

# Using VEEs for Standard Business Applications

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## **SAP is a long-term provider of a VEE**

- **R/3, mySAP and the Web Application Server all incorporate the ABAP environment**
- **ABAP was dedicately developed to enable business applications**

## **SAP is also a user of standard VEEs**

- **SAP NetWeaver is to the greater part developed in Java**
- **We also integrate with .NET technology**

## **Target group is not technical**

- **Both development and customers focus on business content**
- **Reproducibility and standard behavior is key for the customers**
- **Complexity of the scenarios drives technology needs**

**The Platform needs to provide the technological progress in the easiest way possible**

## Provide an environment which is

- **Provides very easy access to business related functionality**
  - ◆ Transactions
  - ◆ Dialog oriented
  - ◆ Very high robustness and fault tolerance
  - ◆ Hide the platform
- **Disables most of the technological features**
  - ◆ Strict resource control
  - ◆ No explicit parallelism – but very good scalability
  - ◆ No direct networking

## **You get a generic machine**

- **You get access to all resources available**
- **It provides fine grained operations**
- **It can be used from embedded devices up to application servers**
- **It hides the platform details**
- **One size fits all**

**ABAP:**

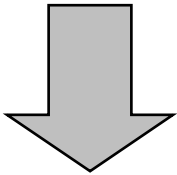
**Physical Environment**

- Preconfigured environment
- Isolation
- Efficiency
- Freedom

+

**Specialized Virtual**

- Restricted
- Easy
- Powerful operation



**Java:**

**General VEE**

- One environment for all layers

## Some observed benefits of application-level virtualization

- Application-level virtualization provides **portable, well-specified behaviour** for program execution and selected, high-level operating system interfaces.
  - Virtualization represents a factoring of the runtime into an API friendly to compilers and programmers and an implementation that can vary and be optimized for each platform
- Access to critical operating system or application resources can be controlled through VEE-enforced **security** mechanisms.
- Programmers can achieve higher levels of **productivity** through
  - VEE safety assurances
  - automated memory management
  - sophisticated analysis and debugging tools
  - automatic support for distribution and persistence
- High levels of **performance** are possible through dynamic and adaptive program transformation.
  - But we are just on the frontier of exploiting this capability

## **Portable and well specified**

- **No build in support to manage the VM instance**
- **Runtime behaviour differs accross platforms**

## **Security**

- **Per default all resources are exposed**

## **Performance**

- **Concurrency is misused**
- **JIT is causing stability problems**
- **GC leads to inpredictable response times**

## Memory Management

- The notion of „GC takes care of it“ leads to bloat
- GC is a big problem area
- No resource monitoring
- No resource alerting

## Productivity

- Tool support under par

## **There is no border line between core and application**

- **People tend to reinvent the wheel**
- **People overestimate their skills**
  - ◆ **Concurrency**

## **Never assume some part is perfect**

- **The VM is a very complex beast**
- **It is far from perfect**

## **Basic operating system mechanisms are missing**

- **Protection and sharing**
- **Ready to use environment**
- **Resource control and monitoring**

## **Nonfunctional aspects dominate in real world scenarios!**

## **Even for one size fits all we need different levels of access**

- We need to get more isolation
- If we have isolation we need sharing and messaging

## **Nonfunctional aspects should be better specified**

- Performance
- GC behaviour

## **Tool support**

- We need to have ways to look into the innerts
- Provide access to resource control
  - ◆ Even simple alerting facilities make a tremendous difference

## **The VM itself is not controllable**

**One tool for all layers is still a valuable goal**

- **But needs strong support and governance**

**Dynamic extensibility is a needed feature**

**The rich environment is breaking boundaries**

**We have to make the promises reality!**

→ The value proposition is still there

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