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Gartner at a Glance

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- 960 Analysts
- 200,000+ Client Interactions
- World's Largest Community of CIOs
- 10,200 Media Inquiries
- 70+ Conferences
- 75% of Global 500
- 72% of Fortune 1000
- 5,500 Benchmarks
- 500 Consultants
- 2,100 Consulting Engagements
- Clients in 85 Countries
- Vertical Coverage in Nine Industries

World's Largest Community of CIOs
Foundational Principles of the Next-Generation Application Architecture for Your Future Software Initiatives

Yefim Natis @ynatis
Applications created today using the good-old traditional architecture will be a business-constraining legacy before they are completed.

Digital business will demand a leap to the new excellence in IT application architecture.
Key Issues

1. What new demands on IT solutions come from the emerging digital business?

2. How will software-defined architecture help IT respond to the demands of digital business?

3. What will be the core principles of digital business ready application architecture?
In the Age of Digital Business, the Demands of Business and IT Merge

Nexus-ready
- Social
- Mobile
- Cloud
- Information

Application

Integrated
- Process Modeling
- Data Modeling

Business Diversity

Context-aware
- Decision
- Process Modeling
- Data Modeling

Business Analytics

Real-time
- Observe
- Orient
- Act
- Decide

Controlled Risk
- Innovation
- Differentiation
- Record

Business Risk/IT Risk

Web Scale
- Efficient
- Adaptive
- Continuous
- Intelligent

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The Era of Digital Business

The creation of **new business designs** by blurring the digital and physical worlds.
The Old Architecture Does Not Measure Up

- Monolithic design
- Over-provisioning and hoarding of resources
- Stateful
- No support of parallel or in-memory computing
- Not open for programmatic access
- Tightly-coupled
- Not modular
- Not designed for 24/7 use
- Discontinuous versioning
- Not horizontally-scalable
- Not instrumented for governance
- Single-channel front-end
- Complex
- Expensive
- Locked into platforms and vendors
Key Issues

1. What new demands on IT solutions come from the emerging digital business?

2. How will software-defined architecture help IT respond to the demands of digital business?

3. What will be the core principles of digital business ready application architecture?
SOA as the Engine of Agility: The Service Graph
Conflicting Imperatives in Modern Application Architecture

Agility

Control
- Security
- Privacy
- Scalability
- Availability
- Quality of service
- Version control
- Compliance
- Event detection
- Activity monitoring
- Integration
- Orchestration
- Intelligence injection
- Resource management

Service Graph
Emerging Software-defined Architecture

- Software-defined networking (SDN) 2008
- Software-defined data center (SDDC) 2012
- Software-defined storage (SDS) 2013
- Software-defined security perimeter (SDSP) 2014
Software-defined Architecture: Control Plane Translates and Adds Value

- **Resource virtualization** — Decoupling of the control plane from the physical plane.
- **Resources as a service** — Resources are pooled and allocated as needed. They are provisioned, operated, and managed through an API.
- **Managed resources** — Intelligent software monitors utilization and performance. Dynamically responds to anomalies. Enables agility, automation and dynamic reconfiguration. Improves efficient resource utilization.
- **Injection of additional capabilities** — Improves quality, increases robustness, enforces policy at the source.
Software-defined Architecture for Applications: The Gateway Takes Control

- Virtualization
- API Translation
- Protocol Translation
- Model Translation
- Security
- Monitoring
- Load Balancing
- Optimization
- Integration
- Routing
- Transformation
- Composition
- Orchestration
- Context Injection
- Scheduling
Software-defined Applications on the Application Architecture Road Map

- UX: User Experience
- BL: Business Logic
- T: Thing (Fit for Purpose Device)
- Svc.: Service

1970's: Mono
1980's: 2-Tier
1990s: 3-Tier
2000's: SOA
2010's: Web Scale SOA
2014+: Software-defined SOA

Virtualization Boundary

Outer APIs
Inner APIs
Data
Key Issues

1. What new demands on IT solutions come from the emerging digital business?

2. How will software-defined architecture help IT respond to the demands of digital business?

3. What will be the core principles of digital business ready application architecture?
Step Up to Digital Business: 1. Services, the Starting Point

- Standardize, Compose, Integrate, Scale, Channel, Reuse, Replace

Encapsulated back-end functionality
REST, SOAP, MOM
Front-end functionality

Open programmatic interfaces (API)
- Request-driven
- Event-driven

Encapsulated enterprise data

<table>
<thead>
<tr>
<th>Svc</th>
<th>Svc</th>
<th>Svc</th>
</tr>
</thead>
</table>

UX UX UX

Standardize, Compose, Integrate, Scale, Channel, Reuse, Replace
Step Up to Digital Business:
2. Software-defined Architecture for Applications

Diagram showing the relationships between UX, Service, Thing, Inner APIs, SDA Gateway, and Outer APIs.
Step Up to Digital Business:
2. Software-defined Architecture for Applications

Virtualization
API Translation
Protocol Translation
Model Translation
Ad-hoc APIs
Security
Monitoring
Optimization
Routing
Load Balancing
Integration
Composition
Orchestration
Context Injection
Scheduling

SDA Gateway

Inner APIs

Outer APIs

UX
Service
Thing

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Step Up to Digital Business:
2. Software-defined Architecture for Applications

Virtualization
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Context Injection
Scheduling

- SDA Gateway
  - Inner APIs
  - Outer APIs
    - UX
    - Service
    - Thing

- API Manager
  - Apigee,
  - Mashery
- API Gateway
  - Layer7,
  - Vordel
- ESB suite
  - Tibco,
  - Software AG
- iPaaS
  - IBM CastIron,
  - Dell Boomi

Based in part on “Magic Quadrant For Application Services Governance”
Step Up to Digital Business: 3. Guard Your Data

Privileged Data Services

Application Services

SDA Gateway

UX
Service
Thing
Step Up to Digital Business:
4. Think Mobile/Think Cloud

**Think Mobile**
- Consumer-grade user experience
- Consider user in context
- Service-oriented
- Event-driven
- Reduced chattiness
- Minimal message sizes
- Multidevice
- Loosely-coupled
- Frequently changed
- Fast attrition
- Intermittent access

**Think Cloud**
- Service-oriented
- Loosely coupled
- Stateless and "hoardless"
- Multitenant ready
- Event-driven
- Continuously versionable
- Parallel and in-memory ready
- Instrumented for governance
- Low chattiness
- Frugal use of resources
- Platform-independent
- Composed and composable
- Public access ready
Step Up to Digital Business:
5. Divide and Conquer by Separation of Concerns

Function
- "Add account"
- "Deposit"
- "Withdrawal"
- "Add customer"

Role
- Privileged data services
- Technical services
- Transaction services
- Query/Analytic services

Cadence
- Frequent (innovation)
- Deliberate (differentiation)
- Rare (record)

Scope
- One application
- One enterprise
- B2B
- Cloud
Step Up to Digital Business:
6. Use Event Processing in the Eventful World

Event Activity Stream

- Social
- Social

Enterprise App
Server App
Mobile App

Analytics
Business Activity Monitoring
Step Up to Digital Business: 7. Automate Context Management

Event Activity Stream

Context Broker

Context Store

State

Other Data Sources

Input

Output
Step Up to Digital Business: 8. Build and Control a Service Ecosystem

One Service Ecosystem

- Many Clients/Devices
- Many Data Sources
- Many Services
- Many Processes

SDA Catalog, Metadata

• API Gateway
• API Management
• SOA Governance
• ESB suite
• Registry/Repository
• Cloud Service Brokerage Marketplace
The Bottom Line 1:
Mind Your Architecture

Digital Business Architecture Principles

<table>
<thead>
<tr>
<th>1. Build on SOA</th>
<th>Plan for modular, distributable, discoverable, shareable and replaceable services</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Adopt software-defined application architecture</td>
<td>Establish a multifunctional gateway for virtualization and control of application services</td>
</tr>
<tr>
<td>3. Guard your data</td>
<td>Control direct access to data by authorizing a small number of privileged highly-controlled data services</td>
</tr>
<tr>
<td>4. Think cloud first, mobile first</td>
<td>All services in the cloud scale, all user experience in the mobile &quot;lifestyle&quot;</td>
</tr>
<tr>
<td>5. Implement separation of concerns</td>
<td>Separate services by role, cadence, semantic content, scope and more</td>
</tr>
<tr>
<td>6. Use event-driven architecture</td>
<td>Implement event processing to support real-time operations and devices</td>
</tr>
<tr>
<td>7. Inject context-awareness</td>
<td>Seek context to support situation-aware operations</td>
</tr>
<tr>
<td>8. Build and Control a Service Ecosystem</td>
<td>Control your ecosystem of resources, use them and let them be used safely</td>
</tr>
</tbody>
</table>
The Bottom Line 2: Change Starts With People

Cultural Change

- Fight the not-invented-here syndrome
- Think open, avoid fiefdoms and stovepipes
- Socialize, listen, crowdsourse and be transparent
- Experiment, be systematically opportunistic
- Avoid rigid architecture policies: Plan, act, learn and change
The Bottom Line 3: "Curb Your New Architecture Enthusiasm"

Reality Check

Avoid grandiose new architecture plans, build in-house expertise and culture gradually

Do not re-architect legacy systems for the sake of re-architecting: most old systems should be wrapped, then replaced.

Establish well-understood objectives to new architecture initiatives

Prepare to measure degree of success before starting on with the new architecture initiative

Do not over-design your systems of innovation or under-design the systems of differentiation or record
Recommended Gartner Research

- Stepping Up to the Nexus of Forces With Nexus-Enabled Application Architecture
  Yefim V. Natis (G00238857)

- The Nexus Effect and How the Nexus of Forces Alters Established Architecture Models
  Yefim V. Natis (G00238661)

- Transform Your Business With the Nexus of Forces
  Chris Howard and others (G00262353)

- Service-Oriented Architecture
  Anne Thomas Manes (G00253586)

- "Service Oriented" Architectures, Part 1
  Roy Schulte and Yefim V. Natis (G0029201)

- "Service Oriented" Architectures, Part 2
  Roy Schulte (G0029202)

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