SAP BI For Cloud Deployments:
The IaaS Alternative to BI OnDemand

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Session is for education only:
- Many factors will affect you in bringing enterprise applications such as BI (and even EIM, ERP, or CRM, etc..) to cloud environments
- Not a substitute for education, analysis of your own environment and discussion with those who can help you (including SAP!)

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1. What “SAP BI 4 For Cloud Deployments” means and how it is different from SAP BI On-Demand.

2. Technical, financial, and logistical considerations when architecting a BI system in the Cloud.

3. Understand the different options for hosting providers and technologies to enable a successful deployment.
Why BI In The Cloud?
When Cloud Makes The Most Sense

- Your data is already (or going to be) in the Cloud:
  - Put processing where the data is – and take advantage of the Cloud!
  - Providing external parties access to data is a good Cloud use case.

- You cannot fulfill your resource needs internally:
  - Systems are too costly, take too long to provision, or require approvals
  - Leveraging a provider gets you further ahead than doing it yourself

- You are deploying for dev / test / training environments:
  - Issues around data security, support, and access are not so relevant
  - A limited time project that needs to be up very quickly
  - A test/staging pilot before a full deployment (or upgrade) on-premise

Deploying to the Cloud is highly attractive, and sometimes the only feasible option, but it has its drawbacks just like any other deployment option (i.e. virtualization, physical, or even “rogue IT”)

Critical Distinction: SaaS vs. IaaS

• **Infrastructure-as-a-Service:**
  - Efficiency: faster/cheaper implementation and lower TCO
  - Agility: Ability to do something else
  - Infrastructure-centric:
    - Requirements typically driven by *IT*:
    - IaaS is not appropriate for all workloads/architectures

• **Software-as-a-Service:**
  - Solving specific business problems
  - Not usually appropriate for general purpose applications
  - User centric model:
    - Requirements typically driven by *business users*
Different “-as-a-Service Models

- IaaS
  - Application
  - Stack
  - OS

- PaaS
  - Application
  - Stack
  - OS

- SaaS
  - Application
  - Stack
  - OS
Business Intelligence (BI) In The Cloud @ SAP

**BI On-Demand**
(SaaS)

**Simple**
Explore, report, and share all in a single, integrated offering

**Intuitive**
Experience easy to use, visual BI tools

**Turnkey**
Be up and running quickly without software or hardware

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**BI for Cloud Deployments**
(IaaS)

**Enterprise-grade**
Fits your enterprise information infrastructure – from the Cloud

**Complete suite**
Range of tools to support different users and usage scenarios

**Flexible**
Supports a wide range of requirements
# Teams Through Enterprise – We’ve Got You Covered

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SAP BI On-Demand
SAP’s Software-as-a-Service BI Offering
BI On-Demand is SAP’s public cloud business intelligence solution. It is primarily targeted at organizations that need low time to value BI, without the expense of managing and maintaining a BI infrastructure.

http://www.ondemand.com/businessintelligence
SAP Business Intelligence On-Demand (BIOD)

- **Self-Service BI for everyone:**
  - Free to try (and with non-expiring account!)
  - Intuitive process for business users to explore, report, and share data
  - Upload datasets, spreadsheets, or reports for analysis “in the cloud”
  - Explorer, Crystal Reports, Web Intelligence, and even dashboards
  - Integration with Salesforce.com for reporting on CRM data
BI For Cloud Deployments
SAP’s Enterprise BI Offering in the Cloud
The Best of Enterprise BI + Cloud Infrastructure

• **Enterprise Grade**
  - Fits your enterprise information infrastructure – from the Cloud
  - Administration, auditing, monitoring, security, multi-lingual, scalable

• **Complete Suite of BI Products**
  - Range of tools to support different users and usage scenarios
  - Explorer, Web Intelligence, Crystal Reports, Analysis, Dashboarding, Predictive Analytics

• **Flexibility and Value of Cloud Infrastructure**
  - Supports a wide range of deployments in public and virtual private scenarios
  - Maintain compatibility with all supported databases and middleware products offered on-premise
Issues With Deploying In The Cloud

- **Enterprise authentication:**
  - How do you ensure you leverage existing security mechanisms?

- **Data Sources:**
  - Where do you put the reporting data? On-premise or Cloud?
  - How will placement of databases affect cost?

- **User Experience:**
  - How do you ensure performance for users isn’t affected by deployment choice?

- **Future Applications/Needs:**
  - How do you future proof your deployment as new technologies come?
  - How do you plan for HANA or other low-latency technologies?
Creating A Virtual Private Cloud Hybrid

- **Transparency extension of corporate network in the Cloud:**
  - Over-the-Internet successor to yesterday’s “leased lines”
  - Systems in the Cloud appear as a subnet off the corporate network
  - Typically implemented as a secure VPN tunnel to the Cloud

- **Pros:**
  - Secure – no more risk than inter-office traffic
  - Transparent to the application – no changes required
  - Easily co-exist with existing network topologies

- **Cons:**
  - Bandwidth is not unlimited, nor is it free
  - Latency can be an issue – apps assume low latency LANs
  - User experience can be affected for “live” or interactive applications
The BI Platform You Know – Deployed in the Cloud

BI for Cloud Deployments

Public Cloud deployment scenario

Virtual Private Cloud deployment scenario

VPN

Corporate network
Accessing on-premise from the Cloud is problematic:
- Bandwidth limited WAN links make some operations impractical
- Network latency can make even small transactions painfully slow

Replicating on-premise databases is also problematic:
- Raw size of data may make it expensive, slow, or unreliable
- Batch replication creates a short term inconsistency in the data

Nature of some data requires immediate processing:
- Click stream and supply chain data cannot be batched for analysis
- Future in-memory technologies require very tight integration
Accessing BI Systems Through Virtual Private Cloud

IaaS Provider

Virtual Private Cloud Connection

Corporate Network

BI 4.0

DB Instances

IaaS Provider

10.0.20.x

Virtual Private Cloud Connection

10.0.10.x

Corporate Datastores

BI 4.0

BI 4.0
Data Replication Through Virtual Private Cloud

IaaS Provider

Virtual Private Cloud Connection

Corporate Network

Corporate Datastores

DB Instances

BI 4.0

BI 4.0

BI 4.0

10.0.20.x

10.0.10.x

Data Services

IaaS Provider
BI For Cloud Deployments
A Deeper Look
The BI Platform You Know – Deployed in the Cloud

BI for Cloud Deployments

Public Cloud deployment scenario

Virtual Private Cloud deployment scenario

Corporate network

VPN
Analyzing Data Flows

- **External bandwidth:**
  - “Cloud” doesn’t mean infinite bandwidth – there’s more than one “Cloud”!
  - Both ingress and egress typically cost – and add up over time
  - Connections need to be resilient for long-term transmissions

- **Internal bandwidth:**
  - Connections within the same provider are shared, and typically w/o QoS!
  - Almost no way to measure, govern, or SLA internal bandwidth availability
  - Common solution by providers is to overprovision and “hope for the best”

- **Latency:**
  - Placement of nodes is critical to avoid long round trips
  - Pings don’t tell the story – application level delays are affected
  - Actions, inter-process communication can make delays difficult to find
I/O is the silent killer in many implementations:
- Saturating the DB/file system is invisible to everybody
- I/O is an issue for all providers – multi-tenancy does not extend to the hardware or storage subsystem

Location, Location, Location!
- Separating in many tiers can cause unexpected latency – systems may not be in the same rack or even network segment
- New variables exist – hosters can move your instance around to other sites

“Virtual Private Cloud” can pose “real” challenges
- Bandwidth, latency, I/O, and geography issues are explicitly introduced
- User experience can be affected for “live” or interactive applications
Analyzing Cost For Data Flows

• **Server data ingress:**
  - Initial costs to get to cloud can be avoided by physical media
  - Some vendors don’t charge → ideal for synchronization use cases
  - Optimize for ongoing synchronization from the start

• **Server data egress:**
  - Analyze downstream effects – are you sync’ing data to another “Cloud”?  
  - If you are building a data warehouse in the Cloud, evaluate how to export it if/when you want to leave

• **Operational data transfer:**
  - Users generate a lot of traffic as well – don’t look only at server processes
  - Separating “chatty” components will cause data overhead
    - Where you “split” on-premise and Cloud matters
(Very) Simplified View Of Data Flows

SELECT * FROM DB_TABLE WHERE...

Data Warehouse

Row set { row1,... row99999,... }

FACT Sales { sl_order as ... }

DB 2

DB 3

Processing Tier

Application Tier

TITLE { .... } { HEADING ... }
BI For Cloud Deployments
Architecting And Deploying The Right System
• **Protect data in the Cloud at least as well as on-premise:**
  - Consider physical, network-level, and on-disk security
  - Cloud deployments are extensions of your corporate network

• **Secure data transfers with multiple levels of security:**
  - Use the hosting provider’s VPN connection at a minimum
  - Some products have over-the-wire encryption for synchronization

• **Secure all user sessions with corporate VPN:**
  - Ensure all traffic from users within corporate network is tunneled correctly
  - Require remote users to VPN to corporate network first (no direct access)
  - Would you open your financial systems to the Internet, even with SSL?

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BI system and all user traffic should be secured by corporate VPN mechanisms at all times. Hosting BI Launchpad externally should only be done on a segregated system.
What Not To Do: Rely On “Implicit” Security

Corporate network

BI for Cloud Deployments

Unauthenticated & unsecured traffic over Internet

Would you ever open your internal portals to the Internet – even with SSL???
Correct: Secure All User Traffic Through Corp VPN
A. Put the entire data warehouse in the Cloud:
   • Keep the data near the BI system to reduce cost, latency
   • Value of processing outweighs the data transfer issues (i.e. HANA)
   • Suitable when data is already there or transfer size is manageable

B. Replicate a subset of the data for specific workloads:
   • Good for department/workgroup use – free up “core” infrastructure
   • Ideal when external access is one of the reasons you are going to the cloud
   • Possible that BIOD could solve this use case

C. Put only the presentation layer in the Cloud:
   • Keep processing on-premise and leverage the Cloud’s “other” benefits
   • Logically makes sense, but can be tricky to implement properly
   • Possible that BIOD could solve this use case
Replication Options

• **SAP Data Services:**
  • Designed for ETL from disparate data sources
  • Includes additional functionality (i.e. text analysis)

• **SAP Sybase Replication Server:**
  • Provides close to “real-time” replication
  • Supports multiple databases (Sybase, Microsoft, Oracle, IBM, etc.)

• **SAP SLT (ECC Systems):**
  • Close to real time, but only for SAP Business Suite applications

• **Database vendor specific tools:**
  • Some can be highly efficient and/or better or specific data workloads
  • Likely will limit you to that vendor’s database on both sides
Making A Cloud Deployment Work For You

• **Make the right choices:**
  • Make sure “Cloud” is the right answer to the right problem
  • Understand how the provider’s geography and topology will change

• **Do a pilot (or a few):**
  • Learn the behavior of your system and narrow down what’s important

• **Don’t “Set It and Forget It”:**
  • Cloud systems need more monitoring – do not expect the provider to do it
  • Find some metrics to benchmark periodically for gauging performance
  • Look for changes in your own usage as well as changes at the provider

• **Make the plan to use more resources than you think:**
  • Expect to need larger instances than you plan
  • Expect data volumes to grow unpredictably
Elements Of A Successful Cloud Deployment

• Do not separate critical system components:
  • Enterprise applications are not designed for high latency networks
  • Think of network communication flows and add 5-10x ping times
  • Would you consider separating the CMS from the system? Why not?

• Do not separate reporting databases from BI system (if possible):
  • Unless you are doing batch reporting, keep “code near”
  • Not required, but performance issues may not be supported

• Do not underestimate processing & network requirements:
  • Tempting to start small and “scale up”, but not usually worth it
  • CPU and network performance can vary widely (and randomly)

• Do not go it alone:
  • Consult with SAP a partner to ensure you are deployed correctly
Things You Should Expect (But Hope To Not Have)

• **Possibly slower than on-premise performance:**
  • No amount of computing capacity does not make up for poor system design
  • “Cloud instances” are not dedicated machines unless specified

• **Potentially unexpected costs:**
  • Compare expected costs with actual use and re-align plan
  • Don’t forget user traffic across VPC is also counted

• **Less visibility into system operations:**
  • Providers are usually not required to show performance or uptime of hosts
  • Difficult to see metrics in guest – it depends on *what* you are on and *when*
BI For Cloud Deployments
Service Provider Options
Options For Hosting SAP BI In the Cloud

• **SAP BI On-Demand (BIOD):**
  • Your first stop unless it does not meet your requirements

• **SAP BusinessObjects Hosting Partners:**
  • Full-time, production level, enterprise BI with full service and support
  • Expert SAP BusinessObjects certified staff to help you with the whole stack

• **Other Hosting Providers:**
  • Experts in hosting enterprise applications, but not necessarily BI
  • You are responsible for the application, hoster provides infrastructure only

• **Amazon Web Services (AWS):**
  • End-to-end (platform & stack) *only when used with a solution provider*
  • More ideal than other options in time limited or other specific use cases
SAP On Amazon Web Services (AWS)

- **Supported for production:**
  - Specific validated AMI instances
  - Linux and Windows
  - Requires AWS Premium Support
  - Use certified SAP partners

- **Non-productive use:**
  - Stringent requirements do not apply
  - Unsupported nonproduction deployment

- **More Info:**
  
Amazon Customer Case

- **Customer Mission:**
  - Explore how SAP BI 4.0 could address growing analytical requirements without waiting months for HW and teams to be available

- **Contracted partner to perform POC project on AWS:**
  - Initial BI 4.0 system environment and platform provisioning
  - Simple user administration, Connection to on-premise data store
  - Development of multiple report templates to show full functionality

- **Outcome:**
  - Actually completed entire SAP BI 4.0 Ramp-Up Program on Amazon!
  - POC took 3 weeks from initial contract signing to full completion
  - System performance measurements using different instance sizes
  - Total cost of infrastructure usage: $500
Amazon AWS Marketplace

- True “pay as you go” model for SAP BI 4:
  - SAP BusinessObjects 4 with 5-50 users

- Smaller systems without the hassle
  - Departments, lines of business
  - Special projects, test systems

https://aws.amazon.com/marketplace
Gauging Performance In The Cloud

- **Trust no one’s numbers other than your own:**
  - Standard benchmarks don’t exist – synthetic ones are not useful
  - There is no “standard” infrastructure like in the on-premise world
  - “Full system” benchmarks are impossible even in the physical world

- **Don’t even trust your numbers:**
  - BI workloads are highly variable – interactive analysis can happen anytime
  - You have no visibility on events outside your instance,

- **The provider cannot usually provide an SLA for I/O resources:**
  - Multi-tenancy at the transaction level is not really possible
  - Provider must balance overprovisioning vs. oversubscription
  - Guess which one usually wins?

*The best (only) thing you can really do is benchmark a series of loads and continue to test over time – it will not show root causes, but will help determine if there is a problem in the first place*
Closing Thoughts
• **Customers have more “creative” use cases than we do:**
  - Almost anything is possible, but *not everything makes sense*
  - Many hybrid situations are technically supported, although very ill advised
  - If data is not already in the Cloud, need to weigh value of replication

• **Network issues are always underestimated:**
  - Connectivity issues can be big – even when transferring “only 1 GB”
  - “In the Cloud” does not always mean “the same Cloud” 😊

• **I/O saturation at the provider is often the invisible killer:**
  - If the DB cannot serve quickly enough, CPU or network won’t get saturated
  - Tenants usually have to trust the provider for uptime, performance, etc..
Key Learnings

• Understanding how your BI system will be used aids in good system architecture

• Where you put your data is critical to the success of your system

• Cloud deployments can have just as much security as on-premise deployments

• Options for hosting BI 4 range from just infrastructure to full service systems
Thank you for participating.

Please provide feedback on this session by completing a short survey via the event mobile application.

SESSION CODE: 0707

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Learn more year-round at www.asug.com