

Delay-Tolerant Networking
Internet-Draft
Intended status: Experimental
Expires: September 12, 2019

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March 11, 2019

ION Licklider Transmission Protocol Admin Application Data Model
draft-birrane-dtn-adm-ion-ltpadmin-01

Abstract

This document describes the Application Data Model (ADM) for the configuration of licklider transmission protocol (LTP) in ION in compliance with the template provided by [[I-D.birrane-dtn-adm](#)].

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Internet-Draft

ION LTP Admin ADM

March 2019

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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.

The ION Licklider Transmission Protocol (LTP) Administration ADM contains all of the functionality that is required to properly configure LTP in ION in accordance with [\[RFC5326\]](#). 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 Admin ADM provides the set of information necessary to provide retransmission based reliability on challenged networks, focusing on the information that are needed to manage LTP properly on the network.

[1.1.](#) Technical Notes

- o This document describes Version 0.0 of the ION LTP Admin ADM.
- o 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.

- o 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 configuration of LTP in ION.

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 Admin ADM's structure is in accordance to [[I-D.birrane-dtn-adm](#)]. This ADM contains metadata, table templates, and controls. Table Templates are column templates that will be followed by any instance of this table available in the network. They may not be created dynamically within the network by Managers. Controls are predefined and sometimes parameterized opcodes that can be run on an Agent. Controls are preconfigured in Agents and Managers as part of ADM support. There are no variables, report templates, macros, edd, constants, or operators in this ADM at this time. The contents of this ADM are derived from the main functions

and data that are needed to manage LTP [RFC 5326](#) [[RFC5326](#)].

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-admin](#)], 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.

Identifier	Value
Namespace	DTN/ION/ltpadmin
ADM Enumeration	9

Table 1: Namespace Information

Given the above ADM enumeration, in accordance with [[I-D.birrane-dtn-amp](#)], the following AMP nicknames are defined.

Nickname	Collection
180	DTN/ION/ltpadmin//Const
181	DTN/ION/ltpadmin//Ctrl
182	DTN/ION/ltpadmin//Edd
183	DTN/ION/ltpadmin//Mac
184	DTN/ION/ltpadmin//Oper
185	DTN/ION/ltpadmin//Rptt
187	DTN/ION/ltpadmin//Tblt
189	DTN/ION/ltpadmin//Var
190	DTN/ION/ltpadmin//Mdat
191-199	DTN/ION/ltpadmin//Reserved

Table 2: ION BP ADM Nicknames

4. ION LTP Admin ADM JSON Encoding

```
{
  "Mdat": [{
    "name": "name",
    "type": "STR",
    "value": "ion_ltp_admin",
    "description": "The human-readable name of the ADM."
  },
  {
    "name": "namespace",
    "type": "STR",
    "value": "DTN/ION/ltpadmin",
    "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": "ion_version",
  "type": "STR",
  "description": "This is the version of ION that is currently
                  installed."
}],
"Tblt": [{
```

```

    "name": "spans",
    "columns": [{
        "type": "UVASt",
        "name": "peer_engine_nbr"
    }, {
        "type": "UINT",
        "name": "max_export_sessions"
    }, {
        "type": "UINT",
        "name": "max_import_sessions"
    }, {
        "type": "UINT",
        "name": "max_segment_size"
    }, {
        "type": "UINT",
        "name": "aggregation_size_limit"
    }, {
        "type": "UINT",
        "name": "aggregation_time_limit"
    }, {
        "type": "STR",
        "name": "lso_control"
    }, {
        "type": "UINT",
        "name": "queueing_latency"
    }
    ],
    "description": "This table lists all spans of potential LTP data
                    interchange that exists between the local LTP
                    engine and the indicated (neighboring) LTP engine."
}],
"Ctrl": [{
    "name": "manage_heap",
    "parmspec": [{

```

```

        "type": "UINT",
        "name": "max_database_heap_per_block"
    }
    ],
    "description": "This control declares the maximum number of
                    bytes of SDR heap space that will be occupied by
                    the acquisition of any single LTP block. All
                    data acquired in excess of this limit will be
                    written to a temporary file pending extraction

```

and dispatching of the acquired block. Default is the minimum allowed value (560 bytes), which is the approximate size of a ZCO file reference object; this is the minimum SDR heap space occupancy in the event that all acquisition is into a file."

```

},
{
  "name": "manage_max_ber",
  "parmspec": [{
    "type": "REAL32",
    "name": "max_expected_bit_error_rate"
  }],
  "description": "This control sets the expected maximum bit error
    rate(BER) that LTP should provide for in
    computing the maximum number of transmission
    efforts to initiate in the transmission of a
    given block.(Note that this computation is also
    sensitive to data segment size and to the size
    of the block that is to be transmitted.) The
    default value is .0001 (10^-4).",
},
{
  "name": "manage_own_queue_time",
  "parmspec": [{
    "type": "UINT",
    "name": "own_queing_latency"
  }],
  "description": "This control sets the number of seconds of
    predicted additional latency attributable to
    processing delay within the local engine itself
    that should be included whenever LTP computes
    the nominal round-trip time for an exchange of
    data with any remote engine.The default value
    is 1.",
},
{
  "name": "manage_screening",
  "parmspec": [{
    "type": "UINT",

```

"name": "new_state"


```

    }],
    "description": "This control enables or disables the screening
                    of received LTP segments per the periods of
                    scheduled reception in the node's contact graph.
                    By default, screening is disabled. When
                    screening is enabled, such segments are silently
                    discarded. Note that when screening is enabled
                    the ranges declared in the contact graph must
                    be accurate and clocks must be synchronized;
                    otherwise, segments will be arriving at times
                    other than the scheduled contact intervals and
                    will be discarded."
},
{
    "name": "span_add",
    "parmspec": [{
        "type": "UVAST",
        "name": "peer_engine_number"
    }, {
        "type": "UINT",
        "name": "max_export_sessions"
    }, {
        "type": "UINT",
        "name": "max_import_sessions"
    }, {
        "type": "UINT",
        "name": "max_segment_size"
    }, {
        "type": "UINT",
        "name": "aggregation_size_limit"
    }, {
        "type": "UINT",
        "name": "aggregation_time_limit"
    }, {
        "type": "STR",
        "name": "lso_control"
    }, {
        "type": "UINT",
        "name": "queuing_latency"
    }
    ],
    "description": "This control declares that a span of potential
                    LTP data interchange exists between the local
                    LTP engine and the indicated (neighboring) LTP
                    engine."
},
{
    "name": "span_change",

```

```
"parmspec": [{
  "type": "UVAST",
  "name": "peer_engine_number"
}, {
  "type": "UINT",
  "name": "max_export_sessions"
}, {
  "type": "UINT",
  "name": "max_import_sessions"
}, {
  "type": "UINT",
  "name": "max_segment_size"
}, {
  "type": "UINT",
  "name": "aggregation_size_limit"
}, {
  "type": "UINT",
  "name": "aggregation_time_limit"
}, {
  "type": "STR",
  "name": "lso_control"
}, {
  "type": "UINT",
  "name": "queuing_latency"
}],
"description": "This control sets the indicated span's
                configuration parameters to the values provided
                as arguments"
},
{
  "name": "span_del",
  "parmspec": [{
    "type": "UVAST",
    "name": "peer_engine_number"
  }],
  "description": "This control deletes the span identified by
                  peerEngineNumber. The control will fail if any
                  outbound segments for this span are pending
                  transmission or any inbound blocks from the
                  peer engine are incomplete."
},
{
  "name": "stop",
  "description": "This control stops all link service input and
                  output tasks for the local LTP engine."
},
}
```

```
{
  "name": "watch_set",
```

```
    "parmspec": [{
      "type": "STR",
      "name": "activity"
    }],
    "description": "This control enables and disables production of
a continuous stream of user- selected LTP activity indication
characters. Activity parameter of 1 selects all LTP activity
indication characters; 0 de-selects all LTP activity indication
characters; any other activitySpec such as df[] selects all
activity indication characters in the string, de-selecting all
others. LTP will print each selected activity indication
character to stdout every time a processing event of the
associated type occurs: d bundle appended to block for next
session, e segment of block is queued for transmission, f
block has been fully segmented for transmission, g segment
popped from transmission queue, h positive ACK received for
block and session ended, s segment received, t block has been
fully received, @ negative ACK received for block and segments
retransmitted, = unacknowledged checkpoint was retransmitted,
+ unacknowledged report segment was retransmitted, { export
session canceled locally (by sender), } import session canceled
by remote sender, [ import session canceled locally (by
receiver), ] export session canceled by remote receiver"
  }
]
```

[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]

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[RFC5326] Ramadas, M., Burleigh, S., and S. Farrell, "Licklider Transmission Protocol - Specification", [RFC 5326](#), DOI 10.17487/RFC5326, September 2008, <<https://www.rfc-editor.org/info/rfc5326>>.

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