



# **Virtual Reality and Field Integrity Management**

**A. Colin, Ph. D.**

Walkinside and ProcessLife for Invisible Asset Management

3D Visualization technology for Subsea Equipment

## **Company profile**

VRcontext is a leading provider of real-time visualization and simulation solutions for complex, multi-disciplinary operations already used worldwide in the Energy, Oil & Gas, Process, and Homeland Security markets

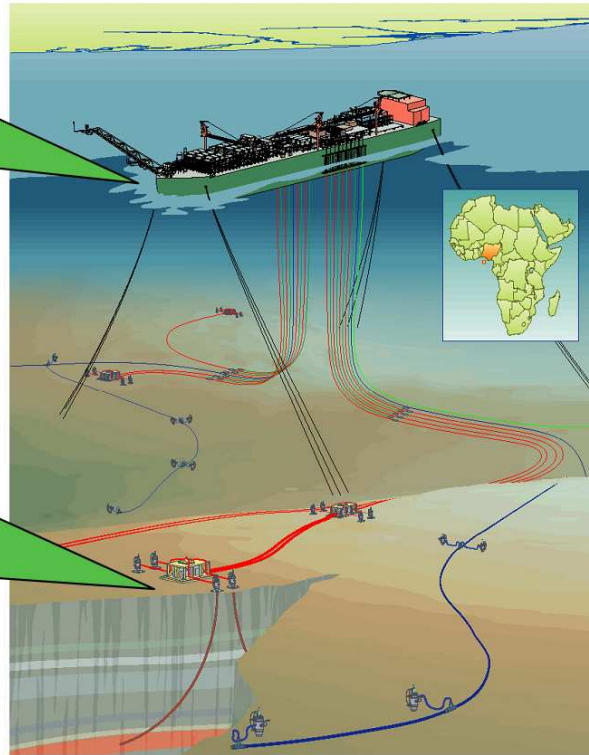
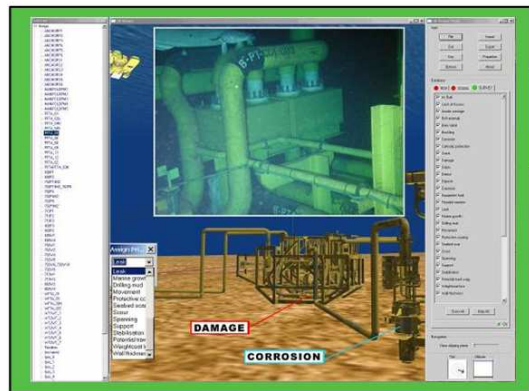
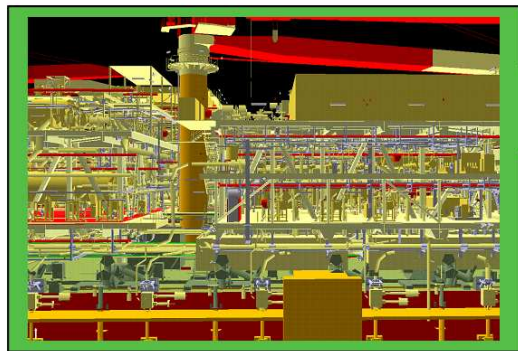
2007 AAPG Annual Convention and Exhibition (April 1 - 4, 2007)



# Massive Model - BONGA Field



## Shell deep water operations Integrated Virtual Massive 3D Model



Courtesy of Shell

### Bonga Oil Field

400 km<sup>2</sup> seabed  
2.000.000 radar 3d points

Flow and mooring Lines  
300 MB PDMS model

29 ProEngineer models,  
200 MB each

30 AutoCAD models,  
22 MB each

15 MicroStation models,  
12 MB each

**A Walkinside 3D Virtual Reality model was created containing all structures and data listed above**

## Invisible Assets

## Maintenance, Operation & Tracking

### Connection to Operational Databases

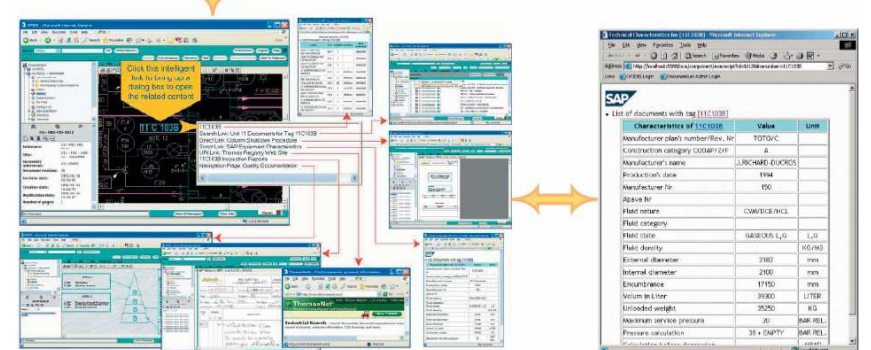
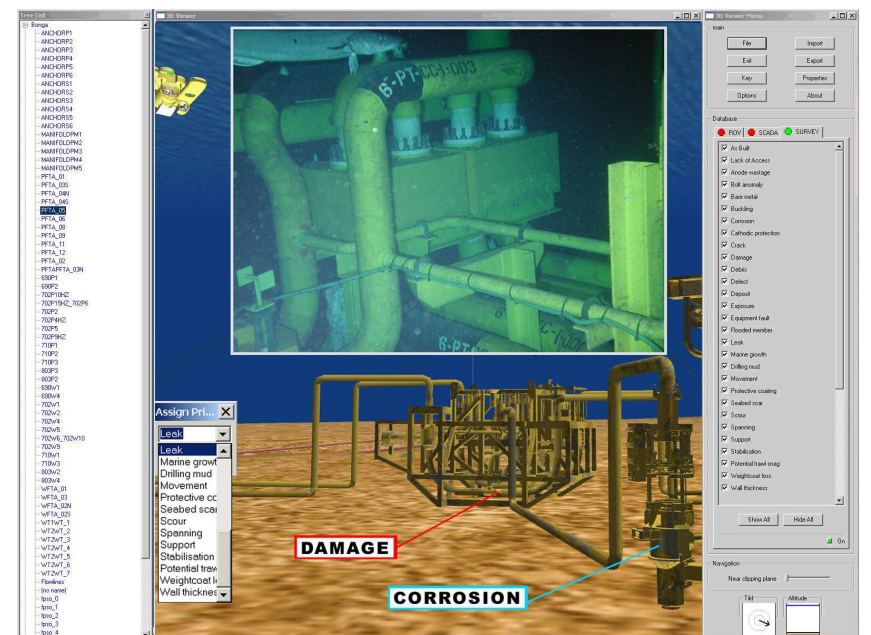
Bi-directional interface between operations documents and the 3D Virtual Reality Model.

Examples:

- Automatic zoom-in on the equipment in the 3D Virtual model when selecting a document or clicking on P&ID symbol.
- Retrieve all documents for a given piece of equipment by clicking on the 3D object in the Virtual Reality model

**End-User :** Maintenance Engineers, Project Managers, Platform managers and other users of operational databases

**Benefit :** Use a common interface, the 3D Virtual model, to access various documents.





# Invisible Assets

## Process Monitoring

**Real-time connection to SCADA/DCS  
in the 3D Virtual model**

Information provided by DCS (Distributed Control Systems) and/or SCADA (Supervisory Control And Data Acquisition) are bi-directionnally linked with the related equipment in the virtual 3D model of the plant.

**End-User :** Control room operator

### **Benefit :**

Provide the control room operator with a 3D View on the offshore rig/FPSO and the subsea equipment.

A two way link can be created between the control room P&ID and 3D model, to visualize real-time data in the 3D model and for instance zoom-in automatically in the 3D model to an equipment where an alarm is reported.

## Integrity Management

### **Real-time ROV monitoring in the 3D Virtual Model**

The ROV (Remotely Operated Vehicle) position is visualized real-time in the 3D model of the seabed with subsea equipment

The ROV position is updated for instance every second based on real-time data sent back by the ROV.

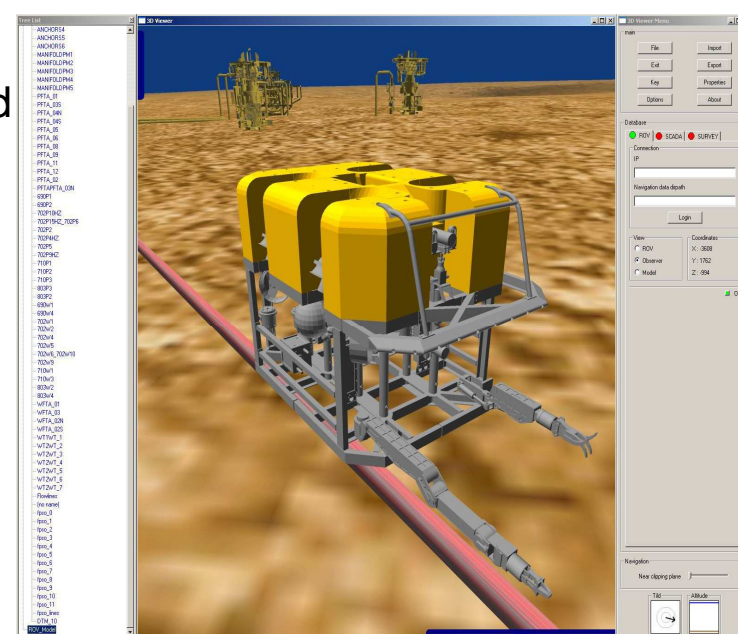
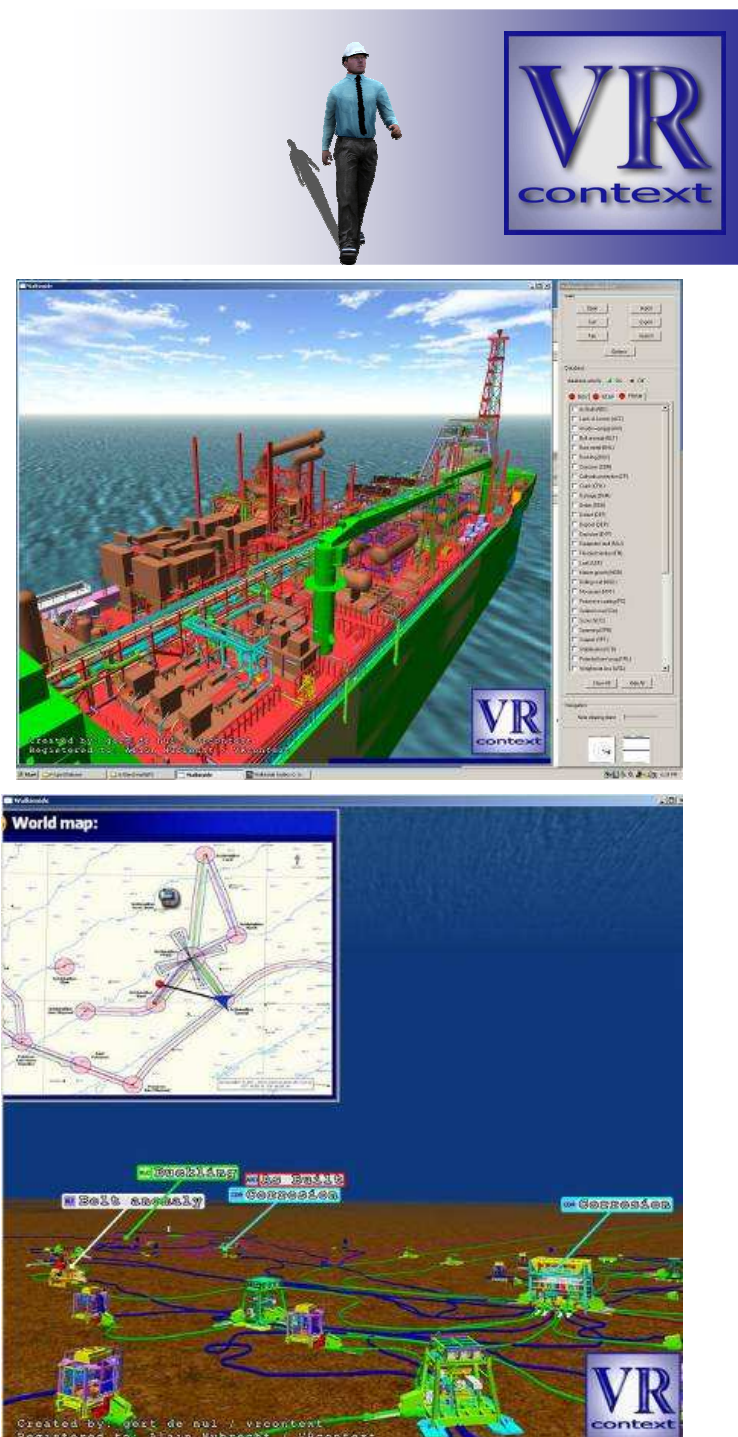
**End-User :** ROV operator

### **Benefit :**

The ROV operator has next to his video camera view a clear view of the 3D environment where the ROV has to work.

In poor video visibility conditions, the ROV operator can see the actual location of the ROV with respect to the subsea equipment and make sure he works on the right equipment

*This is a ProcessLife Decision Support Application*



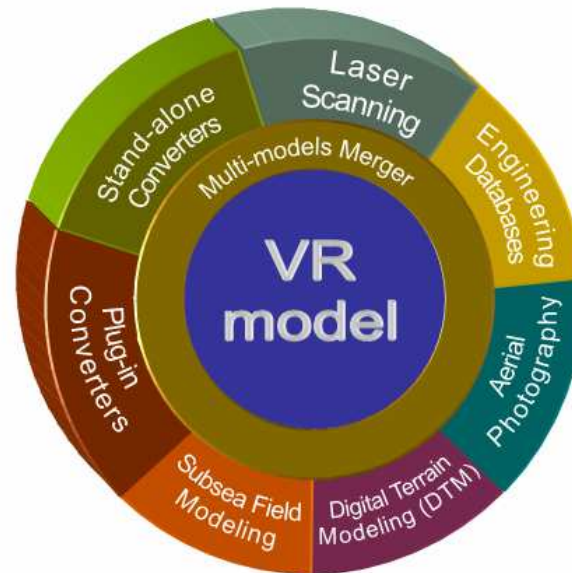
Courtesy of Shell



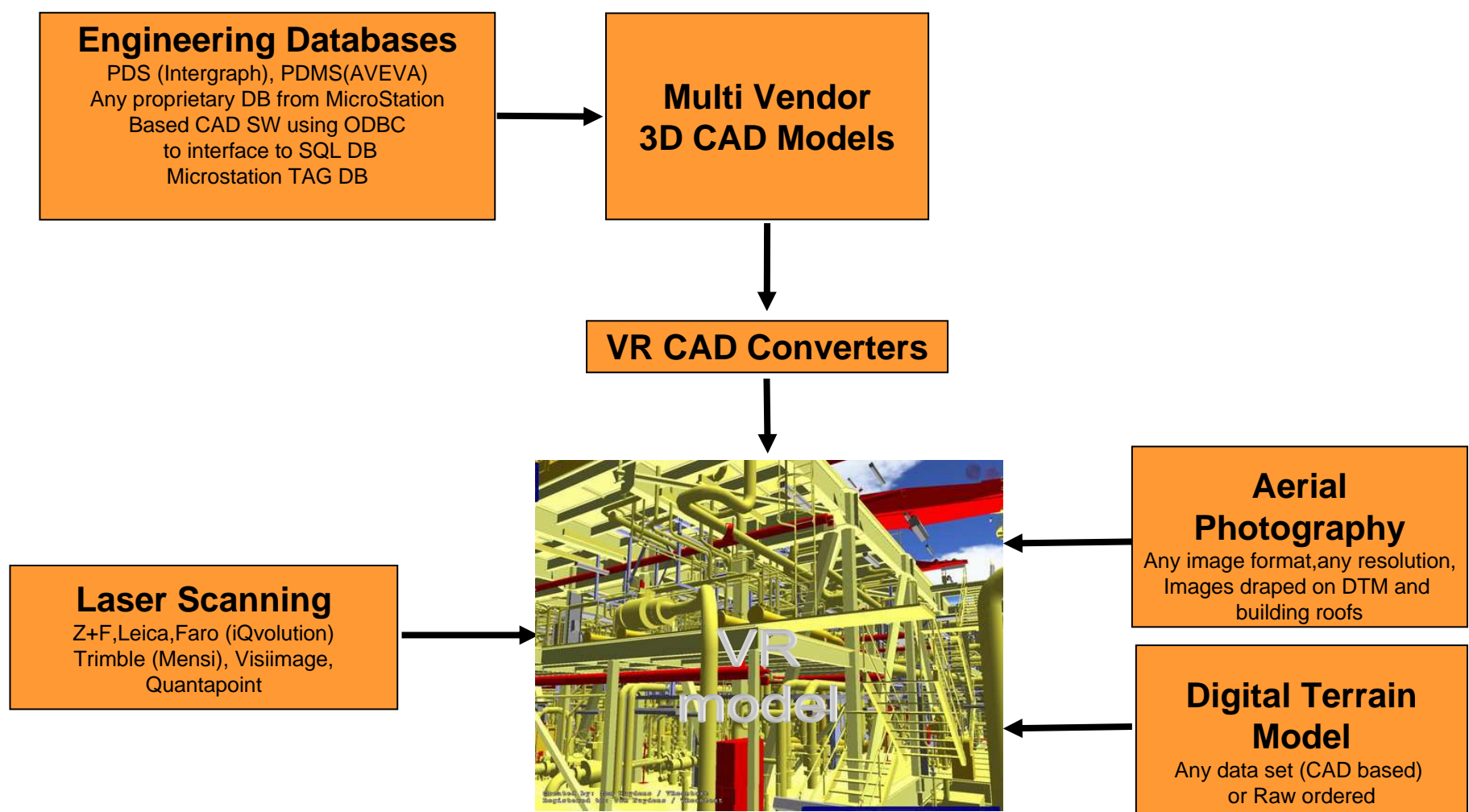
# Step 1: Create VR Model



**Walkinside™**  
Virtual Modeling Space



**Walkinside™** creates 3D Virtual Models of large structures, which can be imported in a straightforward manner from multiple data sources. We are referring to Walkinside, as our “**Virtual Modeling Space**”.



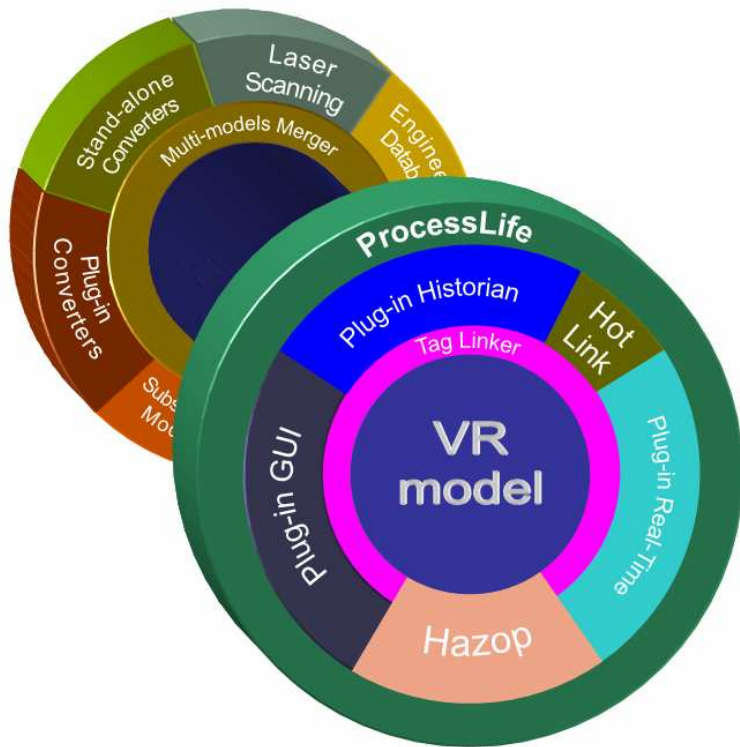
Walkinside™  
explore the inside



**ProcessLife**



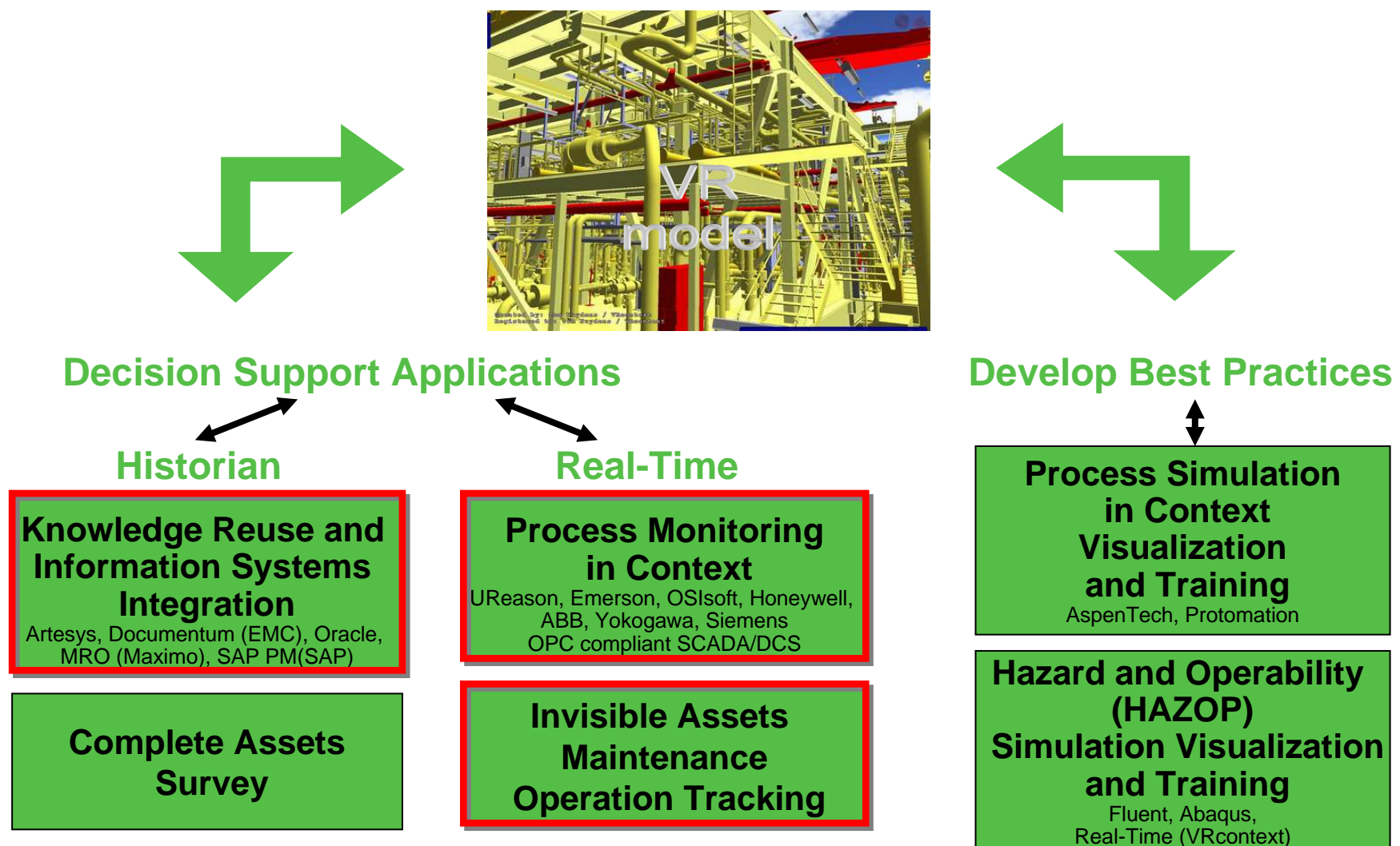
## Step 2: Link tags



**ProcessLife™**  
Decision Support Space

Through **ProcessLife™**, we deliver "Decision Support Applications," by means of real-time access to Monitoring systems and direct links to databases using our "intuitive" graphical interface to the 3D Virtual Model.

## Step 3: Integrate ProcessLife applications





- **Walkinside™**

- ➔ Creates automatically 3D Virtual models of complex engineering structures from multiple sources

*Walkinside is a commercial off-the-shelf software solution*

- **ProcessLife™**

- ➔ Delivers ... “Decision Support Applications”
- ➔ Enables ... “Best Practices”
- ➔ Allows ... “Immersive Context Training”

*ProcessLife applications are implemented by VRcontext System Integrators, using the ProcessLife SDK (Software Development Kit)*

## Conclusion

- The connection of the Operational Information Systems to a 3D Virtual Reality Model
  - ➔ demonstrates a major potential return for Owner/Operators
  - ➔ provides a new vision on the absolute necessity of 3D modeling.
- This unique solution has the advantage of being built on top of existing application tools, protecting therefore prior investments in
  - ➔ Knowledge and legacy data
  - ➔ Staff training
- Does NOT replace BUT federates existing applications used in the operations of Owners/Operators on a daily basis (O/Os).

