The Architecture Enablers of the Architecture for AI

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IDC Model of Strategic Architecture

Platform architecture defines the digital business platform for your organization by refining and adapting IDC's conceptual DX Platform.

Technology architecture manages hybrid environments that support modern design with a migration to the cloud and to the edge.

Security architecture balances the practices of identity, vulnerability, and threat management with the ideas of digital ecosystem trustworthiness.

Business architecture gives objectivity, consistency and transparency to DX scenario exploration, analysis, planning, and execution.

Performance architecture creates an environment for continuous measurement in support of insights and business architecture

Information architecture facilitates value by combining data sources across the enterprise to multiply innovation

Application architecture guides this paradigm toward enterprise-wide value. Microservices will be the implementation strategy for the next decade.

Desired Architectural Outcomes

Innovation

Architecture should not get in the way of innovation. Too often, great ideas encounter the barriers of business rules and system complexity and inflexibility

Reusability

Reusability supports agility. Reusability implies common services. Reusability of common services simplifies architecture. Complexity is the enemy of both agility and operational excellence

Replaceability

Our environment is defined by a rapid pace of change and uncertainty. An architecture that lowers switching costs improves adaptability and agility

Purpose

Purpose defines where we focus innovation and where we rely on the innovation and invention of others

A Trip Down Memory Lane

Tracking the elements of strategic architecture through the phases of enterprise technology

Pre-Virtualization / Internet

Element	Condition	Disruption
Business Architecture	Mostly Non-Existent	Not until SMAC
Performance Architecture	Compute and Storage Monitoring	Not until Virtualization / Internet
Information Architecture	Internal, transactional data	Not until SMAC
Application Architecture	Initially home-grown, transaction processing	ERP
Security Architecture	A lock on the server room door	Not until Virtualization / Internet
Technology Architecture	Compute, Storage and LAN	Not until Virtualization / Internet
Platform Architecture	Non-existent	Not until all of the above

Slow pace of change

Low degree of uncertainty

Virtualization / Internet

Element	Condition	Disruption
Business Architecture	Mostly Non-Existent	Not until SMAC
Performance Architecture	Compute, Storage and Network Monitoring	Next comes SMAC
Information Architecture	Internal and external transactional data	Next comes SMAC
Application Architecture	Large shift to COTS. ERP, CRM, et cetera	Next comes SaaS
Security Architecture	Threats and mitigation. Becomes a category	Next comes SMAC
Technology Architecture	Abstracted workloads from physical servers	Next comes Cloud (IaaS, PaaS)
Platform Architecture	Early versions of hybrid	Next comes SMAC

Increasing pace of change

Medium degree of uncertainty

SMAC

Element	Condition	Disruption
Business Architecture	The digital business	Now a category
Performance Architecture	Compute, Storage, Network, Applications, Integrations, Et cetera	So many options creates its own complexity and uncertainty
Information Architecture	Internal. External categories explode. BI tools.	Digital breadcrumbs from multiple sources. Data validation, engineering and processing. **Now enough data for AI but with barriers**
Application Architecture	ERP, CRM, etc but add specialized applications. CIO as CTO	Thousands of options
Security Architecture	Explosion of threats	Threat categories, regulation, compliance
Technology Architecture	Abstracted workloads to anywhere	IaaS, PaaS, hybrid, edge. **Now enough compute for AI but with barriers**
Platform Architecture	Now a category	Complexity and uncertainty

Rapid pace of change

High degree of uncertainty

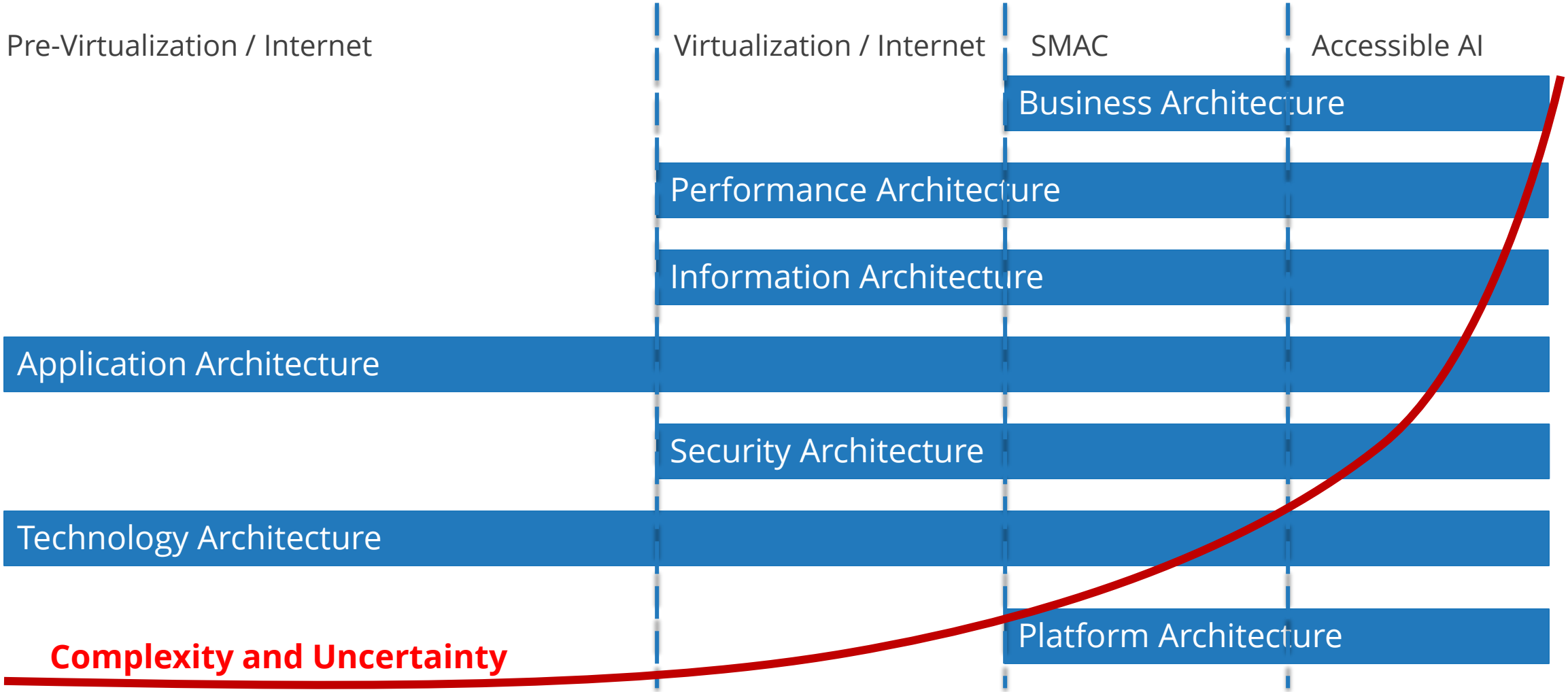
Accessible AI

Element	Condition	Disruption
Business Architecture	Automation, assistants, knowledge create opportunities	LLM + ML + Automation + NLP
Performance Architecture	Automation and assistants	LLM + ML + Automation + NLP
Information Architecture	Increased reliance on data. Increased need for data and model validation	LLM + ML + Automation + NLP
Application Architecture	AI-assisted transactions and intelligence	Embedded AI in everything
Security Architecture	New threat categories. New tools.	AI-assisted threats and tools. Quality fakes
Technology Architecture	Now includes AI processing and deeper reliance on uncertain services	LLM + ML + Automation + NLP
Platform Architecture	Convergence of Pre-AI and AI worlds	Complexity and uncertainty

Crazy pace of change

“Cloud of Dust” uncertainty

Graphically



Elements of AI Architecture

Some are new and others are extensions of our SMAC Information Architecture

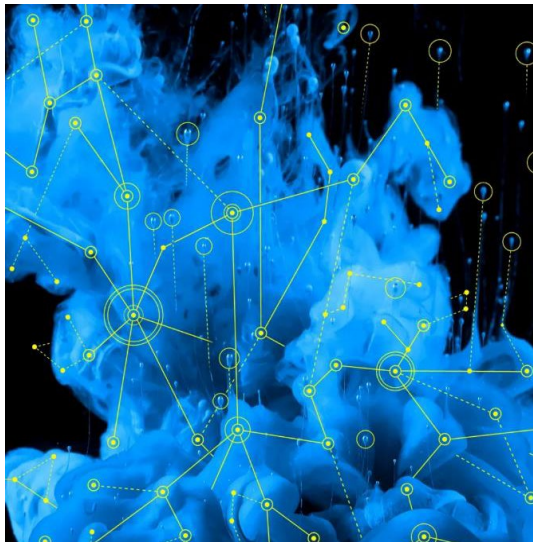
Data Collection
Data Preprocessing
Feature Extraction
Model Training
Model Evaluation
Inference
Feedback Loop
Infrastructure
Deployment
Monitoring and Maintenance
Ethical Monitoring

Extends to how our providers are using / training AI

Enablers of AI Architecture

Recall the desired outcomes:

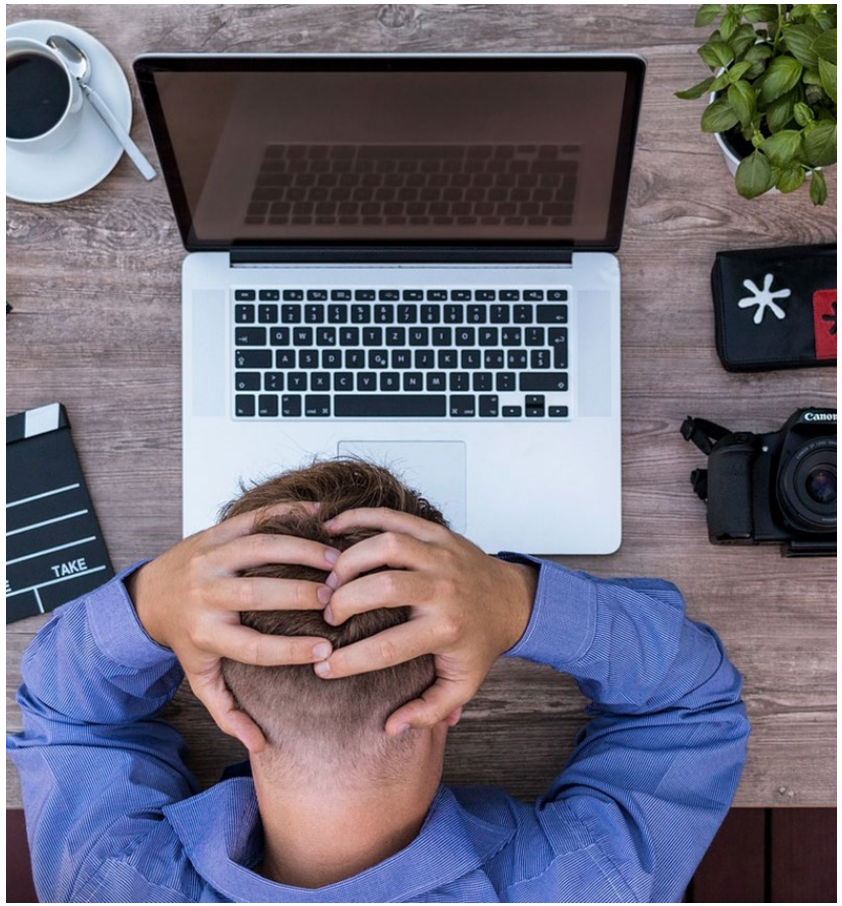
- Innovation
- Reusability
- Replaceability
- Purpose



How do we enable that in our “cloud of dust” and crazy pace of change environment?

- Modernization (make it a standard , ongoing part of the prioritized portfolio)
- Business Value Model – to handle uncertainty and complexity including risks
- Purpose Alignment Model – focus invention where it creates competitive advantage
- Processes for Data and Model Validation – the extensions of Strategic Architecture

Modernization Candidates



Based on Degree of Difficulty

- What reduces agility? What increases time to respond?
- What costs too much effort and money?
- Which are orphan technologies (an orphan technology no longer aligns with strategic architecture, is no longer well-supported, has no upgrade or enhancement paths, etc.)?
- What has cybersecurity/privacy gaps and vulnerabilities?
- What is a nightmare (too much time, effort, and money) to update, maintain, or enhance?
- What is fragile and brittle (brittleness is evident when a change to one part of the system breaks a supposedly unrelated / unconnected part of the system)?
- What requires rare or hard-to-find skills?

The R's and D's of Modernization

The R's	The D's
Replace with something new	Decompose / Decouple and replace the decoupled parts
Retire (and do not replace)	Decompose / Decouple and do not replace the decoupled parts
Retain but contain	Decompose / Decouple and retain but contain the decoupled parts
Retain but fix (so that it will not break)	Decompose / Decouple and fix the decoupled parts
Retain but refactor / enhance	Decompose / Decouple and refactor / enhance the decoupled parts

Business Value Model

Example Considerations:

- Market window
- Flexibility
- Complexity risks
- Uncertainty risks (amplified in times of rapid change)
- Time to value
- Future capability
- Competitive environment

Decision

Costs and Benefits:

If they can be quantified (otherwise, they are Considerations)

Size and Prioritize

Using the Business Value Model

Use the model to define the elements of the “value case”

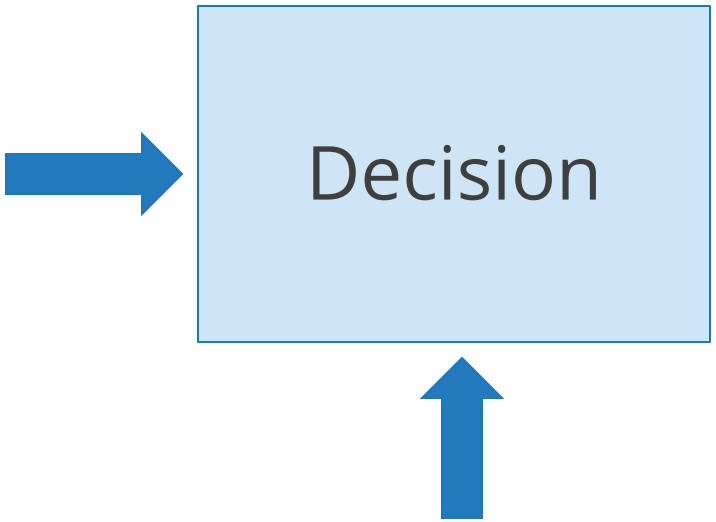
Use the model to identify the categories and scope of risks (uncertainty and complexity) and the path to reduce the risks

An example

- Hypothesis: We can build an AI model that identifies “at-risk” customers. We can build an AI model that determines which offer will retain that customer. We can build a GenAI model that synthesizes the response to the “at-risk” customer
- What is quantifiable in this hypothesis?
- What is a consideration?
- What are the sizes of the considerations?
- What experiment can we do to validate the business case and reduce uncertainty and complexity risks?

Business Value Model

- Do we have the data to build the models?
  - Indications of a straying customer
  - Ability to segment customers
  - What offer will retain that customer segment?
- What is the cost of building these models?
- Do our current systems support this?



Costs and Benefits:

The cost of a lost customer

The cost of the offer that retains the customer

Given This Situation and the Uncertainties . . .

What might be our next steps?

Purpose Alignment

Focuses innovation where it creates competitive advantage. For everything else, leverage the innovation of others. Helps with build / buy decisions

Example

Market Differentiation	Mission Critical
Handle through exclusive partnerships Likely rare and temporary	Differentiating - Creates competitive advantage Deserves innovation and invention
Who cares? Minimize time and effort. Selection based primarily on cost	Parity - Vitally important but importance does not come from uniqueness Adopt and embrace others' inventions

In General

When it comes to AI, what is “Differentiating” and what is “Parity?”

Data and Model Validation

Unlike Business Intelligence / Analytics, AI is based on probability / inference

Model accuracy depends on training sets. Are the sets broad enough? Deep enough? Clean enough? Accurate enough? Composed of outliers that skew the data?

This requires our **Information and Business Architectures** include processes for data and model validation.

The Planes of Data Governance

- Data Plane – deliver and manage data
- Data Control Plane – data governance, quality and provenance
- Data Analysis Plane – deliver outputs such as visualizations
- Decision Plane – drives automated and machine-assisted human decisions

Include this in third party selection and analysis

Processes for Model Validation

1. **Cross-Validation –** Divide the dataset into multiple subsets (folds), train the model on a combination of these subsets, and validate it on the remaining subset
2. **Train-Test Split –** Split the dataset into two parts: a training set and a testing set. Train the model on the training set and evaluate its performance on the testing set
3. **Validation Set** – Set aside a portion of the data as a validation set, separate from the training and testing sets
4. **Baseline Models** – Compare the performance of your AI model against baseline models or simple heuristics to establish a benchmark
5. **Model Interpretability**
6. **External Validation**
7. **Error Analysis / Ensemble Analysis / Cross-Dataset Validation / Metric Selection**

Include this in third party selection and analysis

Closing Guidance

IDC encourages experimentation with the initial AI use cases. Use the experiments to learn and extend:

- Define architecture that supports innovation, reusability, replaceability and purpose
- Practice data and model governance and validation
- Expand decision-making to include the unquantifiable
- Practice aligned build, buy, leverage, simplify decisions
- Make modernization a portion of plans and portfolios – the cycle time of obsolescence is getting shorter

For Additional Information

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