

Build Common Performance Measurer using Java Web Dynpro

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Agenda

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- ❑ Measurer for performance tuning
- ❑ Goals of performance measurer and KPI
- ❑ Architecture and design
- ❑ Detailed usage
- ❑ Demo

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Measurer for performance tuning

- Performance measurer is for the purpose of measuring system performance and provide the baseline for performance tuning.
- Why need performance tuning
 - It is for **system quality**: relief pain of user.
 - ◆ People expect things happen within **3 seconds**.
 - System runs slow simply because it has not been performance tuned.
 - It **really improves** product performance.
 - Performance tuning is **one of the most important things** for a product instead of it is only cool.



Experience

Before doing performance tuning project:

- BISDK's performance was becoming a big concern although we used a lot of cutting edge technologies: JCA, JMI, ODBO, CWM, MMR etc.
 - ◆ System connection time is more than 10 seconds.
 - ◆ Getting SAP variables is more than 45 seconds.
 - ◆ Query execution is not linear.
 - ◆ ...

After doing performance tuning project:

- System bottlenecks have been identified and removed, system performance has dramatically improved in certain area.
 - ◆ System connection time is less than 3 seconds by improving locale info impl.
 - ◆ Getting SAP variables is less than 1 second by reducing system roundtrip.
 - ◆ Makes query execution linear by eliminating empty cells.
 - ◆ ...



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Performance Measurer: Goal and main performance KPI

Goal

- **A reusable Web Dynpro component for measuring performance.**
 - ◆ Measure result views are able to be embedded in other webdynpro view.
- **Being able to track backend call in xRPM 4.0.**
- **Being able to track the overall product performance, identify areas of performance bottlenecks, provide ways for performance analysis.**
- **Provide performance baseline to evaluate the performance of xRPM 4.0 from front end.**

Main Performance KPI

- **CPU Time: How long it takes in order to finish specified operation in milliseconds.**
- **System round trip: How many times you need to call back to backend.**
- **Native Time: How long it takes to call back to backend in order to finish specified operation in milliseconds.**

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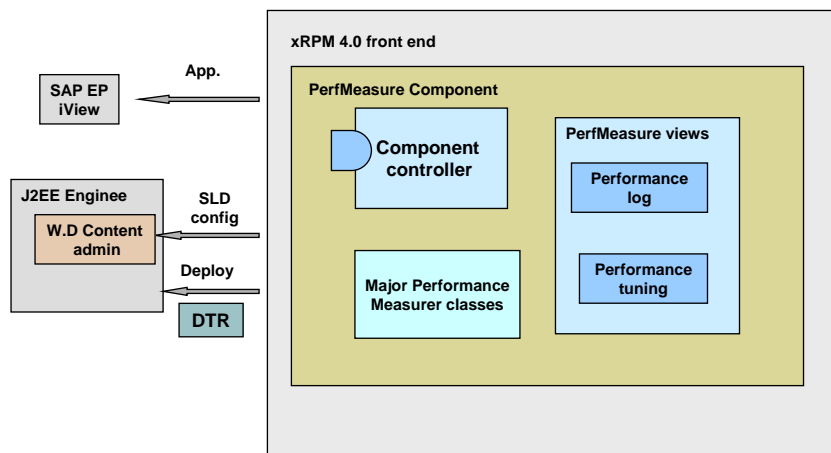
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Overall architecture under xRPM4.0



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Performance Measurer Design

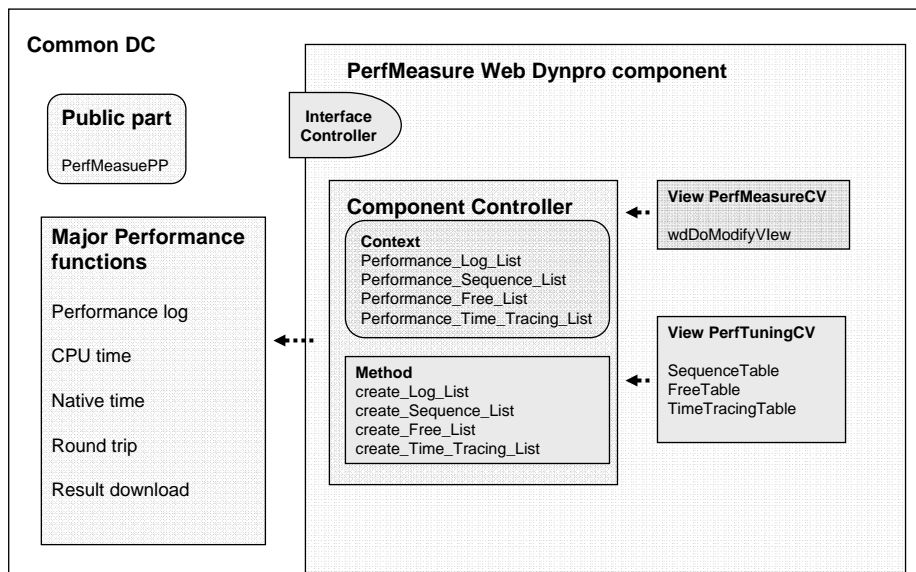
- Reusable web dynpro component
- Performance functions: main performance functions for measuring CPU time, Native time, and System round trip.
- Component controller: Handling performance measure data and access to performance functions .
- Controller context: performance measurer's data.
- View/Controller: View for performance log. Tables to render performance data, functions for view.
- Download result: download results to client side.

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Design diagram



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Performance Log

- **A reusable view that can be embedded in other web dynpro view container.**
- **It can show backend call CPU time, backend call input and output XML.**
- **RFC model execution:**

Using:

```
perfMeasure.LogExecute(inputNode, outputNode);
```

Instead of:

```
inputNode.currentInputElement.modelObject().execute();
```

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Performance Log screen shot

Performance Measurer Result

RPM/REVIEW_GETLIST 2774millisec
[Download result](#)

INPUT_XML

```
<CONTEXT_ROOT>
<_Rpm_Review_Getlist_Input_NODE>
  <_Rpm_Review_Getlist_Input_ELEMENT Iv_Language="en">
<Output_NODE>
  <Es_Context_NODE>
    <Is_Context_ELEMENT Object_Id="" Portfolio_Guid="[B@df9982" Portfolio_Id="" Object_Guid=""
```

OUTPUT_XML

```
<CONTEXT_ROOT>
<Output_NODE>
  <Output_ELEMENT Ev_Rc="0">
  <Et_Reviews_NODE>
    <Et_Reviews_ELEMENT Status="0001" Bucket_Desc="Provider class create description"
Created_On="2005-03-19" Item_Count="0" Review_Guid="[B@18271c2" Parent_Guid="[B@fa8089"
```

RPM/QHNR_GET_LIST 781millisec
[Download result](#)

INPUT_XML

```
<CONTEXT_ROOT>
<Rpm_Qhnr_Get_List_Input_NODE>
  <Rpm_Qhnr_Get_List_Input_ELEMENT Iv_Language="en" Iv_Guid="[B@b83261" Iv_All="false">
<Qhnr_Output_NODE/>
  <Rpm_Qhnr_Get_List_Input_ELEMENT/>
<Rpm_Qhnr_Get_List_Input_NODE>
```

OUTPUT_XML

```
<CONTEXT_ROOT>
<Qhnr_Output_NODE>
  <Qhnr_Output_ELEMENT Ev_Rc="0">
  <Es_Msg_NODE>
    <Es_Msg_ELEMENT Msg_Source="" Objectid="" Msgtype="" Objtype="" Msg_Txt="">
  <Es_Msg_NODE>
```

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Ways of measuring - Measuring in sequence

- **Measuring system performance in sequence.**
- **User starts a measure, followed by ending the measure in sequence without nesting with other measure.**
- **Advantage: User does not need to provide unique description keys for start and end.**

```
perMeasure.startSequence(description);
```

```
...
```

```
perfMeasure.endSequence();
```

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Ways of measuring - Free style

- **Measuring system performance on demand: either in sequence or nested.**
- **User starts a measure with a description key and end a measure with the same description key.**
- **The measure description key for one measuring item must be unique.**
- **Advantage: User could do nested measurement.**

```
perfMeasure.startFree(description1);  
...  
perfMeasure.startFree(description2);  
  
perfMeasure.endFree(description1);  
...  
perfMeasure.endFree(description2);
```

Ways of measuring – Time Tracing

- **Simply measuring CPU time from one point to another.**
- **User add in time tracing point at the location where the user wishes to get time.**
- **Advantage: Flexible to get a time tracing report from one point to another.**
- **Simple yet efficient.**

```
perfMeasure.addTimeTracing(description);
```


Measuring native time and system round trip

- User adds native function execution time right after backend call.
- User increases the counter of system round trip right after backend call.
- Advantage: Know exactly how many roundtrips causes how long time within each CPU time measurement.

```

long timer = System.currentTimeMillis();
<Native call>;
perfMeasure.addNativeTime(System.currentTimeMillis()-timer);
perfMeasure.addRoundTrip();
    
```



Measuring Result

Performance Tuning Result

[Download all result](#)

Measuring performance in sequence

Description	CPUTime	RoundTrip	NativeTime
<input type="checkbox"/> RpmModelCust.sequence1	10	0	0
<input type="checkbox"/> TestPerfMeasureCV.sequence1	3,695	2	3,695
<input type="checkbox"/>			
<input type="checkbox"/>			

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Measuring performance in free style

Description	CPUTime	RoundTrip	NativeTime
<input checked="" type="checkbox"/> RpmModelCust.free1	10	0	0
<input type="checkbox"/> TestPerfMeasureCV.free1	2,894	1	2,894
<input type="checkbox"/> TestPerfMeasureCV.free2	3,695	2	3,695
<input type="checkbox"/>			

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Measuring performance using time tracing

StartLocation	EndLocation	CPUTime
<input type="checkbox"/> RpmModelCust.time1	RpmModelCust.time2	10
<input type="checkbox"/> RpmModelCust.time2	PerfMeasure.time1	10
<input type="checkbox"/> PerfMeasure.time1	TestPerfMeasureCV.time2	2894
<input type="checkbox"/> TestPerfMeasureCV.time2	TestPerfMeasureCV.time3	801
<input type="checkbox"/>		

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