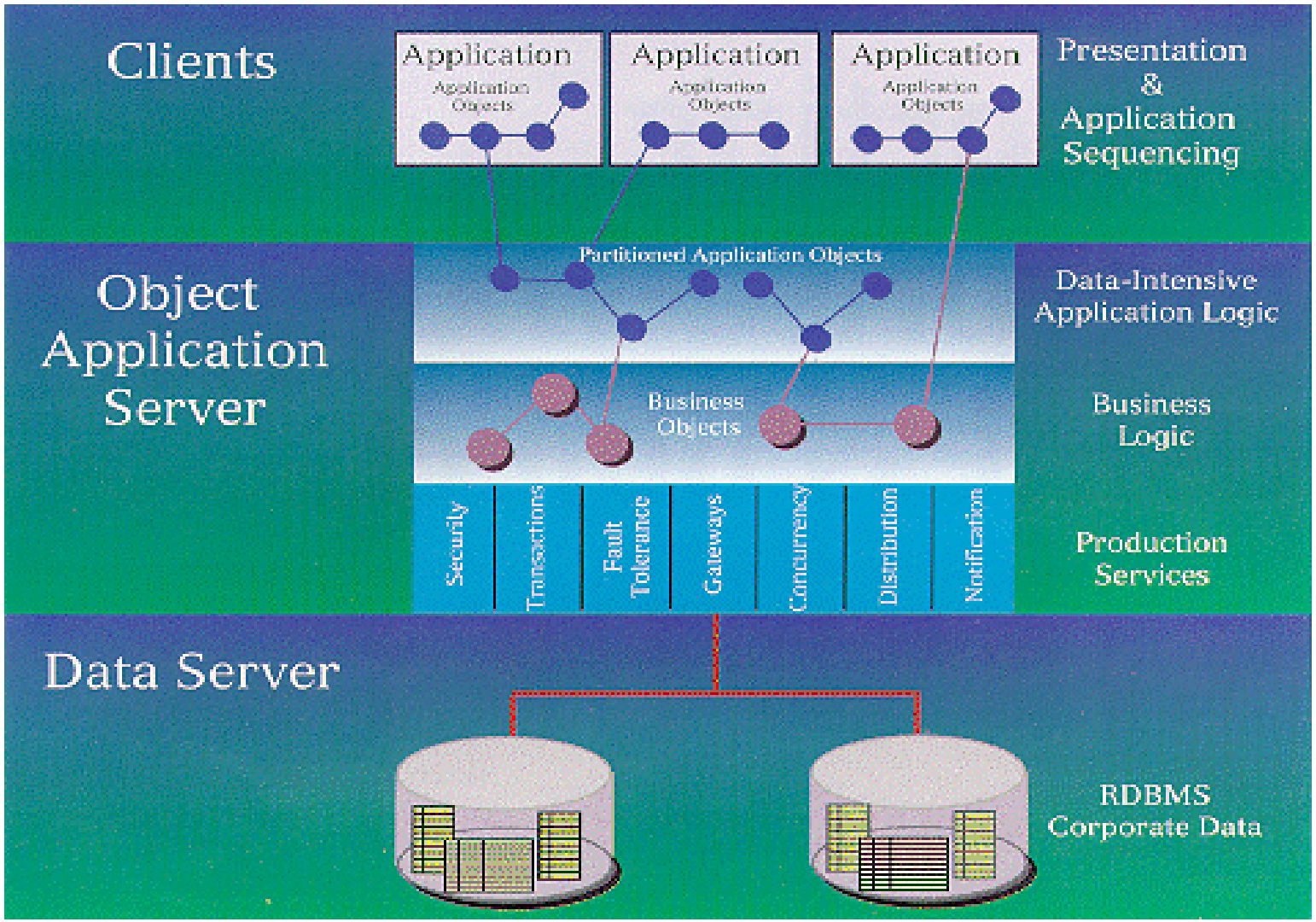
- Continuum below shows progression in features of commercial products



Source: Object-Oriented Strategies, August 1993
(c) Harmon Associates

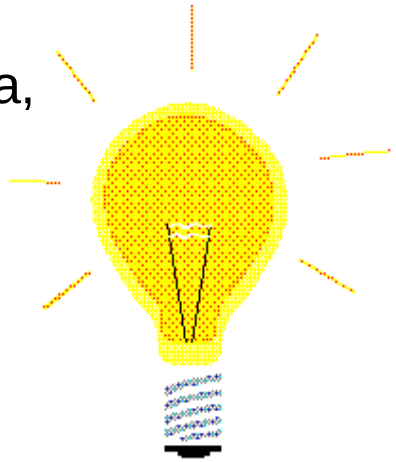
INSPIRED
I.T. Consulting ● Training ● Research

Gemstone Architecture



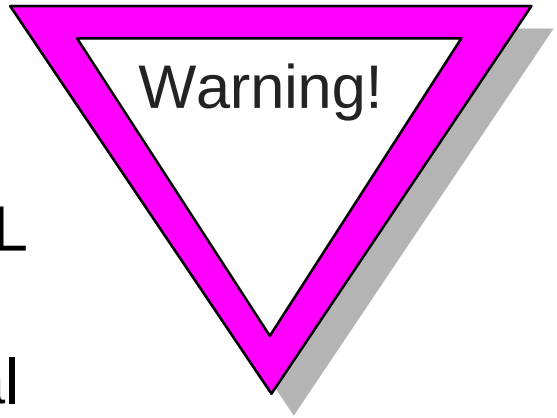
Object DB Strengths

- Allow inclusion of more semantic information in the database - better "real world" modelling
- Better support for complex objects e.g. CAD, Multimedia, Repositories
- Extensible types increase functionality and allow higher abstraction
- Use technological improvements in computers (fast CPU's, memory, cacheing - very high performance)
- Versioning easily supported
- Reusability - faster, high quality development; easier maintenance
- Inheritance eliminates design redundancy - speeds development
- Can implement relational view as one of many models
- No "impedance mismatch" between programming and database language

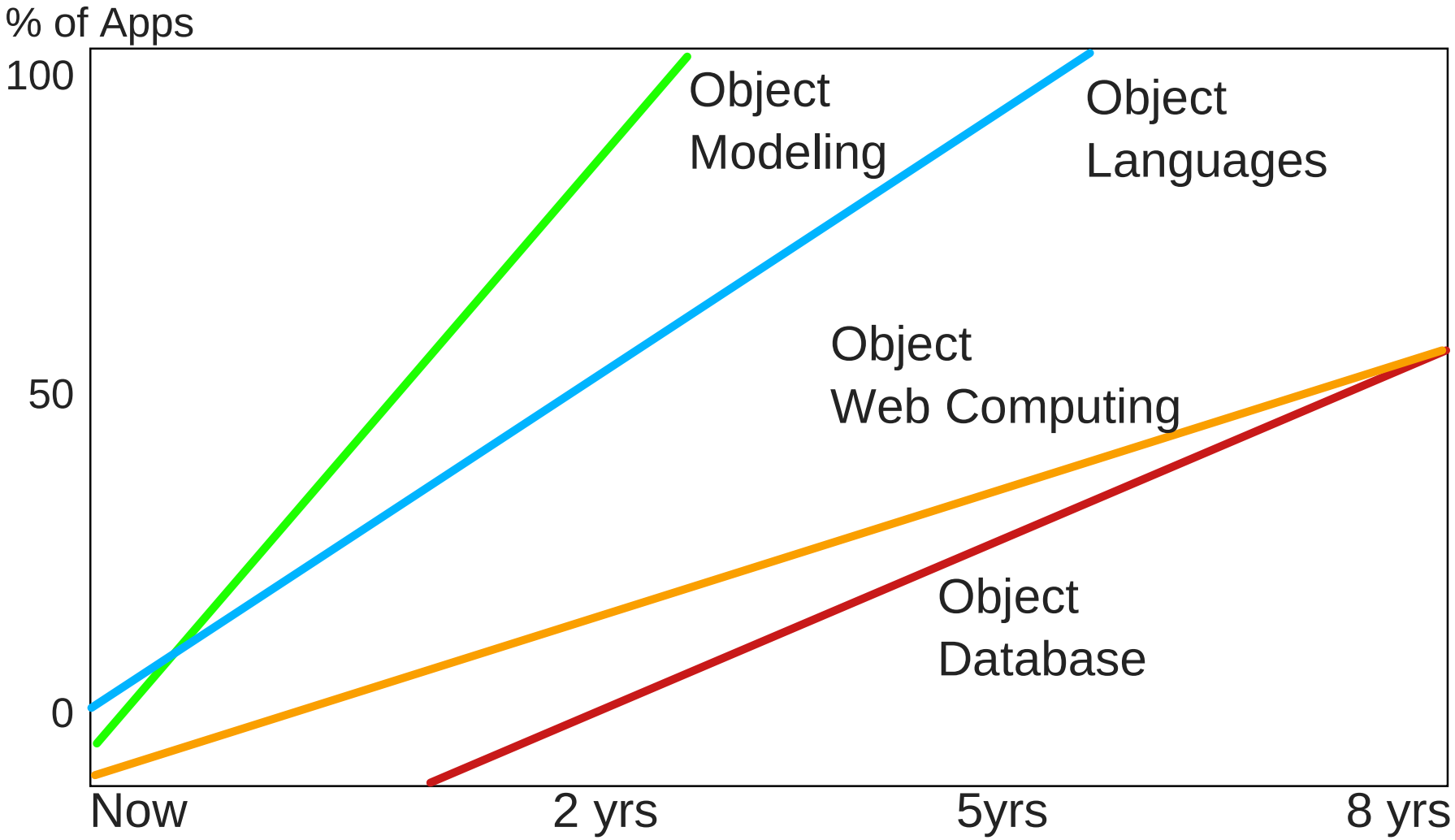


Object DB Weaknesses

- New technology - not necessarily mature, no clear market dominant products
- Lack of standards - vendor lock in (ODMG making progress...)
- Vendors relatively small - strategically risky
- Lack of formal theoretical model
- "Pointers" come in for criticism (not really valid)
- No standard ad-hoc query language (OQL already there, SQL/3 draft complete)
- Steep learning curve - inhibits commercial use
- Lack of pool of skills in the marketplace

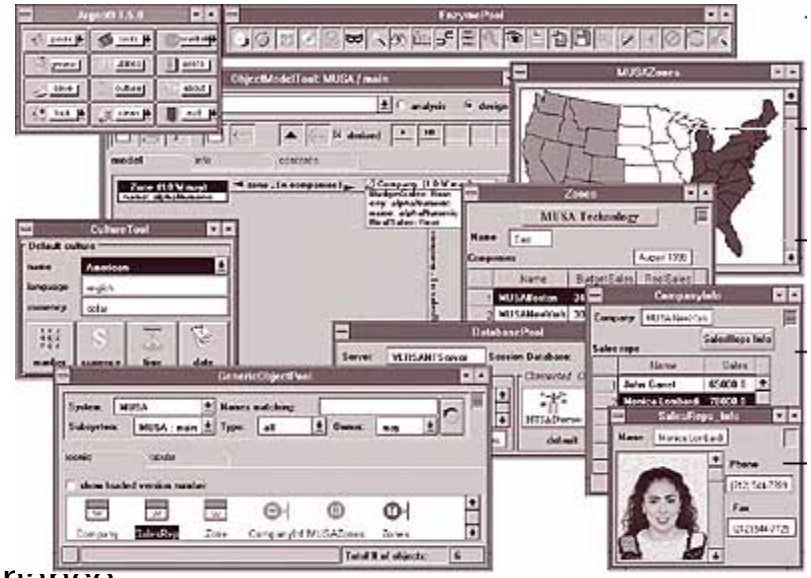


Transition to Object Technology



INSPIRED
I.T. Consulting ● Training ● Research

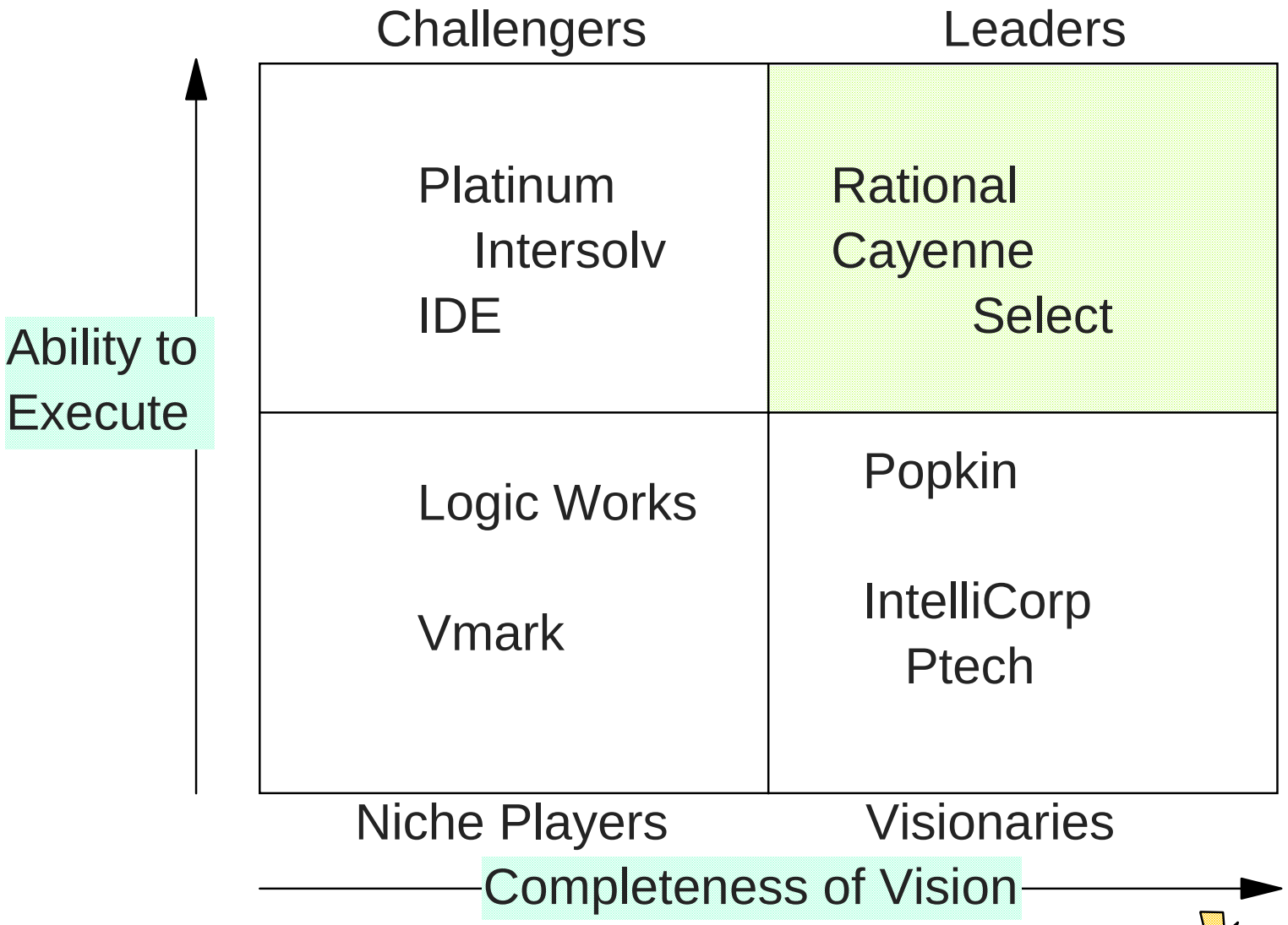
Integrated CASE



- Integrated CASE environments aim to
  - Support the full lifecycle including code generation
  - Support sophisticated modelling with cross checking and a central shared repository
  - Support multiple developers, multiple concurrent projects
  - Target multiple delivery environments
  - Accelerate development and simplify maintenance
- Record shows some spectacular successes, many spectacular failures
- Success requires
  - Management commitment
  - Significant investment (>R35 k per seat)
  - Strong discipline and consistent methodology
  - Technically superior and well integrated product
  - High technical skills
  - Round Trip Engineering Capability

INSPIRED
I.T. Consulting ● Training ● Research

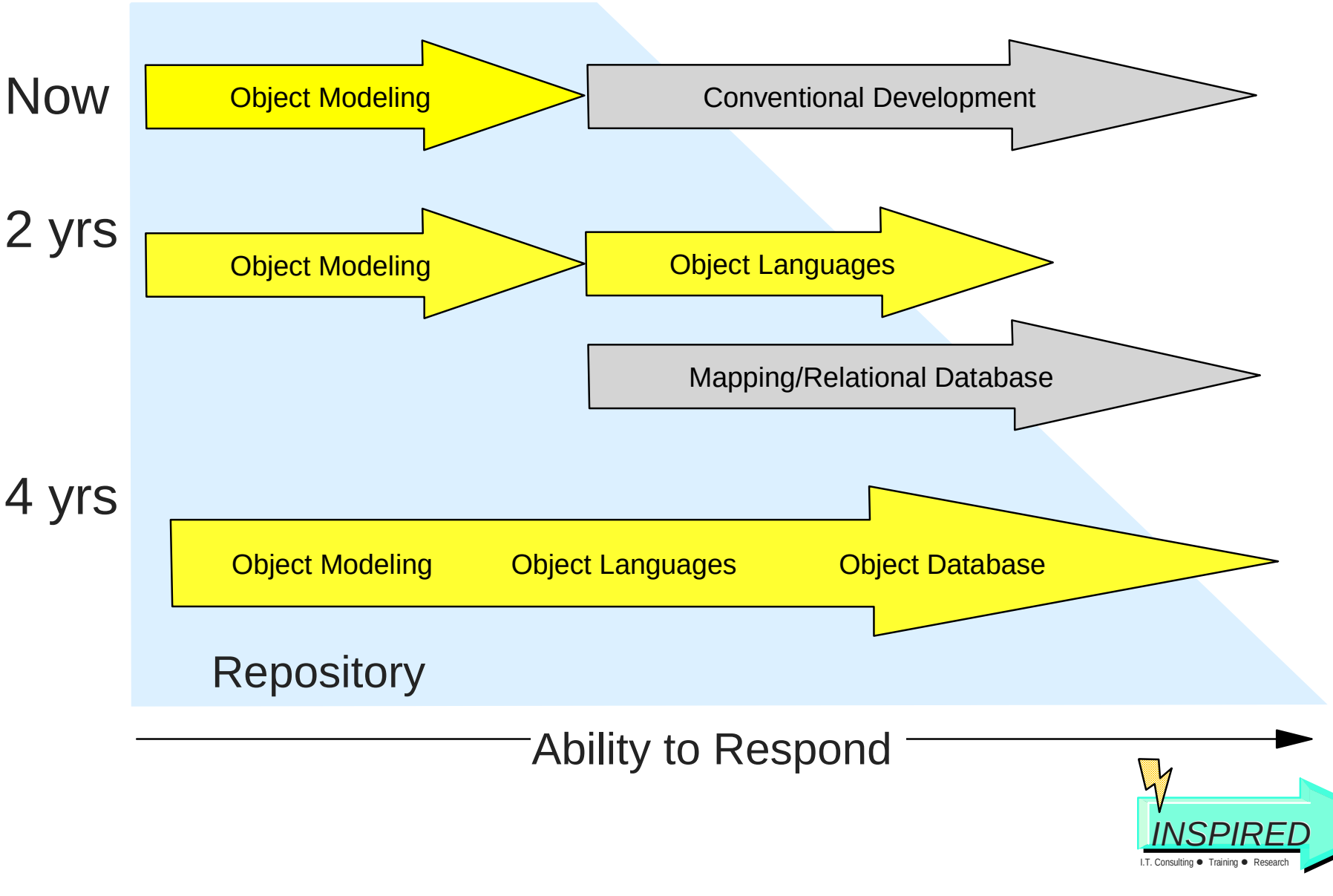
CASE Product Positioning



Source: Gartner Group - May 1996

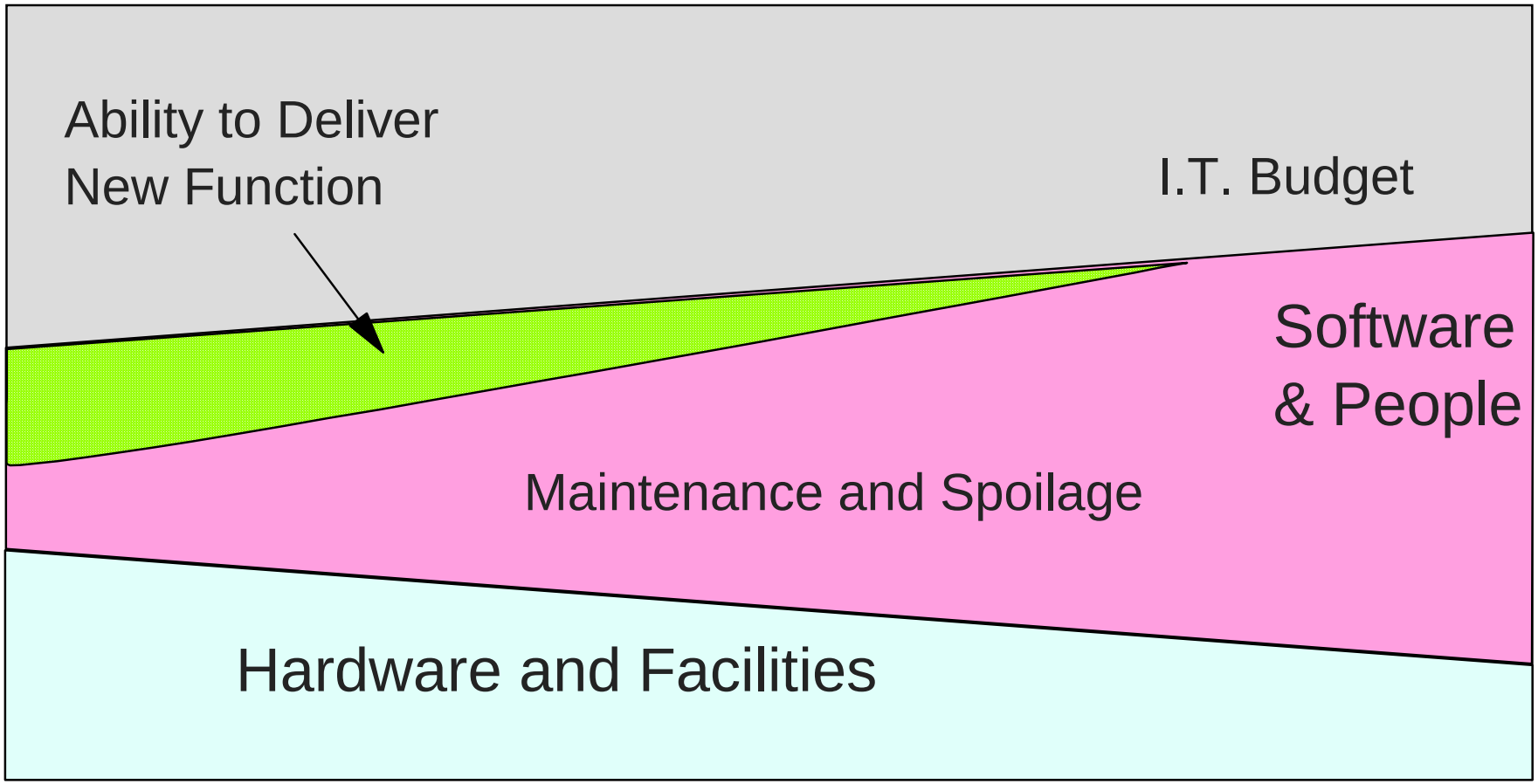
INSPIRED
I.T. Consulting ● Training ● Research

Migration with CASE



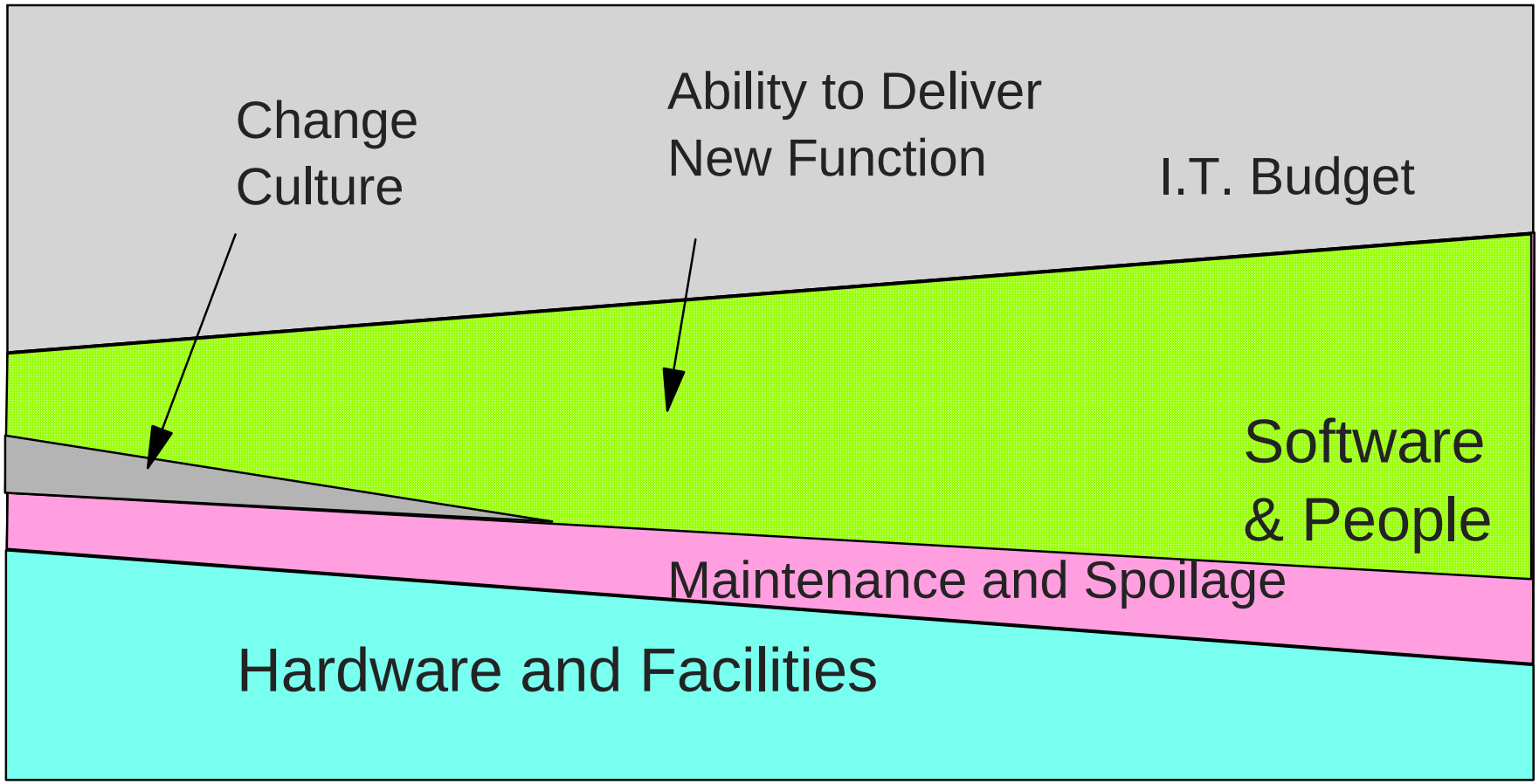
INSPIRED
I.T. Consulting ● Training ● Research

Problematic Quality



Time

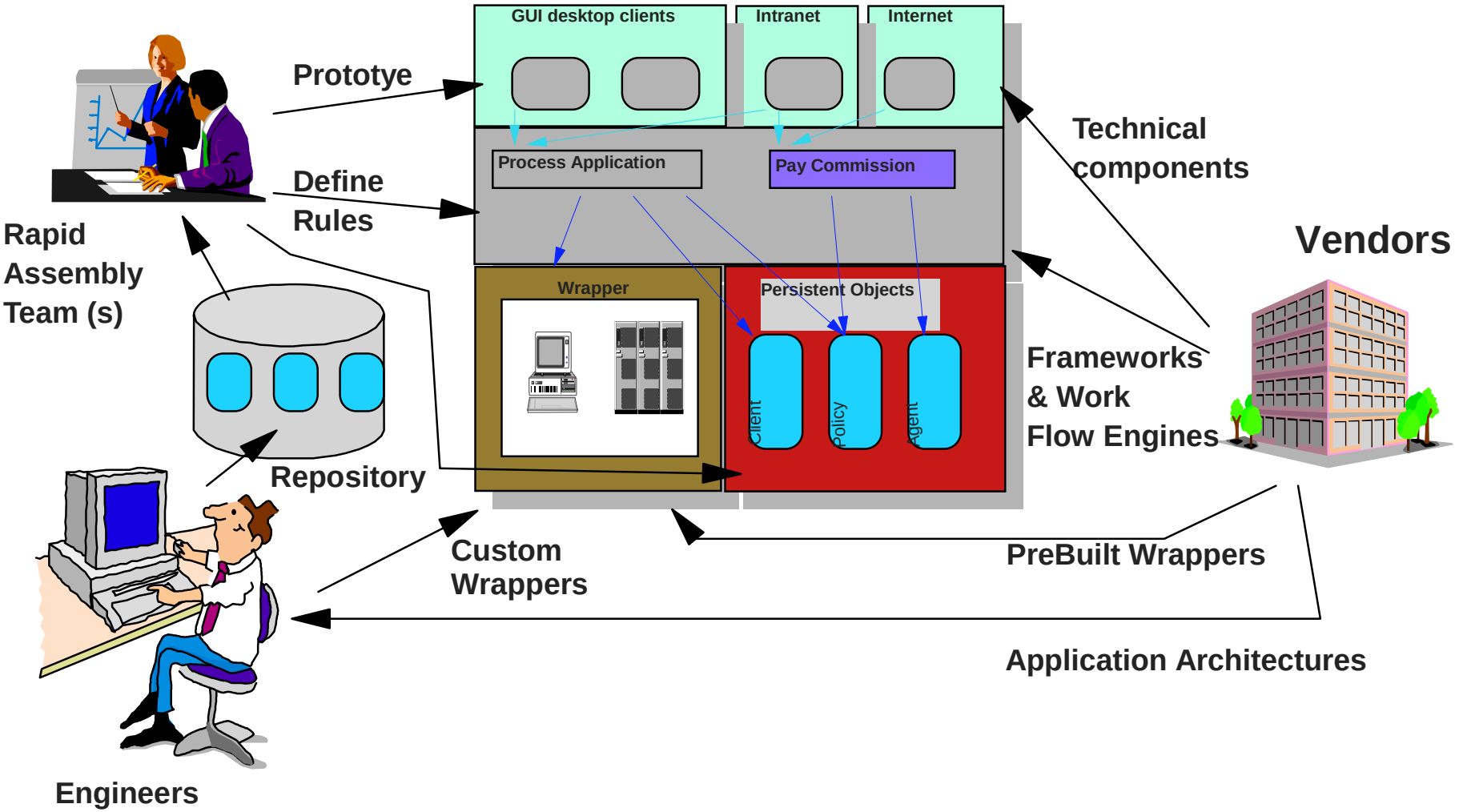
Improving Quality



Time

INSPIRED
I.T. Consulting ● Training ● Research

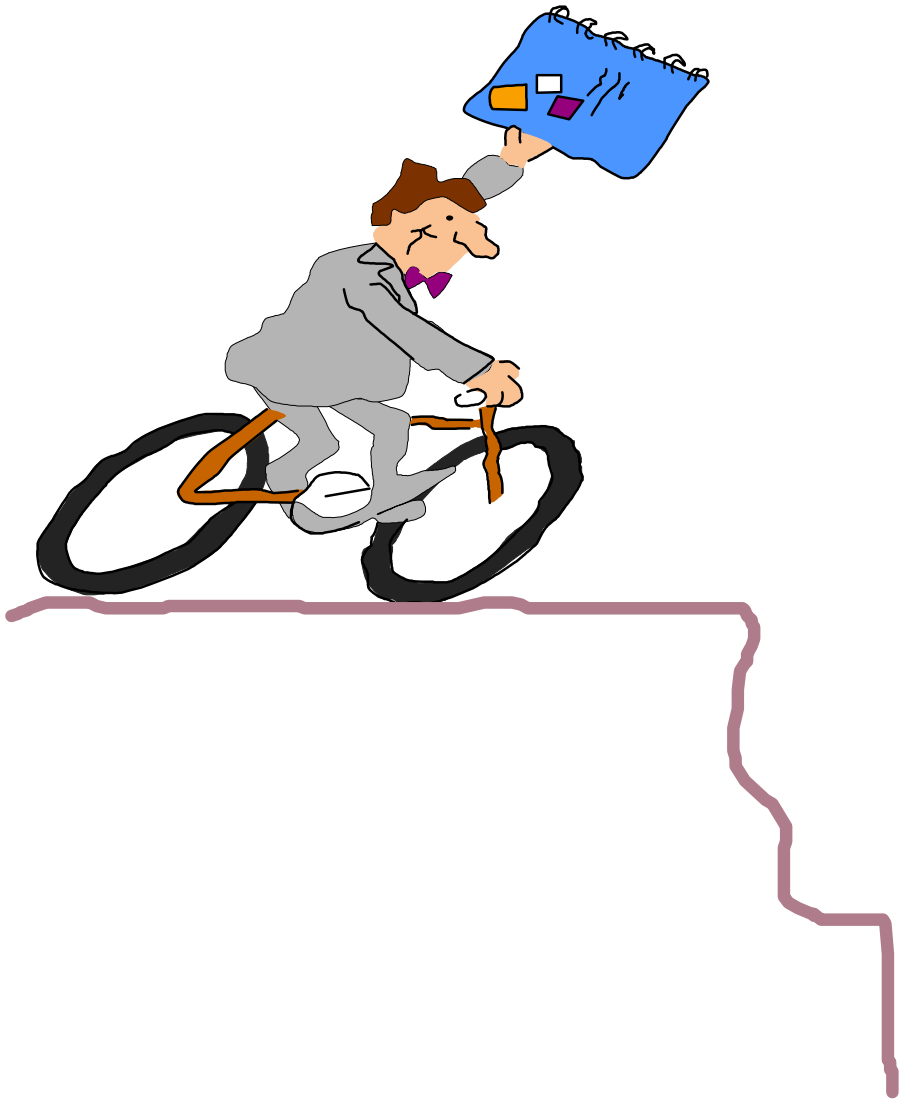
The big picture



INSPIRED
I.T. Consulting ● Training ● Research

No silver bullets

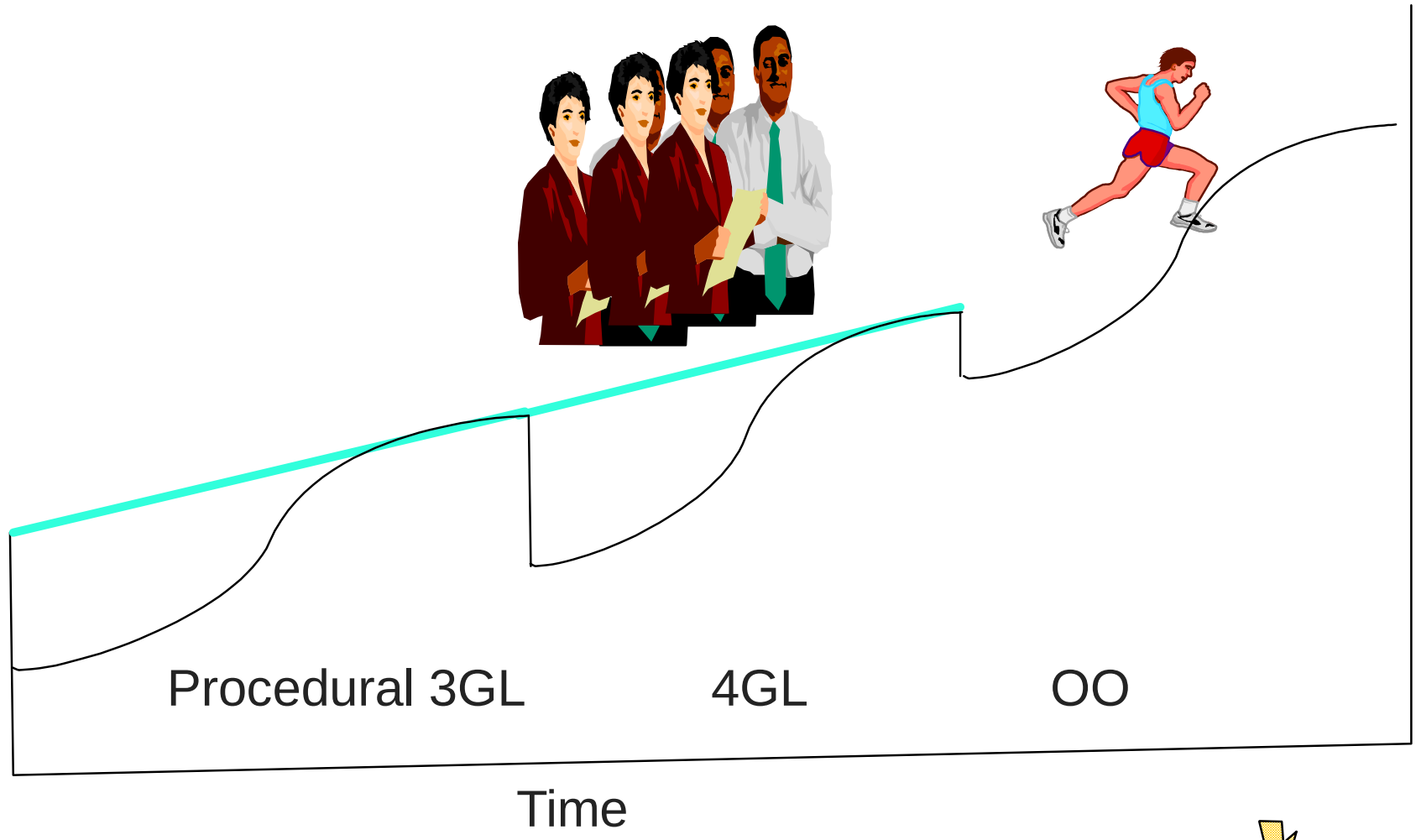
- A fool with a tool is still a fool...



Critical Success Factors

- Business Objects not Widgets
- Architecture
- Standards
- Horses for courses
  - & Jockeys for horses
- Skills
- Methods, Model driven development
- Object Database or insulation from mapping
- Quality Focus
- "Fitness" requires ongoing training
- "Here comes Edward Bear now: Bump, bump, bump on the back of his head, down the stairs. It is, as far as he knows, the only way of coming downstairs. If only he could stop bumping for a minute he might just be able to think of another way."

Transition Management



INSPIRED
I.T. Consulting ● Training ● Research

Unified Modeling Language

Most of the integration work done at

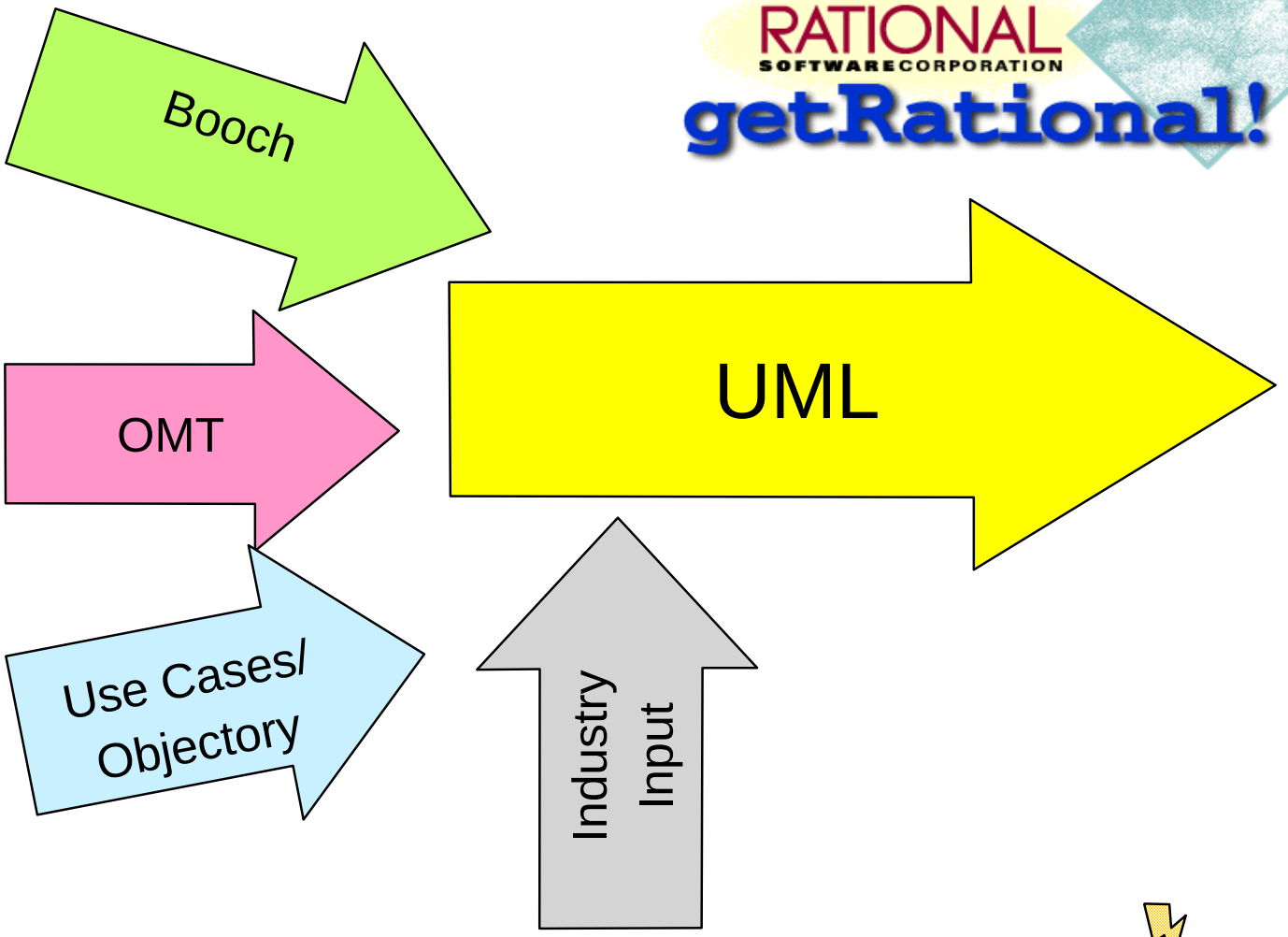
RATIONAL SOFTWARE CORPORATION

getRational!

Grady Booch

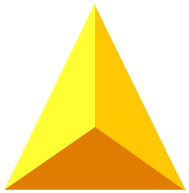
James Rumbaugh et al

Ivar Jacobsen



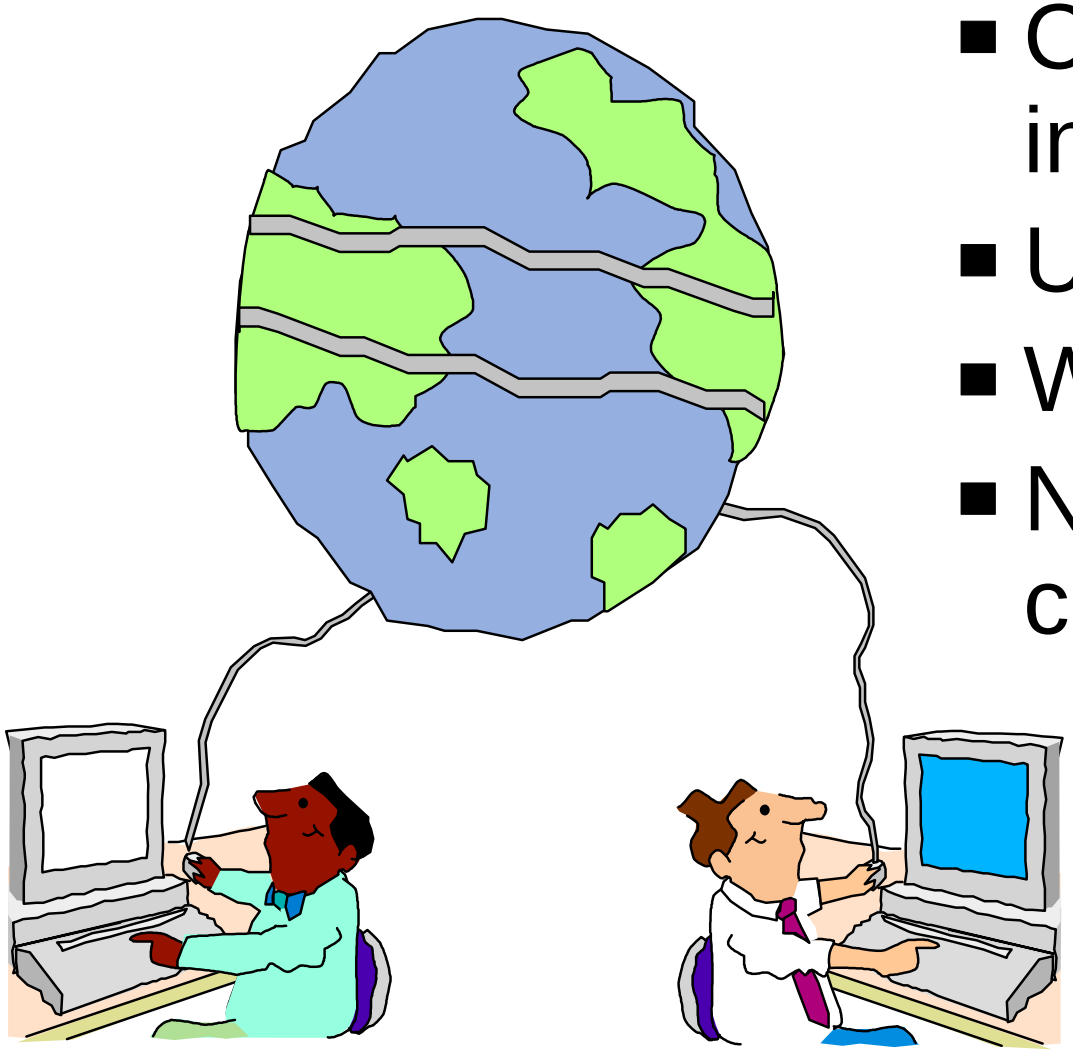
INSPIRED

I.T. Consulting ● Training ● Research



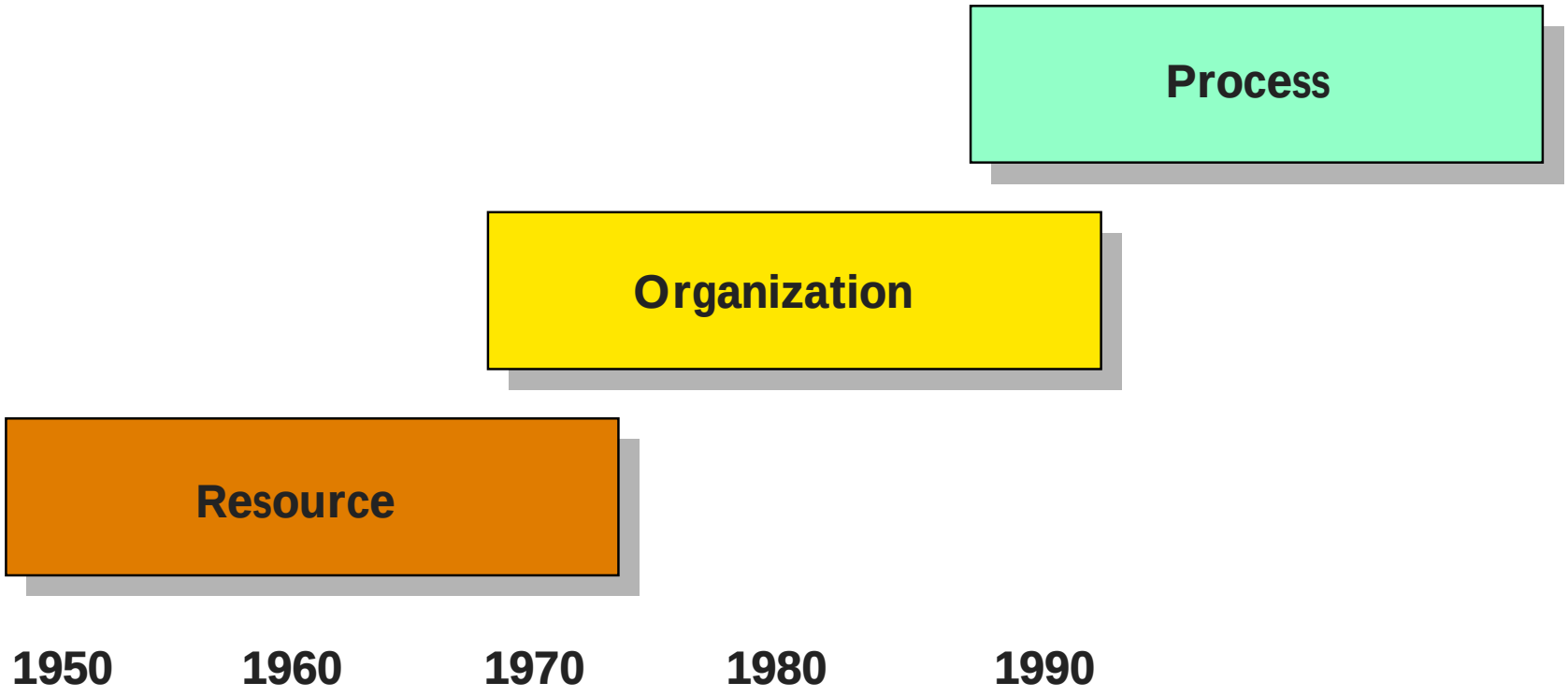

INSPIRED
I.T. Consulting ● Training ● Research

The Internet



- Cheap infrastructure
- Ubiquitous
- World wide reach
- Network computing
  - Single Model
    - Internal
    - External

Generations of Business Engineering



Process engineering focus

- Simplifying operations
- Reducing cycle times
- Customer Orientation
- Increasing added value
- Cutting costs
- Improving reliability
- Tightening vendor relationships
- Focusing on core competencies

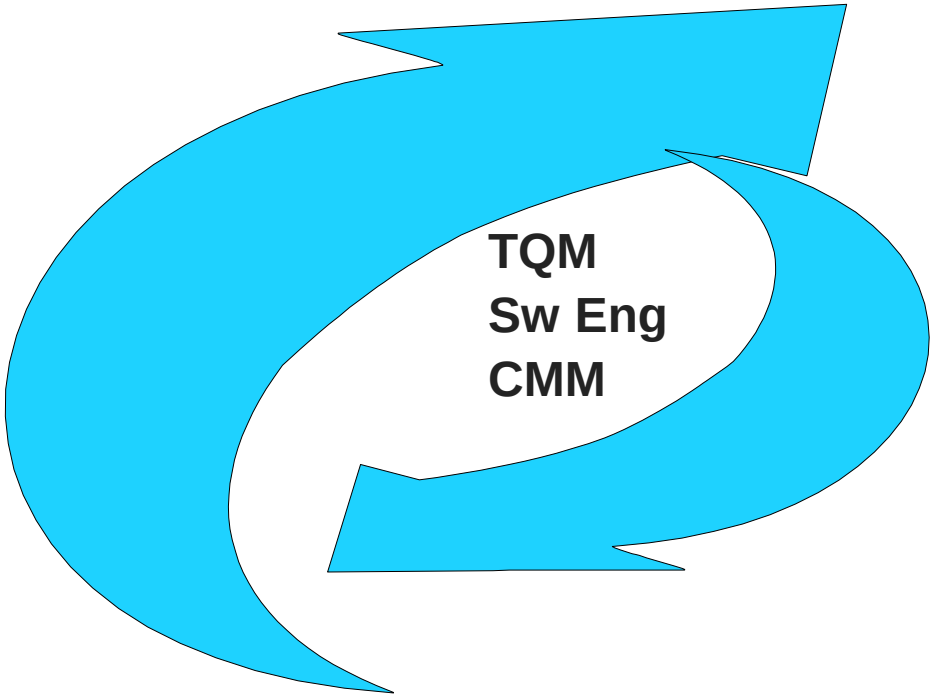
Innovation

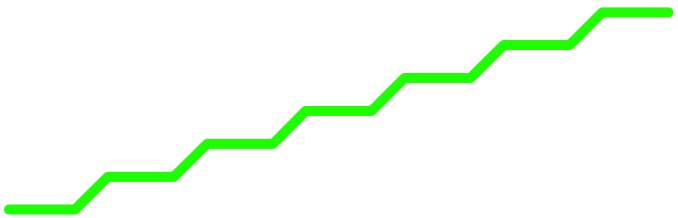
- New Ideas
- Radical
- *n* x change
- Unreliable
- Invasive
- High Risk
- "Western"

INSPIRED
I.T. Consulting ● Training ● Research

Continuous Improvement - *Kaizen*

- Slow, incremental improvements
- .*n* times improvement
- Reliable
- Not disruptive
- Sustainable



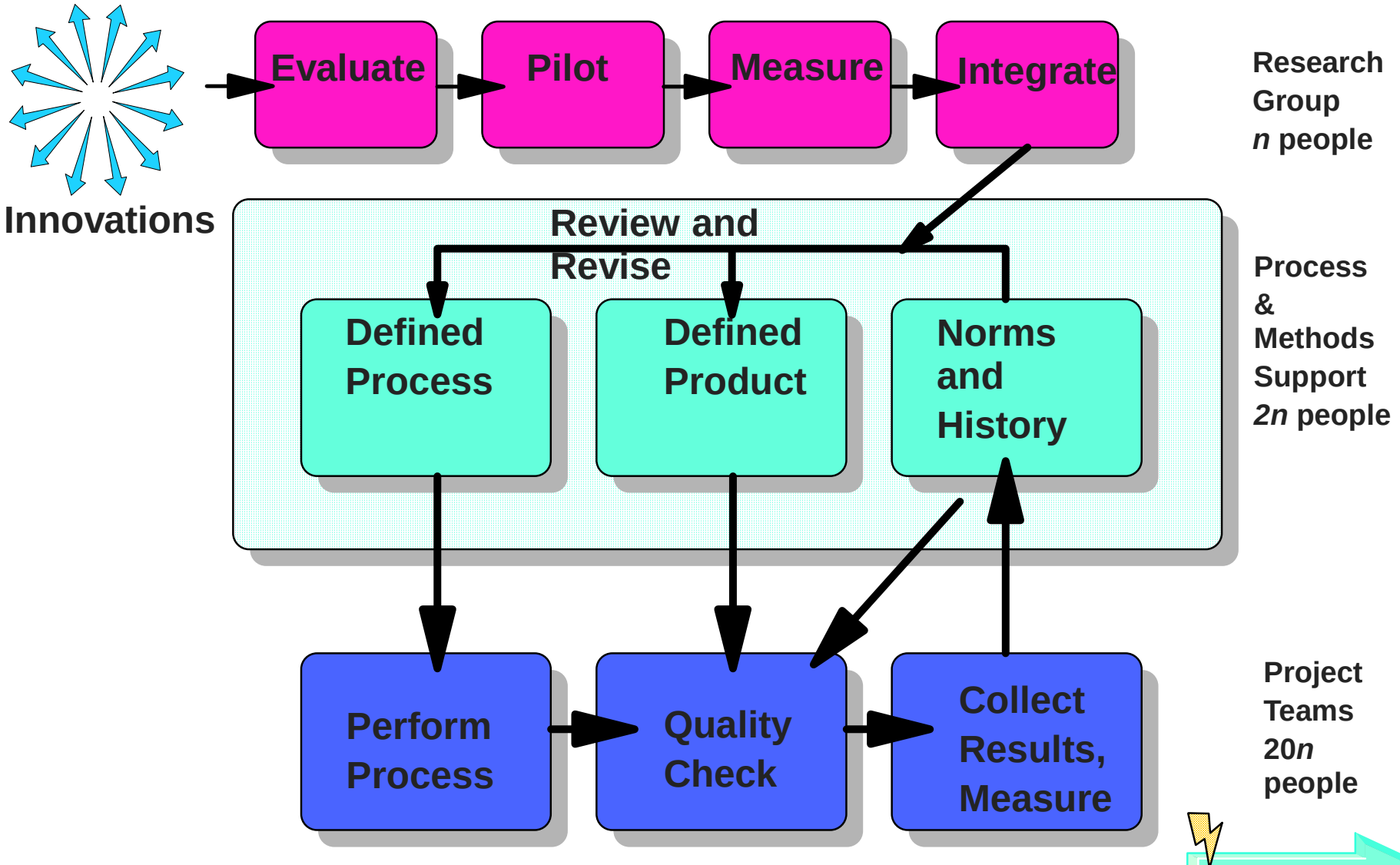


Combining for sustainable, rapid improvement

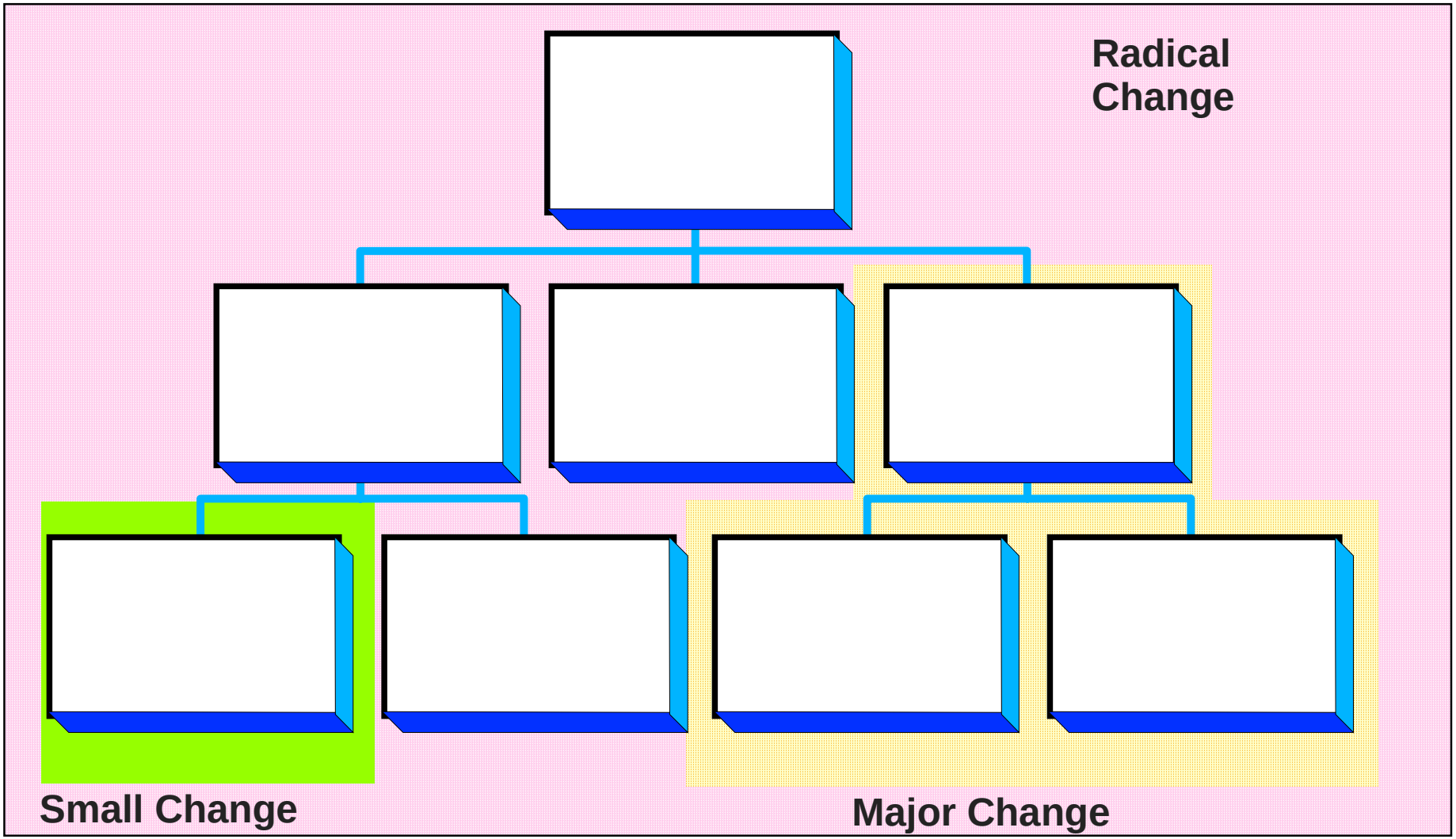
- One-time radical change leading to..
- Framework
- Innovation in isolated cells
- Kaizen in cells and in overall process
- Prove innovations via pilot before deployment

INSPIRED
I.T. Consulting ● Training ● Research

Sustainable Innovation Model

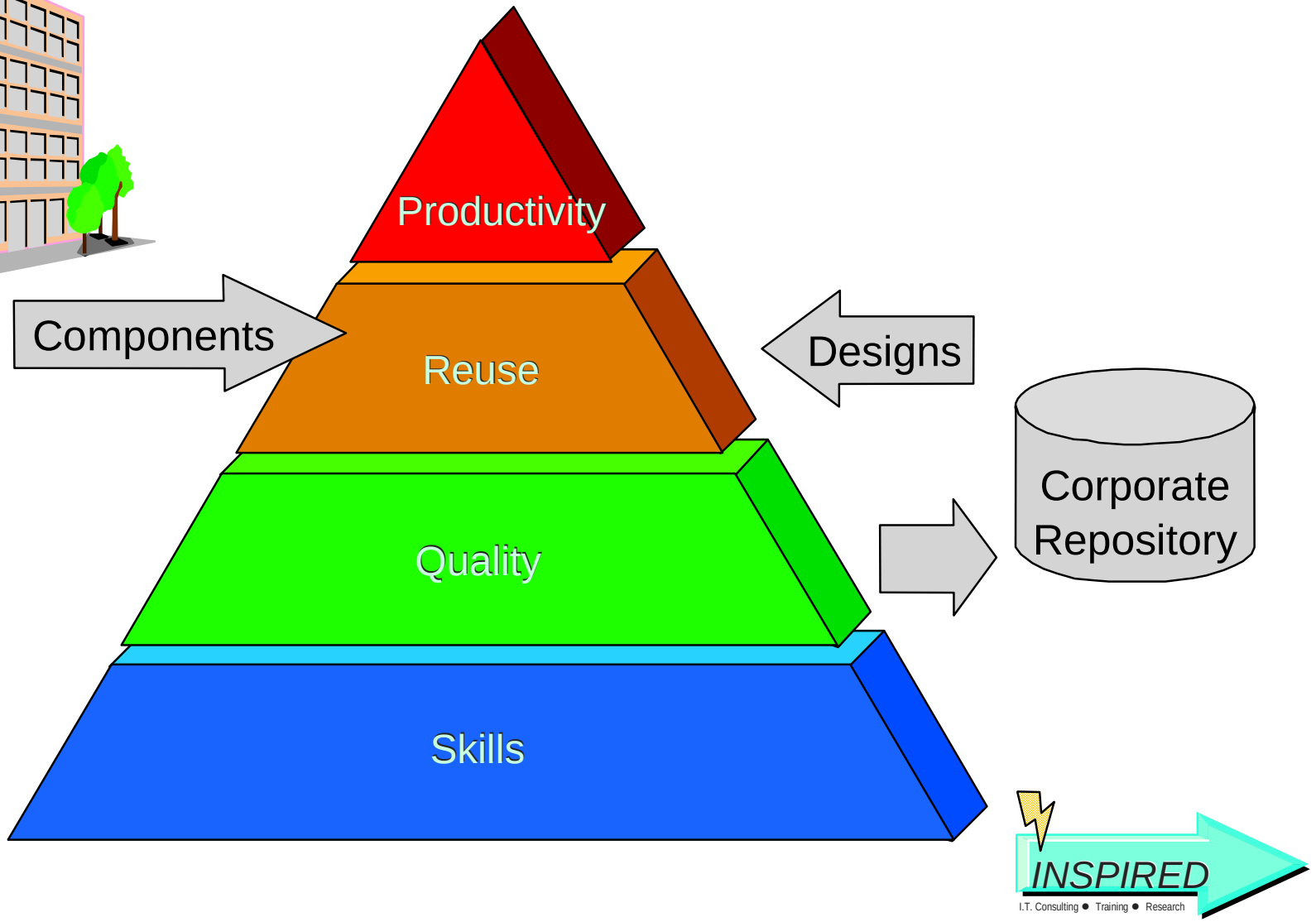


Architecture and Chunked Processes allow choice of strategies



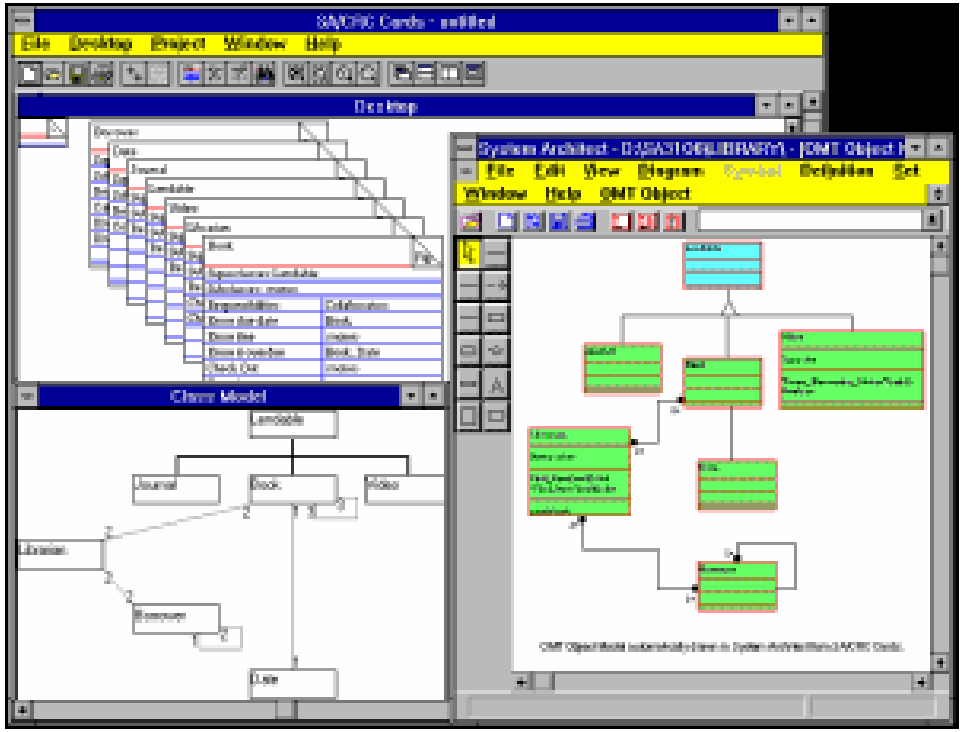
INSPIRED
I.T. Consulting ● Training ● Research

Sustainable Productivity



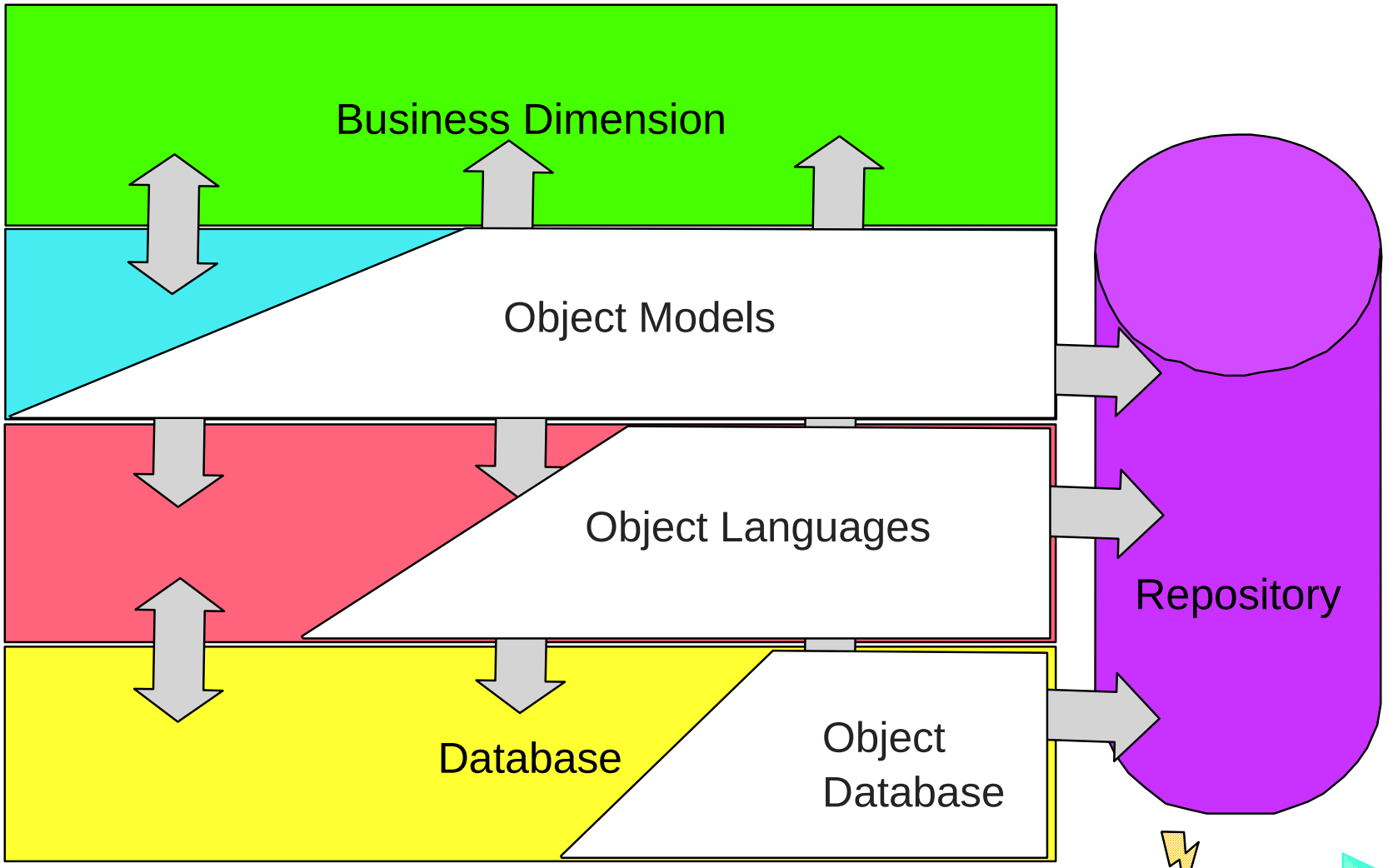
Integrated CASE continued

- Some High End Products
  - SEER Archetype (Object Based)
  - Sapiens, Ideo, Object Pool (fairly OO)
  - Texas Instruments IEF (Not OO)
- Middle tier products
  - Paradigm +
  - Rational Rose
  - Select
  - System Architect
  - ProVision
- Most popular methods
  - OMT, Booch, Jacobson (UML)
  - Martin/Odell
  - Schlaer Mellor
  - Fusion
- Code Generation
  - Most support C++, Smalltalk, Java growing
- Look for round trip engineering



INSPIRED
I.T. Consulting ● Training ● Research

Object Models & Repository facilitate migration



INSPIRED
I.T. Consulting ● Training ● Research