

DeltaV Users Benefit From Matlab Computing

Emerson Process Management
Advanced Control

Austin, Texas



Matlab

- The language of scientific, technical and financial computing - tens of toolboxes for the application in the following areas;
 - Data acquisition
 - Signal and image processing
 - Control design and analysis
 - Math & analysis
 - Finance and economics

Interfacing Matlab to Real World

- Data files
- I/o boards
- Advanced serial ports
- Gpib
- Network

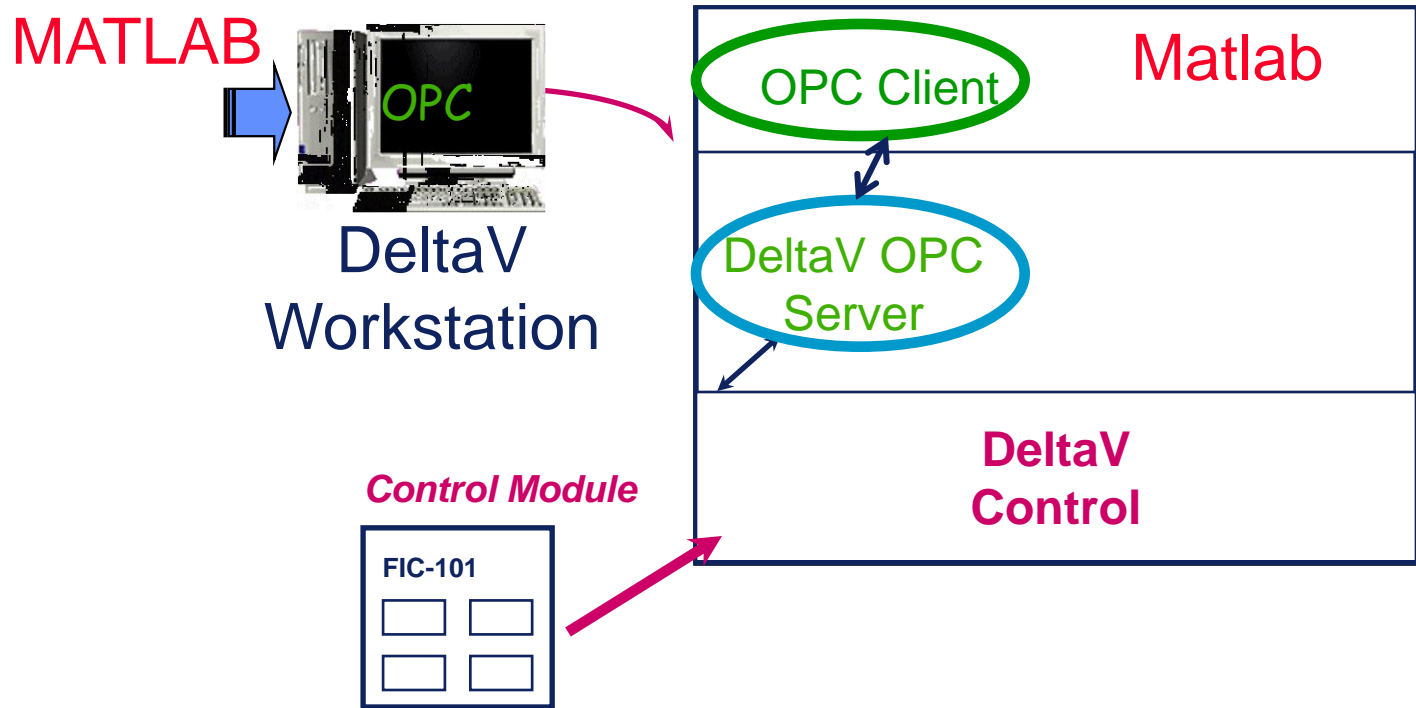
Expensive to implement, time consuming translation to Simulink required, not easy

- OPC

- Easy to implement
- Duplication of functionality avoided
- Invisible to DeltaV operation

Easy

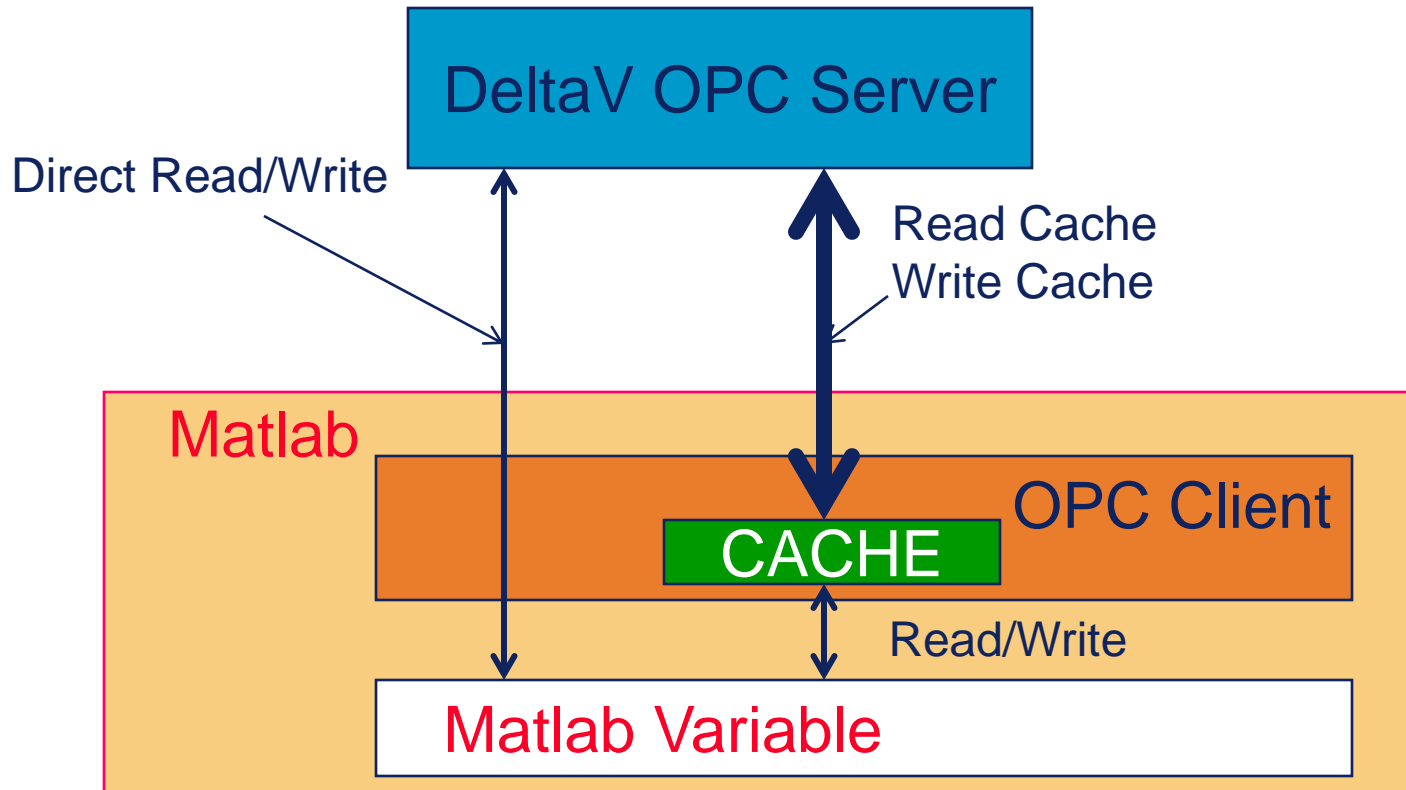
Integration of Matlab into DeltaV



Matlab OPC Client

- May be purchased directly from IPCOS TECHNOLOGY/ISMC NV (approx. 500 EU)
- Christiaan Moons
Managing Director
ISMC NV
Technologielaan 11/0101
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Matlab - DeltaV Transfer Types



Matlab - DeltaV Transfer Features

- **Direct Read/Write**

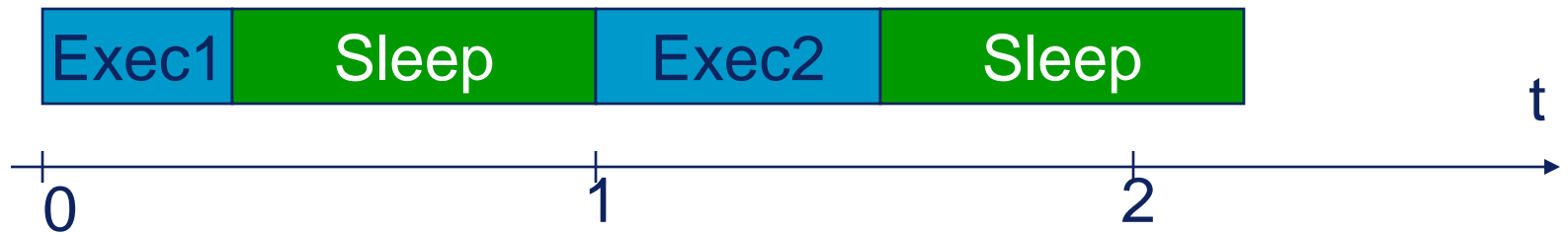
- For transfer of insignificant amount of data (tags)
- Speed depends on the actual system load
- Maximum speed: scan ~100 msec. For ~10 tags

- **Cache Read/Write**

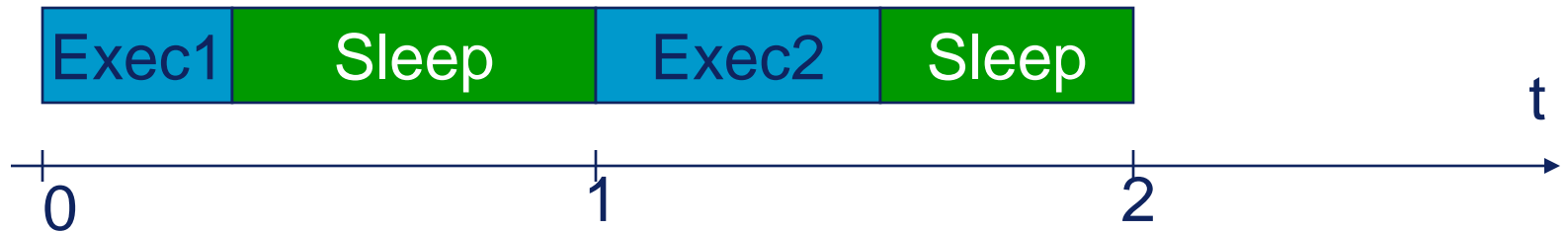
- For transfer of significant amount of data - thousands of tags
- Speed is defined by DeltaV server
- Current speed: scan ~ 1 sec.

Synchronizing Matlab Environment

- Matlab sleep



- OPC client sleep - adjusts sleep to keep constant scan



Programming - direct device access

- Initialize Client (One time)

 - `hr=mxOPC('open','Opc.DeltaV.1','localhost');`

- Set Device Mode (One time)

 - `r=mxOPC('ReadMode','Device');`

- Set Scan - Sleep (One time)

 - `mxOPC('Sleep',500);`

- Activate Sleep / Test missing scans (Once per scan)

 - `Nmissed = mxOPC('Sleep');`

- Read Value from the loop (Once per read/write)

 - `[value,hr]=mxOPC('ReadDouble','MATLABPID/PID1/PV.CV');`

Programming - Cache Access

Extra code:

- Set Cache (One time)

- `hr=mxOPC('SetDoubleCache',
'MATLABPID/PID1/GAIN.CV',1,0);`

- Set Cache Mode

- `hr=mxOPC('ReadMode','Cache');`

- Read Cache (Once per scan)

- `hr=mxOPC('ReadCache');`

Test applications

- Read/Write control loop parameters
- Testing transfer speed for various modes
- Prototyping adaptive controller (in process of development)

Conclusion

- Integrating DeltaV and Matlab is easy
- Using Matlab advances DeltaV for easy development and prototyping computationally demanding applications
- DeltaV with Matlab is a perfect tool for educational and research labs