

Delay-Tolerant Networking
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ION Application Data Model
draft-birrane-dtn-adm-ion-ipnadmin-00

Abstract

This document describes the Application Data Model (ADM) for the configuration of the routing of bundles to ipn endpoint ID scheme conformant endpoints from a local ION node. provided by [[I-D.birrane-dtn-adm](#)].

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Internet-Draft

ION IPN ADM

July 2018

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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 IPN (Interplanetary Internet) Scheme Administration ADM contains all of the functionality that is required to configure the routing of bundles from a local node to an endpoint that conforms to the IPN scheme.

[1.1.](#) Technical Notes

- o This document describes Version 0.0 of the ION IPN Admin ADM.
- o The Asynchronous 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 the IPN scheme 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 IPN Admin ADM's structure is in accordance to [\[I-D.birrane-dtn-adm\]](#). This ADM contains metadata, edd, table templates, and controls. Externally Defined Data (EDD) are values that are calculated external to the ADM system. 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, 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 for configuration in accordance with the IPN scheme.

There are two categories of functions in IPN. They are ones that deal with egress plans (plans for unobstructed and continuous ways of exit travel) and ones that deal with exits for static default routing. These plans and exits are discussed throughout the ADM.

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. All of the functions that are related to the configuration of IPN in ION are present in this document.

[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/ipnadmin
ADM Enumeration	6

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
120	DTN/ION/ipnadmin/Const
121	DTN/ION/ipnadmin/Ctrl
122	DTN/ION/ipnadmin/Edd
123	DTN/ION/ipnadmin/Mac
124	DTN/ION/ipnadmin/Oper
125	DTN/ION/ipnadmin/Rptt
127	DTN/ION/ipnadmin/Tblt
129	DTN/ION/ipnadmin/Var
130	DTN/ION/ipnadmin/Mdat
131-139	DTN/ION/ipnadmin/Reserved

Table 2: ION IPN Admin ADM Nicknames

4. ION IPN Admin ADM JSON Encoding

```
{
  "Mdat": [
    {
      "name": "name",
      "type": "STR",
      "value": "ion_ipn_admin",
      "description": "The human-readable name of the ADM."
    },
    {
      "name": "namespace",
      "type": "STR",
      "value": "DTN/ION/ipnadmin/",
      "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 is that currently
      installed."
  }
],
}
```

```

"Tblt": [
  {
    "name": "exits",
    "columns": [
      {"type": "UINT", "name": "first_node_nbr"},
      {"type": "UINT", "name": "last_node_nbr"},
      {"type": "STR", "name": "gateway_endpoint_id"}
    ],
    "description": "This table lists all of the exits that are defined in
      the IPN database for the local node."
  },
  {
    "name": "plans",
    "columns": [
      {"type": "UINT", "name": "node_nbr"},
      {"type": "STR", "name": "default_duct_expression"}
    ],
    "description": "This table lists all of the egress plans that are
      established in the IPN database for the local node."
  }
],
"Ctrl": [
  {
    "name": "exit_add",
    "parmspec": [
      {"type": "UINT", "name": "first_node_nbr"},
      {"type": "UINT", "name": "last_node_nbr"},
      {"type": "STR", "name": "gateway_endpoint_id"}
    ],
    "description": "This control establishes an \"exit\" for static
      default routing."
  },
  {

```

```

    "name": "exit_change",
    "parmspec": [
      {"type": "UINT", "name": "first_node_nbr"},
      {"type": "UINT", "name": "last_node_nbr"},
      {"type": "STR", "name": "gatewayEndpointId"}
    ],
    "description": "This control changes the gateway node number for the
      exit identified by firstNodeNbr and lastNodeNbr."

```

```

    },
    {
      "name": "exit_del",
      "parmspec": [
        {"type": "UINT", "name": "first_node_nbr"},
        {"type": "UINT", "name": "last_node_nbr"}
      ],
      "description": "This control deletes the exit identified by
        firstNodeNbr and lastNodeNbr."
    },
    {
      "name": "plan_add",
      "parmspec": [
        {"type": "UINT", "name": "node_nbr"},
        {"type": "STR", "name": "default_duct_expression"}
      ],
      "description": "This control establishes an egress plan for the
        bundles that must be transmitted to the neighboring node that is
        identified by it's nodeNbr."
    },
    {
      "name": "plan_change",
      "parmspec": [
        {"type": "UINT", "name": "node_nbr"},
        {"type": "STR", "name": "default_duct_expression"}
      ],
      "description": "This control changes the duct expression for the
        indicated plan."
    },
    {
      "name": "plan_del",
      "parmspec": [
        {"type": "UINT", "name": "node_nbr"}
      ],
      "description": "This control deletes the egress plan for the node that
        is identified by it's nodeNbr."
    }
  ]
}

```


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),
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[I-D.birrane-dtn-amp]
Birrane, E., "Asynchronous Management Protocol", [draft-birrane-dtn-amp-04](#) (work in progress), June 2018.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
Requirement Levels", [BCP 14](#), [RFC 2119](#),
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