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Reference implementation - 'metaBus' intended to provide minimalist source-code examples to include in other projects.

Demonstrations

```
'echo' 'PASS' '|' './ubiquitous_bash.sh' '_interpreter' '2>/dev/null'
# [1;32;46m init: _start_metaengine_host [0m
# [0;36m init: _set_me_null_in [0m
# [0;36m set: metaObjName= _me_processor_interpreter_file_in [0m
# [1;32;46m write: _me_processor_interpreter_file_in [0m
# [0;36m init: _set_me [0m
# [0;32m metaDir= tmp [0m
# [0;32m metaReg= tmp [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_in [0m
# [0;36m init: _set_me_io_name_in [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_out [0m
# [0;36m init: _set_me_io_name_out [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;34m ##### SET [0m
# [0;34m metaBase= /home/commonadmin/project/_playground/metaBus [0m
# [0;34m metaObjName= _me_processor_interpreter_file_in [0m

# [0;34m metaID= AtpoCMXz3IAfYBFALX [0m

# [0;34m metaPath= AtpoCMXz3IAfYBFALX [0m
# [0;34m metaDir_tmp= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/AtpoCMXz3IAfYBFALX [0m
# [0;34m metaDir_base= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/AtpoCMXz3IAfYBFALX [0m
# [0;34m metaDir= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/AtpoCMXz3IAfYBFALX [0m
# [0;34m metaReg= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/_reg [0m
# [0;34m metaConfidence= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/_reg/confidence [0m

# [0;34m ##### PATH [0m
# [0;34m in_me_a_path= /dev/null [0m
# [0;34m in_me_b_path= /dev/null [0m
# [0;34m out_me_a_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/_reg/name/01_file_in/ao [0m
# [0;34m out_me_b_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/_reg/name/01_file_in/bo [0m

# [1;32;46m fork: _me_processor_interpreter_file_in:
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/AtpoCMXz3IAfYBFALX/me.sh [0m
# [0;36m init: _set_me_rand_out [0m
# [0;32m metaType= [0m
# [0;36m cycle: in_me_a_name= (out_me_a_name)01_file_in cycle: in_me_b_name= (out_me_b_name)01_file_in [0m
# [0;34m rand: out_me_a_name= g9CEBZumELBR19RxZT rand: out_me_b_name= g9CEBZumELBR19RxZT [0m
# [0;36m set: metaObjName= _me_processor_interpreter [0m
# [1;32;46m write: _me_processor_interpreter [0m
# [0;36m init: _set_me [0m
# [0;32m metaDir= tmp [0m
# [0;32m metaReg= tmp [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_in [0m
# [0;36m init: _set_me_io_name_in [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_out [0m
# [0;36m init: _set_me_io_name_out [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;34m ##### SET [0m
# [0;34m metaBase= /home/commonadmin/project/_playground/metaBus [0m
# [0;34m metaObjName= _me_processor_interpreter [0m

# [0;34m metaID= 4bKKqIykHSGKib189S [0m

# [0;34m metaPath= 4bKKqIykHSGKib189S [0m
# [0;34m metaDir_tmp= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/4bKKqIykHSGKib189S [0m
# [0;34m metaDir_base= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/4bKKqIykHSGKib189S [0m
# [0;34m metaDir= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/4bKKqIykHSGKib189S [0m
# [0;34m metaReg= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/_reg [0m
# [0;34m metaConfidence= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/_reg/confidence [0m

# [0;34m ##### PATH [0m
# [0;34m in_me_a_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiIk/_reg/name/01_file_in/ao [0m
```

```
# [0;34m in_me_b_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/_reg/name/01_file_in/bo [0m
# [0;34m out_me_a_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/_reg/name/03_interpreter/ao [0m
# [0;34m out_me_b_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/_reg/name/03_interpreter/bo [0m

# [1;32;46m fork: _me_processor_interpreter:
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/4bKKqIykHSGKib189S/me.sh [0m
# [0;36m init: _set_me_rand_out [0m
# [0;32m metaType= [0m
# [0;36m cycle: in_me_a_name= (out_me_a_name)03_interpreter cycle: in_me_b_name= (out_me_b_name)03_interpreter [0m
# [0;34m rand: out_me_a_name= IbD10k32NNcRTANHI7 rand: out_me_b_name= IbD10k32NNcRTANHI7 [0m
# [0;36m init: _set_me_null_out [0m
# [0;36m set: metaObjName= _me_processor_interpreter_file_out [0m
# [1;32;46m write: _me_processor_interpreter_file_out [0m
# [0;36m init: _set_me [0m
# [0;32m metaDir= tmp [0m
# [0;32m metaReg= tmp [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_in [0m
# [0;36m init: _set_me_io_name_in [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_out [0m
# [0;36m init: _set_me_io_name_out [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;34m ##### SET [0m
# [0;34m metaBase= /home/commonadmin/project/_playground/metaBus [0m
# [0;34m metaObjName= _me_processor_interpreter_file_out [0m

# [0;34m metaID= kS5qyyb7mGoNPKw5F6 [0m

# [0;34m metaPath= kS5qyyb7mGoNPKw5F6 [0m
# [0;34m metaDir_tmp= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/kS5qyyb7mGoNPKw5F6 [0m
# [0;34m metaDir_base= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/kS5qyyb7mGoNPKw5F6 [0m
# [0;34m metaDir= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/kS5qyyb7mGoNPKw5F6 [0m
# [0;34m metaReg= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/_reg [0m
# [0;34m metaConfidence= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/_reg/confidence [0m

# [0;34m ##### PATH [0m
# [0;34m in_me_a_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/_reg/name/03_interpreter/ao [0m
# [0;34m in_me_b_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/_reg/name/03_interpreter/bo [0m
# [0;34m out_me_a_path= /dev/null [0m
# [0;34m out_me_b_path= /dev/null [0m

# [1;32;46m fork: _me_processor_interpreter_file_out:
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/kS5qyyb7mGoNPKw5F6/me.sh [0m
# [0;32m metaType= [0m
# [1;32;46m launch: _me_processor_interpreter_file_in [0m
# [0;36m init: _wait metaengine [0m
# [0;32m ready: in_me_a_path, in_me_b_path [0m
# [0;32m ready: in_me_a_path, in_me_b_path [0m
# [1;32;46m processor: _me_processor_interpreter_file_in [0m
# [0;34m init: _start metaengine [0m
# [0;36m init: _set_me [0m
# [0;32m metaDir= tmp [0m
# [0;32m metaReg= tmp [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_in [0m
# [0;36m init: _set_me_io_name_in [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_out [0m
# [0;36m init: _set_me_io_name_out [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;34m ##### SET [0m
# [0;34m metaBase= /home/commonadmin/project/_playground/metaBus [0m
# [0;34m metaObjName= _me_processor_interpreter_file_in [0m

# [0;34m metaID= AtpoCMXz3IAfYBFALX [0m

# [0;34m metaPath= AtpoCMXz3IAfYBFALX [0m
# [0;34m metaDir_tmp= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/AtpoCMXz3IAfYBFALX [0m
# [0;34m metaDir_base= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/AtpoCMXz3IAfYBFALX [0m
# [0;34m metaDir= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/AtpoCMXz3IAfYBFALX [0m
# [0;34m metaReg= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDiiK/_reg [0m
```

```
# [0;34m metaConfidence= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/confidence [0m

# [0;34m ##### PATH [0m
# [0;34m in_me_a_path= /dev/null [0m
# [0;34m in_me_b_path= /dev/null [0m
# [0;34m out_me_a_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in/ao [0m
# [0;34m out_me_b_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in/bo [0m

# [0;36m init: _report_metaengine [0m
# [1;32;46m launch: [0m
# [0;36m init: _wait_metaengine [0m
# [0;36m init: _relink_metaengine [0m
# [0;32m valid: name_in [0m
# [0;36m init: _relink_metaengine_name [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/null [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/null [0m
# [1;32;46m launch: _me_processor_interpreter_file_out [0m
# [0;36m init: _wait_metaengine [0m
# [0;32m return: complete [0m
# [0;32m return: success [0m
# [0;36m init: _relink_metaengine [0m
# [0;32m valid: name_out [0m
# [0;36m init: _relink_metaengine_name [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in [0m
# [0;34m _relink_relative /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/AtpoCMXz3IAfYBFALX/ao
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in/ao [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in [0m
# [0;34m _relink_relative /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/AtpoCMXz3IAfYBFALX/bo
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in/bo [0m
# [0;32m return: complete [0m
# [0;32m return: success [0m
# [0;32m ready: in_me_a_path, in_me_b_path [0m
# [0;32m ready: in_me_a_path, in_me_b_path [0m
# [1;32;46m processor: _me_processor_interpreter [0m
# [0;34m init: _start_metaengine [0m
# [0;36m init: _set_me [0m
# [0;32m metaDir= tmp [0m
# [0;32m metaReg= tmp [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_in [0m
# [0;36m init: _set_me_io_name_in [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_out [0m
# [0;36m init: _set_me_io_name_out [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;34m ##### SET [0m
# [0;34m metaBase= /home/commonadmin/project/_playground/metaBus [0m
# [0;34m metaObjName= _me_processor_interpreter [0m

# [0;34m metaID= 4bKKqIykHSGKib189S [0m

# [0;34m metaPath= 4bKKqIykHSGKib189S [0m
# [0;34m metaDir_tmp= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/4bKKqIykHSGKib189S [0m
# [0;34m metaDir_base= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/4bKKqIykHSGKib189S [0m
# [0;34m metaDir= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/4bKKqIykHSGKib189S [0m
# [0;34m metaReg= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg [0m
# [0;34m metaConfidence= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/confidence [0m

# [0;34m ##### PATH [0m
# [0;34m in_me_a_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in/ao [0m
# [0;34m in_me_b_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in/bo [0m
# [0;34m out_me_a_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter/ao [0m
# [0;34m out_me_b_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter/bo [0m

# [0;36m init: _report_metaengine [0m
# [0;36m init: _relink_metaengine [0m
# [0;32m valid: name_in [0m
# [0;36m init: _relink_metaengine_name [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in [0m
# [0;34m _relink_relative /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in/ao
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/4bKKqIykHSGKib189S/ai [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in [0m
# [0;34m _relink_relative /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/01_file_in/bo
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/4bKKqIykHSGKib189S/bi [0m
# [0;32m return: complete [0m
```

```
# [0;32m return: success [0m
# [0;36m init: _relink_metaengine [0m
# [0;32m valid: name_out [0m
# [0;36m init: _relink_metaengine_name [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter [0m
# [0;34m _relink_relative /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/4bKKqIykHSGKib189S/ao
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter/ao [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter [0m
# [0;34m _relink_relative /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/4bKKqIykHSGKib189S/bo
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter/bo [0m
# [0;32m return: complete [0m
# [0;32m return: success [0m
# [0;36m init: _interpreter_filter [0m
# [0;32m ready: in_me_a_path, in_me_b_path [0m
# [0;32m ready: in_me_a_path, in_me_b_path [0m
# [1;32;46m processor: _me_processor_interpreter_file_out [0m
# [0;34m init: _start_metaengine [0m
# [0;36m init: _set_me [0m
# [0;32m metaDir= tmp [0m
# [0;32m metaReg= tmp [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_in [0m
# [0;36m init: _set_me_io_name_in [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;36m init: _set_me_io [0m
# [0;32m valid: name_out [0m
# [0;36m init: _set_me_io_name_out [0m
# [0;32m return: success [0m
# [0;32m return: success [0m
# [0;34m ##### SET [0m
# [0;34m metaBase= /home/commonadmin/project/_playground/metaBus [0m
# [0;34m metaObjName= _me_processor_interpreter_file_out [0m

# [0;34m metaID= kS5qyyb7mGoNPKw5F6 [0m

# [0;34m metaPath= kS5qyyb7mGoNPKw5F6 [0m
# [0;34m metaDir_tmp= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/kS5qyyb7mGoNPKw5F6 [0m
# [0;34m metaDir_base= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/kS5qyyb7mGoNPKw5F6 [0m
# [0;34m metaDir= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/kS5qyyb7mGoNPKw5F6 [0m
# [0;34m metaReg= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg [0m
# [0;34m metaConfidence= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/confidence [0m

# [0;34m ##### PATH [0m
# [0;34m in_me_a_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter/ao [0m
# [0;34m in_me_b_path= /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter/bo [0m
# [0;34m out_me_a_path= /dev/null [0m
# [0;34m out_me_b_path= /dev/null [0m

# [0;36m init: _report_metaengine [0m
# [0;36m init: _relink_metaengine [0m
# [0;32m valid: name_in [0m
# [0;36m init: _relink_metaengine_name [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter [0m
# [0;34m _relink_relative /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter/ao
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/kS5qyyb7mGoNPKw5F6/ai [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter [0m
# [0;34m _relink_relative /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/03_interpreter/bo
/home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/kS5qyyb7mGoNPKw5F6/bi [0m
# [0;32m return: complete [0m
# [0;32m return: success [0m
# [0;36m init: _relink_metaengine [0m
# [0;32m valid: name_out [0m
# [0;36m init: _relink_metaengine_name [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/null [0m
# [0;34m mkdir -p /home/commonadmin/project/_playground/metaBus/.m_9SEjSbgQQv1lkRDik/_reg/name/null [0m
# [0;32m return: complete [0m
# [0;32m return: success [0m
```

Usage

```
# Interprets 'talk' , responds with corresponding 'talk' . Basic command line interface example.
echo 'PASS' | ./ubiquitous_bash.sh _interpreter

# Basic command interpreter - interprets 'talk' , responds with corresponding 'talk' .
# Largely serves to demonstrate a well-arranged implementation of a processing chain.
# No production use. *Strongly discouraged.* Actual applications realistically cannot assume transport assures complete
input/output strings.
# Directly piping from one command to another is possible if the '_process_reflector_*' functions own standard output is
redirected to a file (suppressing inappropriate log messages to actual standard output as suggested by comments in script
'reflector.sh').
echo 'PASS' | ./ubiquitous_bash.sh _reflector_ask
echo 'PASS' | ./ubiquitous_bash.sh _reflector_answer
echo 'PASS' | ./ubiquitous_bash.sh _reflector_present
```

Inspection

```
MetaEngine "$metaDir" directories may be examined by adding a delay (ie. 'sleep 90' ) before or overriding
'_stop_metaengine_wait' .
```

Design

Please keep all examples and associated code as 'elegant' as possible - perhaps simple and nonrepetitive - to best illustrate logic flow. Flow charts may not be adequate to supplement unnecessarily complicated code.

Sufficiently reusable functions may be ported upstream to 'ubiquitous_bash' to allow more rapid or more obvious assembly of at least some specialized types of MetaEngine processing chains.

Serialization

Any serialization format should be acceptable for sending messages across shared channels. However, these channels should be assumed 'noisy' so that multiple serialization formats may be used simultaneously.

Transports

Existing IPC transports may be used with, or independently of, MetaEngine . However, the essential benefits of ad-hoc real-time redirection, innumerable 'ports', noise/collision tolerance, native executable multiplatform compatibility (UNIX/MSW), may not be directly provided.

ZeroMQ

May not offer an MSW compatible transport layer.

' inter-process communication (Linux only and not available in any of the native ports as yet) '
<https://blog.scottlogic.com/2015/03/20/ZeroMQ-Quick-Intro.html>

'Does it requires to install wsl2 or dependency is natively available without install wsl2 ?

It is an hard dependency :(not easy to manage with installer.'
<https://github.com/zeromq/libzmq/issues/153>

Redis

May not offer an MSW compatible transport layer.

<https://redislabs.com/blog/redis-on-windows-10/>

RabbitMQ

<https://www.rabbitmq.com/tutorials/tutorial-three-python.html>

DBus

"If you use this low-level API directly, you're signing up for some pain."
<https://dbus.freedesktop.org/doc/api/html/index.html>
<https://hackaday.io/project/279-sonomkr-noise-monitoring/log/86364-zeromq-vs-dbus-for-pub-sub-pattern>

FIFO

As typically provided by OS, FIFO (named pipe) may not be directly receivable by multiple recipients.

<https://stackoverflow.com/questions/33613341/how-to-send-broadcast-messages-with-named-pipe-using-c>

TCP

A possible workaround may be to declare a 'standard' TCP port for IPC by the 'primary' user of a computer, an approach typical of 'extendedInterface'.

Distribution

Best practice may be to add a 'git submodule' to a '_lib' subdirectory of any project using 'metaBus' .

Ideally, an uncompressed, squashfs, or otherwise accessible filesystem should always be made available for developers who may need to quickly maintain associated hardware (ie. 3D printers in factories). However, good compression of source code including multiple repositories with 'metaBus' submodules might be achieved with 'bup' .

Redistribution and Preservation

Entire 'recursive' clones of the 'metaBus' and derivative repositories may be appropriate for redistribution and preservation.

```
git clone --recursive https://github.com/mirage335/metaBus
```

Distributing a 'binary' version with a separate means to obtain a 'source' copy is *strongly discouraged*.

Without relevant source code, it may become infeasible to interoperate with, or to revise, potentially expensive, complicated, or otherwise entrenched hardware and software systems. Entire point of 'metaBus' project, is to ensure new or redundant modules, may be connected ad-hoc, to existing systems. In particular, 'metaBus' is intended to further eliminate maintenance labor from the widespread use of 3D printing.

For 'development' work, the complete repository is a necessity which modern data storage and bandwidth is easily able to accommodate.

Particularly, please respect the 'Remote Network Interaction' requirements of the GNU Affero General Public License associated with this software - author's desire is that all clients must have prominent notices of 'Corresponding Source' availability. Simply because the communications happening over 'metaBus' networks may or may not be intended for *direct* end-user interaction, is not an excuse for unreasonable lack of due diligence.

As examples, the following use cases include end-user interaction which provides at least reasonable opportunity for prominent notification of 'Corresponding Source' availability.

- * Documentation, hardcopy or otherwise, intended for end-user reading, in any way distributed with 'metaBus' software, or with hardware which may include 'metaBus' software.
- * Messages sent by 3D printer firmware over serial port (eg. UART) at startup and/or as typical of responses to G-Code commands, which may include end-user notices of other copyright, firmware, machine name, etc.
- * Client programs (eg. 'pronterface') which are intended for end-user interaction and are in any way distributed with 'metaBus' software, or with hardware which may include 'metaBus' software.
- * An occupancy sensor graphic indicator on an internet accessible service intended for end-users which may include commentary, notices of other copyright/authorship/ownership, etc.

To be clear, in such cases which provide at least reasonable opportunity for prominent notification of 'Corresponding Source' availability, author's desire is to require such prominent notification.

Patent enforcement by distributors of metaBus may be subject to the requirements of the GNU Affero General Public License associated with this software. Additionally, some patent holders have pledged to limit their own enforcement of patents.

'Open Invention Network (OIN) is a company that acquires patents and licenses them royalty-free to its community members who, in turn, agree not to assert their own patents against Linux and Linux-related systems and applications.[1]'
https://en.wikipedia.org/wiki/Open_Invention_Network

'Microsoft has irrevocably pledged not to assert any claims against open source developers[21] which CEO Steve Ballmer called "an important step and significant change in how we share information about our products and technologies."[22] This pledge has been accepted with some skepticism.[23]'
https://en.wikipedia.org/wiki/Software_patents_and_free_software

'It has now yielded, under pressure from the market and from the European Commission.'
https://web.archive.org/web/20120910183540/http://www.gartner.com/DisplayDocument?doc_cd=155733
<https://www.microsoft.com/en-us/legal/intellectualproperty/ip-and-open-source>
<https://www.zdnet.com/article/microsoft-open-sources-its-entire-patent-portfolio/>

Future Work

- * Demonstrate ability to preserve less dependable SSDs (ie. typical SD Cards) by automatically detecting usable `"/dev/shm"` as `"$metaDir"` (derived from `"$metaTmp"`) location (also applies to upstream Ubiquitous Bash).
- * Real-time examples using FIFO , many-to-many 'broadcast' over FIFO and/or TCP/UDP , etc .

Reference

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