perfbase Demonstration

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Live Demo

- Experiment with b_eff_io benchmark:
  - Influence of ‘list-less I/O’ technique on performance of non-contiguous I/O
  - Parameters: block size (**S_chunk**), technique for non-contiguous I/O (**noncontig**), access type (**operation**)
    (Number of processes (NP), file system (fs), MPI version, …)
  - Results: Bandwidth for individual tests (B_scatter),
- We have:
  - A number of b_eff_io result summary files (.sum suffix)
- We want to know:
  - How much variation did occur between runs with identical parameters?
    (Depending on this information, it might be necessary to perform more runs to get statistically valid data)
  - What is the performance difference between ‘list-less’ and the conventional ‘list-based’ technique for the different I/O operations ‘write’, ‘rewrite’ and ‘read’?
    (Depending on this information, more optimizations might be required.)

Define the Experiment

- Experiment description contains
  - General Information on the experiment
  - Parameter and result values
- XML document type ‘pb_experiment.dtd’

- XML file: `exp_desc.xml`

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Create the Experiment Database

- First time users need to run perfbase commands `init` and `start` to initialize and start up the database server

- Run the perfbase command `setup`
  - Parameter: experiment description
- Creates database with database server

- Command line:

```
perfbase setup -d exp_desc.xml
```

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Show Experiment Information

- Use perfbase command `info` to retrieve information on:
  - All experiment of a database server
  - Details of an experiment
  - Details of a run

- Command line:

```
perfbase info -a
perfbase info -e b_eff_io_DEMO
```

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Update the Experiment Database

- Use the perfbase command `setup` to
  - Add or remove parameter and result values
  - Change properties of the experiment or values
- XML document type ‘pb_experiment_update.dtd’
  - XML file: `exp_update.xml`
- Command line:

```
perfbase setup -u -d exp_update.xml
```

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Create the Input Parser Definition

- Specify the retrieval or parameter and result content from a text file
- XML document type ‘pb_input.dtd’
  - XML file: `input_desc.xml`

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Import Experiment Data

- Run perfbase command `input` to import data from text files into the experiment database
  - Parameter: input description
- Multiple files are processed at once
- Command lines:

```
perfbase input -m -d input_desc.xml -f noncontig=list-less *less*.sum
perfbase input -m -d input_desc.xml -f noncontig=list-based *base*.sum
```

  - Option '-m' (aka --match-values): try to provide default values for parameters or results not found in the input files
  - Option '-f' (aka --fixed): specifiy a fixed content for a parameter value for all runs created by this import operation

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Create a Query Description

- Query description creates relations between
  - Data sources with parameter filters
  - Operators & Combiners
  - Data output
- Here:
  - Show **average** and **standard deviation**
  - Show relative differences between two sets of runs, diffentiated by a parameter value
- Operators are applied to datasets from multiple runs
- XML document type ‘pb_query.dtd’

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Perform a Query

- Run the perfbase command `query`
  - Parameter: query description
- Results can be presented in different ways
  - ASCI-formatted columns ('raw_text')
  - Gnuplot charts ('gnuplot')
  - Other output 'drivers' can be added (LaTeX, Excel XML, …)

- **Here:** Show the standard deviation and the average of the data for the list-less technique:
  - XML query description: query_stddev.xml
  - Command line:

    ```
    perfbase query -d query_stddev.xml
    ```
  - Chart is plotted to screen and to `stddev_listless.eps`

Modify the Query

- Show the relative bandwidth difference between the two I/O techniques
  - ‘above’-Operator is applied to the output of two ‘max’-Operators
  - Results for all operation types are displayed in a single ‘barchart’
- XML query description: query_above.xml
- Command line:

```
perfbase query -d query_above.xml
```

- Chart is plotted to screen and store to file: `listless_vs_listbased.eps`
- Next to this, the corresponding gnuplot command file is generated for potential manual edit:

```
listless_vs_listbased.gp
```

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