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# **Abuse of MessageSvc and MsgStream Objects**

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# The Problem

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- perfmon shows a lot of time spent inside MsgStream objects that are never printed out, because the job/algorithm logging level is set higher than the level of the MsgStream object. ie DEBUG messages:

```
...
MsgStream log(msgSvc,name());
log << MSG::DEBUG << "lets " << write << " a " << m_lot
    << " of " << m_stuff << " to " << debug << output << endreq;
```

- even worse:

```
...
MsgStream log(msgSvc,name());

while (counter < a_very_large_number) {
    important_var = do_some_useful_crap(m_crap);
    log << MSG::DEBUG << "the output of do_something with input "
        << m_crap << " is " << important_var << endreq;
}
```

# Why It's A Problem

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```
MsgStream& operator<< (MSG::Level level) {
    return report(level);
}

MsgStream& report(int lvl) {
    lvl = (lvl >= MSG::NUM_LEVELS) ?
        MSG::ALWAYS : (lvl < MSG::NIL) ? MSG::NIL : lvl;
    if ((m_currLevel=MSG::Level(lvl)) >= level()) {
        activate();
    } else {
        deactivate();
    }
    return *this;
}

template <typename T>
MsgStream& operator<< (MsgStream& lhs, const T& arg) {
    if(lhs.isActive())
        try { lhs.stream() << arg; } catch (...) {}
    return lhs;
}
```

# How To Detect Abuses

```
class GAUDI_API IInactiveMessageCounter: virtual public
IInterface {
public:
    DeclareInterfaceID(IInactiveMessageCounter,1,0);
    virtual void incrInactiveCount( MSG::Level level,
                                   const std::string& src ) = 0;
};
```

```
MsgStream& report(int lvl) {
    lvl = (lvl >= MSG::NUM_LEVELS) ?
        MSG::ALWAYS : (lvl < MSG::NIL) ? MSG::NIL : lvl;
    if ((m_currLevel=MSG::Level(lvl)) >= level()) {
        activate();
    } else {
        deactivate();
#ifdef NDEBUG
        if (MsgStream::countInactive() && m_inactCounter) {
            m_inactCounter->incrInactiveCount(MSG::Level(lvl),m_source);
        }
#endif
    }
    return *this;
}
```

# How To Run

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- only works for debug builds
- set `MessageSvc.countInactive` property to `True`
- ```
> Reco_trf.py AMI=q122 \  
append_postExec=svcMgr.MessageSvc.countInactive=True
```
- results summarized at end of job
- there will be some false positives if `#ifndef NDEBUG` statements are used to protect output (eg `ClassIDSvc`)

# RAWtoESD: Top 10 Offenders

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## DEBUG

|                                 |         |
|---------------------------------|---------|
| ToolSvc.TrigDataAccess          | 4606240 |
| LArRawChannelBuilder            | 257518  |
| ToolSvc.LArHVCablingTool        | 100459  |
| MdtSubdetectorMap               | 88764   |
| ToolSvc.LArRodDecoder           | 65058   |
| InDetSCT_Clusterization         | 45890   |
| TriggerTowerCollectionConverter | 37130   |
| StoreGateSvc                    | 35107   |
| ToolSvc.RpcPrepDataProviderTool | 32836   |
| MuonCalibAlg                    | 32139   |

## VERBOSE

|                                     |          |
|-------------------------------------|----------|
| ClassIDSvc                          | 31110828 |
| ToolSvc.RpcR0D_Decoder              | 1023886  |
| ToolSvc.MuonTrackingGeometryBuilder | 285477   |
| ToolSvc.HLTCaloFEB                  | 219080   |
| ToolSvc.TileCondToolEmscale         | 158977   |
| ToolSvc.MDTCablingDbTool            | 132200   |
| LArRawChannelBuilder                | 128751   |
| SCT_ClusterContainerCnv             | 91691    |
| TRT_DriftCircleContainerCnv         | 82670    |
| ToolSvc.MGM_AlignmentDbTool         | 38176    |

# ESDtoDPD: Top 10 Offenders

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## DEBUG

|                                 |       |
|---------------------------------|-------|
| TRT_DriftCircleContainerCnv     | 56890 |
| TriggerTowerCollectionConverter | 55567 |
| MuonRdoContainerTPCnv           | 22473 |
| RpcPadContainerCnv              | 22429 |
| SCT_ClusterContainerCnv         | 15817 |
| AGDD2GeoSvc                     | 9760  |
| ToolSvc.SCT_RegionSelectorTable | 8181  |
| MdtCsmContainerCnv              | 7469  |
| CaloClusterContainerCnv         | 4223  |
| MuGM:MuonFactory                | 3513  |

## VERBOSE

|                                     |         |
|-------------------------------------|---------|
| ClassIDSvc                          | 8848684 |
| ToolSvc.MuonTrackingGeometryBuilder | 285477  |
| ToolSvc.TileCondToolEmscale         | 158977  |
| SCT_ClusterContainerCnv             | 111902  |
| TRT_DriftCircleContainerCnv         | 56851   |
| ToolSvc.MGM_AlignmentDbTool         | 38176   |
| PixelClusterContainerCnv            | 25641   |
| ToolSvc.SCT_RegionSelectorTable     | 16353   |
| MuGM:MdtReadoutElement              | 8884    |
| DataProxy                           | 7415    |

# ESDtoAOD: Top 10 Offenders

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## DEBUG

|                                    |        |
|------------------------------------|--------|
| TrigMenuNtupleAlg.TrigDecisionTool | 116311 |
| THistSvc                           | 97830  |
| ToolSvc.L1PPrMonTool               | 71692  |
| MdtSubdetectorMap                  | 44382  |
| TriggerTowerCollectionConverter    | 35850  |
| ToolSvc.CaloClusterMonNoTA         | 24090  |
| SCT_ClusterContainerCnv            | 22695  |
| StoreGateSvc                       | 11658  |
| AGDD2GeoSvc                        | 9760   |
| MuonRPC_CablingSvc                 | 5469   |

## VERBOSE

|                                     |          |
|-------------------------------------|----------|
| ClassIDSvc                          | 17332141 |
| ToolSvc.MuonTrackingGeometryBuilder | 285477   |
| ToolSvc.TileCondToolEmscale         | 158977   |
| SCT_ClusterContainerCnv             | 69030    |
| ToolSvc.MDTCablingDbTool            | 66104    |
| ToolSvc.MGM_AlignmentDbTool         | 38176    |
| TrigMenuNtupleAlg.TrigDecisionTool  | 15149    |
| CaloTTOnOffIdMap                    | 14336    |
| CaloTTOnAttrIdMap                   | 14336    |
| MuGM:MdtReadoutElement              | 12842    |



# How To Fix Your Code

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- it's easy!

```
if (m_log.level() <= MSG::DEBUG) {  
    m_log << MSG::DEBUG << "My output is now protected!"  
    << endreq;  
}
```

- if you want to be super anal:

```
#ifndef NDEBUG  
    if (m_log.level() <= MSG::DEBUG) {  
        m_log << MSG::DEBUG << "My output is now protected!"  
        << endreq;  
    }  
#endif
```