Licklider Transmission Protocol Agent Application Data Model
draft-birrane-dtn-adm-ltp-01

Abstract

This document describes the Application Data Model (ADM) for a Licklider Transmission Protocol Agent (LTPA) in compliance with the template provided by [I-D.birrane-dtn-adm].

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1. Introduction

An Application Data Model (ADM) provides a guaranteed interface for the management of an application or protocol in accordance with the Asynchronous Management Architecture (AMA) defined in [I-D.birrane-dtn-ama]. The ADM described in this document complies with the ADM Template provided in [I-D.birrane-dtn-adm] as encoded using the JSON syntax.

Licklider Transmission Protocol Agents (LTPAs) are software instances that implement functionality required by the Licklider Transmission Protocol [RFC5326]. LTP is a convergence layer protocol. There is no flow control or congestion control in LTP. LTP must run either over UDP or directly over a link layer protocol. Because of this, LTP cannot be used in every situation. This LTP Agent ADM provides the set of information necessary to provide retransmission based reliability on challenged networks, focusing on the information that an agent on a network implementing LTP would need in order to run correctly.

1.1. Technical Notes

- This document describes Version 0.0 of the LTP Agent ADM.

- The AMM Resource Identifier (ARI) for this ADM is NOT correctly set. A sample ARI is used in this version of the specification and MAY change in future versions of this ADM until an ARI registry is established. This notice will be removed at that time.

- Agent applications MAY choose to ignore the name, description, or other annotative information associated with the component.
definitions within this ADM where such items are only used to
provide human-readable information or are otherwise not necessary
to manage a device.

1.2.  Scope

This ADM specifies those components of the Asynchronous Management
Model (AMM) common to the management of any instance of a LTP Agent.

Any Manager software implementing this ADM MUST perform the
responsibilities of an AMA Manager as outlined in
[I-D.birrane-dtn-adm] as they relate to the objects included in this
document.

Any Agent software implementing this ADM MUST perform the
responsibilities of an AMA Agent as outlined in [I-D.birrane-dtn-adm]
as they relate to the objects included in this document.

1.3.  Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
"SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
document are to be interpreted as described in RFC 2119 [RFC2119].

2.  Structure and Design of this ADM

The LTP Agent ADM’s structure is in accordance to
[I-D.birrane-dtn-adm].  This ADM contains metadata, edd, report
templates, and controls.  Externally Defined Data (EDD) are values
that are calculated external to the ADM system.  Controls are
predefined and sometimes parameterized opcodes that can be run on an
Agent.  Report Templates are ordered sets of data descriptions that
show how values will be represented in a corresponding report.  There
are no variables, table templates, macros, or operators in this ADM
at this time.  The contents of this ADM are derived from the main
functions and data that an agent needs to run LTP RFC 5326 [RFC5326].

The Metadata that is present in this document is common to all ADMs.
All ADMs have metadata that includes the name, namespace, and version
of the ADM as well as the name of the organization that is issuing
that particular ADM.  This is important for identification purposes
of the ADMs and to ensure version control.  The main idea identified
in LTP that is present in this ADM is a span of potential LTP data
interchange between engines(nodes on a network that use LTP).
3. Naming and Identification

This section outlines the namespaces used to uniquely identify ADM objects in this specification.

3.1. Namespace and Nicknames

In accordance with [I-D.birrane-dtn-adm], every ADM is assigned a moderated Namespace. In accordance with [I-D.birrane-dtn-amp], these namespaces may be enumerated for compactness. The namespace and ADM identification for these objects is defined as follows.

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namespace</td>
<td>DTN/ltp_agent</td>
</tr>
<tr>
<td>ADM Enumeration</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 1: Namespace Information

Given the above ADM enumeration, in accordance with [I-D.birrane-dtn-amp], the following AMP nicknames are defined.
<table>
<thead>
<tr>
<th>Nickname</th>
<th>Collection as an ARI</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>DTN/ltp_agent/Const</td>
</tr>
<tr>
<td>61</td>
<td>DTN/ltp_agent/Ctrl</td>
</tr>
<tr>
<td>62</td>
<td>DTN/ltp_agent/Edd</td>
</tr>
<tr>
<td>63</td>
<td>DTN/ltp_agent/Mac</td>
</tr>
<tr>
<td>64</td>
<td>DTN/ltp_agent/Oper</td>
</tr>
<tr>
<td>65</td>
<td>DTN/ltp_agent/Rptt</td>
</tr>
<tr>
<td>67</td>
<td>DTN/ltp_agent/Tblt</td>
</tr>
<tr>
<td>69</td>
<td>DTN/ltp_agent/Var</td>
</tr>
<tr>
<td>70</td>
<td>DTN/ltp_agent/Mdat</td>
</tr>
<tr>
<td>71-79</td>
<td>DTN/ltp_agent/Reserved</td>
</tr>
</tbody>
</table>

Table 2: LTP ADM Nicknames

4. LTP Agent ADM JSON Encoding

```json
{
    "Mdat": [{
        "name": "name",
        "type": "STR",
        "value": "ltp_agent",
        "description": "The human-readable name of the ADM."
    },
    {
        "name": "namespace",
        "type": "STR",
        "value": "DTN/ltp_agent",
        "description": "The namespace of the ADM."
    },
    {
        "name": "version",
        "type": "STR",
        "value": "v0.0",
        "description": "The version of the ADM."
    }
}
```
{
  "name": "organization",
  "type": "STR",
  "value": "JHUAPL",
  "description": "The name of the issuing organization of the ADM."
},
"Edd": [{
  "name": "span_remote_engine_nbr",
  "type": "UINT",
  "parmspec": [{
    "type": "UINT",
    "name": "ltp_span"
  }],
  "description": "The remote engine number of this span."
},
{
  "name": "span_cur_expt_sess",
  "type": "UINT",
  "parmspec": [{
    "type": "UINT",
    "name": "ltp_span"
  }],
  "description": "Expected sessions on this span."
},
{
  "name": "span_cur_out_seg",
  "type": "UINT",
  "parmspec": [{
    "type": "UINT",
    "name": "ltp_span"
  }],
  "description": "The current number of outbound segments for this span."
},
{
  "name": "span_cur_imp_sess",
  "type": "UINT",
  "parmspec": [{
    "type": "UINT",
    "name": "ltp_span"
  }],
  "description": "The current number of import segments for this span."
},
{ "name": "span_cur_in_seg",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}]
,
"description": "The current number of inbound segments for this span."
},

{  
"name": "span_reset_time",
"type": "UVAST",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}]
,
"description": "The last time the span counters were reset."
},

{  
"name": "span_out_seg_q_cnt",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}]
,
"description": "The output segment queued count for the span."
},

{  
"name": "span_out_seg_q_bytes",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}]
,
"description": "The output segment queued bytes for the span."
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"name": "span_out_seg_pop_cnt",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}]
,
"description": "The output segment popped count for the span."
},

{  
"name": "span_out_seg_pop_bytes",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}]

"type": "UINT",
"name": "ltp_span"
],
"description": "The output segment popped bytes for the span."
},
{
"name": "span_out_ckpt_xmit_cnt",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}],
"description": "The output checkpoint transmit count for the span."
},
{
"name": "span_out_pos_ack_rx_cnt",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}],
"description": "The output positive acknowledgment received count for the span."
},
{
"name": "span_out_neg_ack_rx_cnt",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}],
"description": "The output negative acknowledgment received count for the span."
},
{
"name": "span_out_cancel_rx_cnt",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}],
"description": "The output canceled received count for the span."
},
{
"name": "span_out_ckpt_rexmit_cnt",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}],
"description": "The output checkpoint retransmission count for the span."
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   "name": "ltp_span"
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},
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      "name": "ltp_span"
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,"description": "The output cancel retransmit count for the span."
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   "name": "span_out_complete_cnt",
   "type": "UINT",
   "parmspec": [{
      "type": "UINT",
      "name": "ltp_span"
   }]
,"description": "The output completed count for the span."
},
{
   "name": "span_in_seg_rx_red_cnt",
   "type": "UINT",
   "parmspec": [{
      "type": "UINT",
      "name": "ltp_span"
   }]
,"description": "The input segment received red count for the span."
},
{
   "name": "span_in_seg_rx_red_bytes",
   "type": "UINT",
   "parmspec": [{
      "type": "UINT",
      "name": "ltp_span"
   }]
,"description": "The input segment received red bytes for the span."
},
{
   "name": "span_in_seg_rx_green_cnt",
}
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}],
"description": "The input segment received green count for the span."
},
{
  "name": "span_in_seg_rx_green_bytes",
  "type": "UINT",
  "parmspec": [{
    "type": "UINT",
    "name": "ltp_span"
  }],
  "description": "The input segment received green bytes for the span."
},
{
  "name": "span_in_seg_rx_redundant_cnt",
  "type": "UINT",
  "parmspec": [{
    "type": "UINT",
    "name": "ltp_span"
  }],
  "description": "The input segment received redundant count for the span."
},
{
  "name": "span_in_seg_rx_redundant_bytes",
  "type": "UINT",
  "parmspec": [{
    "type": "UINT",
    "name": "ltp_span"
  }],
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  "name": "span_in_seg_rx_mal_cnt",
  "type": "UINT",
  "parmspec": [{
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    "name": "ltp_span"
  }],
  "description": "The input segment malformed count for the span."
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  "name": "ltp_span"
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"description": "The input segment unknown sender count for the span."
},
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"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
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},
"description": "The input segment unknown sender bytes for the span."
},
{name": "span_in_seg_rx_unk_client_cnt",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}]
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"description": "The input segment unknown client count for the span."
},
{name": "span_in_seg_rx_unk_client_bytes",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}]
},
"description": "The input segment unknown client bytes for the span."
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{  
  "name": "span_in_seg_stray_cnt",
  "type": "UINT",
  "parmspec": [{
    "type": "UINT",
    "name": "ltp_span"
  }],
  "description": "The input segment stray count for the span."
},

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  "name": "span_in_seg_stray_bytes",
  "type": "UINT",
  "parmspec": [{
    "type": "UINT",
    "name": "ltp_span"
  }],
  "description": "The input segment stray bytes for the span."
},

{  
  "name": "span_in_seg_miscolor_cnt",
  "type": "UINT",
  "parmspec": [{
    "type": "UINT",
    "name": "ltp_span"
  }],
  "description": "The input segment miscolored count for the span."
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    "name": "ltp_span"
  }],
  "description": "The input segment miscolored bytes for the span."
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  "name": "span_in_seg_closed_cnt",
  "type": "UINT",
  "parmspec": [{
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    "name": "ltp_span"
  }],
  "description": "The input segment closed count for the span."
}

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"type": "UINT",
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      "name": "ltp_span"
    },
    "description": "The input segment closed bytes for the span."
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"type": "UINT",
"parmspec": [
    {
      "type": "UINT",
      "name": "ltp_span"
    },
    "description": "The input checkpoint receive count for the span."
],

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"type": "UINT",
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    {
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      "name": "ltp_span"
    },
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],

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    },
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"type": "UINT",
"parmspec": [{
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  "name": "ltp_span"
}]
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"description": "The input acknowledgeable retransmit count for the span."
},
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"parmspec": [{
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  "name": "ltp_span"
}]
},
"description": "The input cancel receive count for the span."
},
{"name": "span_in_complete_cnt",
"type": "UINT",
"parmspec": [{
  "type": "UINT",
  "name": "ltp_span"
}]
},
"description": "The input completed count for the span."
}
],
"Tblt": [{
"name": "engines",
"columns": [{
  "type": "UVAST",
  "name": "peer_engine_nbr"
}],
"description": "This table lists all known remote engine ids."
}],
"Rptt": [{
"name": "endpointReport",
"parmspec": [{
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  "name": "ltp_span"
}]
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"definition": [
{"ns": "DTN/ltp_agent",
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  "value": "ltp_span"}]
]}
]
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"nm":"edd.span_out_seg_pop_cnt",
"ap": [{
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  "value": "ltp_span"
}]
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  "ns":"DTN/ltp_agent",
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  "ap": [{
    "type": "ParmName",
    "value": "ltp_span"
  }]
}],
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  "nm":"edd.span_out_ckpt_xmit_cnt",
  "ap": [{
    "type": "ParmName",
    "value": "ltp_span"
  }]
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  "ns":"DTN/ltp_agent",
  "nm":"edd.span_out_pos_ack_rx_cnt",
  "ap": [{
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    "value": "ltp_span"
  }]
},
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  "ns":"DTN/ltp_agent",
  "nm":"edd.span_out_neg_ack_rx_cnt",
  "ap": [{
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    "value": "ltp_span"
  }]}
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}]
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"ap": [{
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"value": "ltp_span"
}]
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"ap": [{
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"value": "ltp_span"
}]
},

"ns":"DTN/ltp_agent",
"nm":"edd.span_out_complete_cnt",
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},

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},

"ns":"DTN/ltp_agent",
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"ap": [{
"type": "ParmName",
"value": "ltp_span"
}]
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"ns":"DTN/ltp_agent",
"nm":"edd.span_in_seg_rx_green_cnt",
"ap": [{
"type": "ParmName",
"value": "ltp_span"
}]
}


"value": "ltp_span"
]}
},
"ns":"DTN/ltp_agent",
"nm":"edd.span_in_ckpt_rx_cnt",
"ap": [{
"type": "ParmName",
"value": "ltp_span"
}]
},
"ns":"DTN/ltp_agent",
"nm":"edd.span_in_pos_ack_tx_cnt",
"ap": [{
"type": "ParmName",
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}]
},
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}]
},
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"ap": [{
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"nm":"edd.span_in_neg_ack_tx_cnt",
"ap": [{
"type": "ParmName",
"value": "ltp_span"
}]
},
"ns":"DTN/ltp_agent",
"nm":"edd.span_in_cancel_tx_cnt",
"ap": [{
"type": "ParmName",
"value": "ltp_span"
}]
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"ns":"DTN/ltp_agent",
"nm":"edd.span_in_cancel_rx_cnt",
"ap": [{
"type": "ParmName",
"value": "ltp_span"
}]
}
"type": "ParmName",
"value": "ltp_span"
}
],
    "ns":"DTN/ltp_agent",
    "nm":"edd.span_in_complete_cnt",
    "ap": [{
        "type": "ParmName",
        "value": "ltp_span"
    }]
}]
"description": "This is all known endpoint information"
]}

"Ctrl": [{
    "name": "reset",
    "parmspec": [{
        "type": "UINT",
        "name": "ltp_span"
    }],
    "description": "Resets the counters associated with the engine and updates the last reset time for the span to be the time when this control was run."
}
]

5. IANA Considerations

At this time, this protocol has no fields registered by IANA.

6. References

6.1. Informative References

[I-D.birrane-dtn-ama]
Birrane, E., "Asynchronous Management Architecture",
draft-birrane-dtn-ama-07 (work in progress), June 2018.

6.2. Normative References

[I-D.birrane-dtn-adm]
Birrane, E., DiPietro, E., and D. Linko, "AMA Application Data Model",
draft-birrane-dtn-adm-02 (work in progress), June 2018.


Authors’ Addresses

Edward J. Birrane
Johns Hopkins Applied Physics Laboratory
Email: Edward.Birrane@jhuapl.edu

Evana DiPietro
Johns Hopkins Applied Physics Laboratory
Email: Evana.DiPietro@jhuapl.edu

David Linko
Johns Hopkins Applied Physics Laboratory
Email: David.Linko@jhuapl.edu