

SFC Netmod
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**YANG Data Model for SFC Operations, Administration, and Maintenance
(OAM)
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Abstract

This draft defines YANG data model for SFC OAM. It extends from the basic YANG data model for Layer independent OAM Management defined in [[I-D.tissa-lime-yang-oam-model](#)] and [[I-D.wang-lime-rpc-yang-oam-management](#)] with SFC technology specifics. It includes SFC OAM related configuration, state, and RPC information data.

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1. Introduction

YANG [[RFC6020](#)] is a data modeling language used to model configuration and state data manipulated by the Network Configuration Protocol (NETCONF) [[RFC6241](#)], NETCONF remote procedure calls (RPC), and NETCONF notifications.

This draft defines the YANG data model for Service Function Chaining (SFC) [SFCPS] OAM. The SFC OAM YANG module involves the OAM configuration, RPCs and notifications, etc.

Currently, [[I-D.tissa-lime-yang-oam-model](#)] and [[I-D.wang-lime-rpc-yang-oam-management](#)] propose a basic YANG data model for Layer independent OAM Management that can be applied to various network technologies. So, SFC OAM YANG data model can directly extend them with SFC technology specifics. It can bring some obvious benefits

such as unified format, reusable parts, and correlation of defects, faults, network failure at different layers.

By referring to the SFC technology specific YANG data model for various SFC components defined in [[SFCYANG](#)], this draft defines the SFC OAM YANG data model as an augmentation to the basic YANG model defined in [[I-D.tissa-lime-yang-oam-model](#)] and [[I-D.wang-lime-rpc-yang-oam-management](#)].

Note that SFC OAM mechanisms are not yet defined or standardized although some of the basic concepts and functions (e.g., fault detection, fault localization, performance measurement, etc) may be similar to traditional OAM mechanisms. This draft should get alignment with the latest development SFC OAM mechanisms.

2. Conventions used in this document

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](#)].

The following terms are defined in [[RFC6241](#)] and are not redefined here:

- o client
- o configuration data
- o server
- o state data

The following terms are defined in [[RFC6020](#)] and are not redefined here:

- o augment
- o data model
- o data node

The terminology for describing YANG data models is found in [[RFC6020](#)].

2.1. Terminology

MP - Maintenance Point [[8021Q](#)]

MEP - Maintenance End Point [[8021Q](#)] [[RFC6371](#)]

MIP - Maintenance Intermediate Point [[8021Q](#)] [[RFC6371](#)]

MEG - Maintenance Entity Group [[Y1731](#)] [[RFC6371](#)]

ME - Maintenance Entity [Y.1731] [[RFC6371](#)]

MD - Maintenance Domain [[8021Q](#)]

OAM - Operations, Administration, and Maintenance [[RFC6291](#)]

LIME - Layer Independent OAM Management [I-D.tissa-lime-yang-oam-model] [[I-D.wang-lime-rpc-yang-oam-management](#)]

SF - Service Function [[SFCYANG](#)]

SFC - Service Function Chaining [[SFCYANG](#)]

SFF - Service Function Forwarder [[SFCYANG](#)]

3. SFC Extensions to LIME YANG Model

A new Technology parameter of SFC is defined here for the purpose of identifying the SFC specific YANG model extension:

```
identity SFC {  
    base goam:technology-types;  
    description  
        "SFC type";  
}
```

Figure 1 SFC identity type

Only when the Technology parameter is set to the "SFC" value, the SFC specific extensions are applied.

3.1. MEP Address

In SFC, either the SF on service function layer or SF/SFF on SFC forwarding layer can be MEP/MIP. A MEP/MIP cannot be identified without specifying service function path. Therefore the MEP/MIP address can only be identified by SF/SFF address plus service

function path id. In [[I-D.tissa-lime-yang-oam-model](#)] and [I-D.wang-lime-rpc-yang-oam-management], MEP/MIP address is defined using a combination of choice and case statement. We augment this to include SFC specific SF/SFF address plus service function path id.

augment

```
"/goam:domains/goam:domain/goam:MA/goam:MA/goam:MEP/goam:mep-  
address" {
```

```
  case sf-mep-ref {
```

```
    description
```

```
      "Service function (or service function forwarder) address plus  
      service function path id to identify one SFC MEP. A SFC MP  
      can be a service function or service function forwarder!"
```

```
  leaf sf-mep-ref {
```

```
    when "/goam:domains/goam:domain/goam:technology='sfc'";
```

```
    type sfc-sf:service-function-ref;
```

```
  }
```

```
  leaf sfp-mep-ref {
```

```
    when "/goam:domains/goam:domain/goam:technology='sfc'";
```

```
    type sfc-sfp:service-function-path-ref;
```

```
  }
```

```
}
```

```
case sff-mep-ref {
```

```
  description
```

```
    "Service function address plus service function path id  
    identify one SFC MEP. A SFC MP can be a service function or  
    service function forwarder!"
```

```
  leaf sff-mep-ref {
```

```
    type sfc-sff:service-function-forwarder-ref;
```

```
    }  
  
    leaf sfp-mep-ref {  
        type sfc-sfp:service-function-path-ref;  
    }  
}  
}
```

Figure 2 Augment SFC MEP address

3.2. Context-id

In SFC, context-id is the service function path id. [I-D.tissa-lime-yang-oam-model] and [[I-D.wang-lime-rpc-yang-oam-management](#)] defines a placeholder for context-id. This allows other technologies to easily augment that to include technology specific extensions. The snippet below depicts an example of augmenting context-id to include the SFC context-id.

```
augment  
"/goam:domains/goam:domain/goam:MA/goam:MA/goam:MEP/goam:context-  
id" {  
  
    case context-id-sfc {  
  
        leaf context-id-sfp {  
            type sfc-sfp:service-function-path-ref;  
        }  
    }  
}
```

Figure 3 Augment SFC Context-id

3.3. SFC Layer For RPC - Path Discovery

Path discovery is used to discover the path that specific service traverses in the network. For SFC, it can be used on both service function layer and SFC forwarding layer depending on what is the desired degree of path information.

```
typedef SFC-layer {  
    type enumeration {  
        enum "Service function layer" {  
            value 0;  
        }  
        enum "SFC forwarding layer" {  
            value 1;  
        }  
    }  
}  
  
augment "/goam:path-discovery/goam:input" {  
    description  
        "adds SFC specific items on the input";  
    leaf path-discovery-layer {  
        type SFC-layer;  
        description  
            "Identifying which SFC layer to run path discovery";  
    }  
}
```

```
}  
}
```

Figure 4 Augment SFC SFC-layer for path discovery

4. SFC OAM YANG Data Hierarchy

The complete data hierarchy related to the SFC OAM YANG model is presented below. The following notations are used within the data tree and carry the meaning as noted below.

Each node is printed as:

<status> <flags> <name> <opts> <type>

<status> is one of:

- + for current
- x for deprecated
- o for obsolete

<flags> is one of:

- rw for configuration data
- ro for non-configuration data
- x for rpcs
- n for notifications

<name> is the name of the node

If the node is augmented into the tree from another module,
its

name is printed as <prefix>:<name>.

<opts> is one of:

- ? for an optional leaf or choice
- ! for a presence container
- * for a leaf-list or list
- [<keys>] for a list's keys

<type> is the name of the type for leafs and leaf-lists

```
module: sfc-oam
```

```
augment /goam:domains/goam:domain/goam:MAS/goam:MA/goam:context-id:
```

```
  +--:(context-id-sfc)
```

```
    +--rw context-id-sfp?   sfc-sfp:service-function-path-ref
```

```
augment
```

```
/goam:domains/goam:domain/goam:MAS/goam:MA/goam:MEP/goam:mep-address:
```

```
  +--:(sf-mep-ref)
```

```
    | +--rw sf-mep-ref      sfc-sf:service-function-ref
```

```
    | +--rw sfp-mep-ref?    sfc-sfp:service-function-path-ref
```

```
  +--:(sff-mep-ref)
```

```
    | +--rw sff-mep-ref     sfc-sff:service-function-forwarder-ref
```

```
    +--rw sfp-mep-ref?      sfc-sfp:service-function-path-ref
```

```
augment
```

```
/goam:domains/goam:domain/goam:MAS/goam:MA/goam:MEP/goam:session/goam:destination-mep-address:
```

```
  +--:(sf-mep-ref)
```

```
| +-rw sf-mep-ref    sfc-sf:service-function-ref
| +-rw sfp-mep-ref?  sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)

  +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref

  +-rw sfp-mep-ref?  sfc-sfp:service-function-path-ref

augment
/goam:domains/goam:domain/goam:MAS/goam:MA/goam:MEP/goam:session/goam:context-id:

+--:(context-id-sfc)

  +-rw context-id-sfp?  sfc-sfp:service-function-path-ref

augment /goam:domains/goam:domain/goam:MAS/goam:MA/goam:remote-
MEP/goam:mep-address:

+--:(sf-mep-ref)

| +-rw sf-mep-ref    sfc-sf:service-function-ref
| +-rw sfp-mep-ref?  sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)

| +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref

  +-rw sfp-mep-ref?  sfc-sfp:service-function-path-ref

augment /goam:contiuity-check/goam:input/goam:context-id:

+--:(context-id-sfc)

  +-rw context-id-sfp?  sfc-sfp:service-function-path-ref

augment /goam:contiuity-check/goam:input/goam:source-mep/goam:mep-
addr:

+--:(sf-mep-ref)

| +-rw sf-mep-ref    sfc-sf:service-function-ref
| +-rw sfp-mep-ref?  sfc-sfp:service-function-path-ref
```

```
+--:(sff-mep-ref)
```

```
| +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref
```

```
    +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
```

```
augment /goam:contiuity-check/goam:input/goam:destination-mep/goam:
mep-addr:
```

```
+--:(sf-mep-ref)
```

```
| +-rw sf-mep-ref sfc-sf:service-function-ref
```

```
| +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
```

```
+--:(sff-mep-ref)
```

```
| +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref
```

```
    +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
```

```
augment /goam:contiuity-check/goam:output/goam:source-mep/goam:mep-
addr:
```

```
+--:(sf-mep-ref)
```

```
| +-rw sf-mep-ref sfc-sf:service-function-ref
```

```
| +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
```

```
+--:(sff-mep-ref)
```

```
| +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref
```

```
    +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
```

```
augment /goam:contiuity-check/goam:output/goam:destination-mep/goam:
mep-addr:
```

```
+--:(sf-mep-ref)
```

```
| +-rw sf-mep-ref sfc-sf:service-function-ref
```

```
| +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
```

```
+--:(sff-mep-ref)
```

```
| +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref
    +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
augment /goam:continuity-verification/goam:input/goam:context-id:
    +--:(context-id-sfc)
        +-rw context-id-sfp? sfc-sfp:service-function-path-ref
augment /goam:connectivity-verification/goam:input/goam:source-
mep/goam:mep-addr:
    +--:(sf-mep-ref)
        | +-rw sf-mep-ref sfc-sf:service-function-ref
        | +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
    +--:(sff-mep-ref)
        | +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref
        +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
augment /goam:connectivity-verification/goam:input/goam:destination-
mep/goam:mep-addr:
    +--:(sf-mep-ref)
        | +-rw sf-mep-ref sfc-sf:service-function-ref
        | +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
    +--:(sff-mep-ref)
        | +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref
        +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
augment /goam:connectivity-verification/goam:output/goam:source-
mep/goam:mep-addr:
    +--:(sf-mep-ref)
        | +-rw sf-mep-ref sfc-sf:service-function-ref
```

```
| +-rw sfp-mep-ref?   sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)

| +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref
  +-rw sfp-mep-ref?   sfc-sfp:service-function-path-ref

augment /goam:connectivity-verification/goam:output/goam:destination-
mep/goam:mep-addr:

+--:(sf-mep-ref)

| +-rw sf-mep-ref   sfc-sf:service-function-ref
| +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)

| +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref
  +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref

augment /goam:path-discovery/goam:input/goam:context-id:

+--:(context-id-sfc)

  +-rw context-id-sfp?   sfc-sfp:service-function-path-ref

augment /goam:path-discovery/goam:input/goam:source-mep/goam:mep-
addr:

+--:(sf-mep-ref)

| +-rw sf-mep-ref   sfc-sf:service-function-ref
| +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)

| +-rw sff-mep-ref sfc-sff:service-function-forwarder-ref
  +-rw sfp-mep-ref? sfc-sfp:service-function-path-ref

augment /goam:path-discovery/goam:input/goam:destination-
mep/goam:mep-addr:
```

```
+--:(sf-mep-ref)
|  +--rw sf-mep-ref    sfc-sf:service-function-ref
|  +--rw sfp-mep-ref?  sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)
|  +--rw sff-mep-ref sfc-sff:service-function-forwarder-ref
|  +--rw sfp-mep-ref?  sfc-sfp:service-function-path-ref

augment /goam:path-discovery/goam:output/goam:source-mep/goam:mep-
addr:

+--:(sf-mep-ref)
|  +--rw sf-mep-ref    sfc-sf:service-function-ref
|  +--rw sfp-mep-ref?  sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)
|  +--rw sff-mep-ref sfc-sff:service-function-forwarder-ref
|  +--rw sfp-mep-ref?  sfc-sfp:service-function-path-ref

augment /goam:path-discovery/goam:output/goam:destination-
mep/goam:mep-addr:

+--:(sf-mep-ref)
|  +--rw sf-mep-ref    sfc-sf:service-function-ref
|  +--rw sfp-mep-ref?  sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)
|  +--rw sff-mep-ref sfc-sff:service-function-forwarder-ref
|  +--rw sfp-mep-ref?  sfc-sfp:service-function-path-ref

augment /goam:path-discovery/goam:input:

+--ro:path-discovery-layer SFC-layer

augment /goam:performance-measurement/goam:input/goam:context-id:
```

```
+--:(context-id-sfc)
  +--rw context-id-sfp?   sfc-sfp:service-function-path-ref

augment /goam:performance-measurement/goam:input/goam:source-
mep/goam:mep-addr:

+--:(sf-mep-ref)
|  +--rw sf-mep-ref       sfc-sf:service-function-ref
|  +--rw sfp-mep-ref?     sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)
|  +--rw sff-mep-ref      sfc-sff:service-function-forwarder-ref
|  +--rw sfp-mep-ref?     sfc-sfp:service-function-path-ref

augment /goam:performance-measurement/goam:input/goam:destination-
mep/goam:mep-addr:

+--:(sf-mep-ref)
|  +--rw sf-mep-ref       sfc-sf:service-function-ref
|  +--rw sfp-mep-ref?     sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)
|  +--rw sff-mep-ref      sfc-sff:service-function-forwarder-ref
|  +--rw sfp-mep-ref?     sfc-sfp:service-function-path-ref

augment /goam:performance-measurement/goam:output/goam:source-
mep/goam:mep-addr:

+--:(sf-mep-ref)
|  +--rw sf-mep-ref       sfc-sf:service-function-ref
|  +--rw sfp-mep-ref?     sfc-sfp:service-function-path-ref
+--:(sff-mep-ref)
|  +--rw sff-mep-ref      sfc-sff:service-function-forwarder-ref
```

```

    +--rw sfp-mep-ref?    sfc-sfp:service-function-path-ref

augment /goam:performance-measurement/goam:output/goam:destination-
mep/goam:mep-addr:

  +--:(sf-mep-ref)
  |   +--rw sf-mep-ref    sfc-sf:service-function-ref
  |   +--rw sfp-mep-ref?  sfc-sfp:service-function-path-ref
  +--:(sff-mep-ref)
  |   +--rw sff-mep-ref sfc-sff:service-function-forwarder-ref
  +--rw sfp-mep-ref?    sfc-sfp:service-function-path-ref

```

Figure 5 Data hierarchy of SFC OAM

5. SFC OAM YANG Module

```

<CODE BEGINS> file "xxx.yang"

module trill-oam {

  namespace "urn:huawei:params:xml:ns:yang:sfc-oam";

  prefix sfcoam;

  import ietf-management-oam {
    prefix goam;
  }

  import ietf-inet-types {
    prefix inet;
  }

  import ietf-interfaces {
    prefix if;
  }

```

```
}

import service-function {
    prefix sfc-sf;
}

import service-function-path {
    prefix sfc-sfp;
}

import service-function-forwarder {
    prefix sfc-sff;
}

revision 2014-09-04 {
    description
        "Initial revision.";
}

identity sfc {
    base goam:technology-types;
    description
        "sfc type";
}

typedef SFC-layer {
    type enumeration {
```

```
enum "Service function layer" {
    value 0;
}

enum "SFC forwarding layer" {
    value 1;
}
}

augment "/goam:domains/goam:domain/goam:MA/goam:MA/goam:context-id"
{
    case context-id-sfc {
        leaf context-id-sfp {
            type sfc-sfp:service-function-path-ref;
        }
    }
}

augment
"/goam:domains/goam:domain/goam:MA/goam:MA/goam:MEP/goam:mep-
address" {
    case sf-mep-ref {
        description
```

"Service function (or service function forwarder) address plus service function path id identify one SFC MEP. A SFC MP can be a service function or service function forwarder!"

```
leaf sf-mep-ref {  
    when "/goam:domains/goam:domain/goam:technology='sfc'";  
    type sfc-sf:service-function-ref;  
}  
  
leaf sfp-mep-ref {  
    when "/goam:domains/goam:domain/goam:technology='sfc'";  
    type sfc-sfp:service-function-path-ref;  
}  
}  
  
case sff-mep-ref {  
    description  
        "Service function address plus service function path id  
        identify one SFC MEP. A SFC MP can be a service function or  
        service function forwarder!"  
  
    leaf sff-mep-ref {  
        type sfc-sff:service-function-forwarder-ref;  
    }  
  
    leaf sfp-mep-ref {  
        type sfc-sfp:service-function-path-ref;  
    }  
}  
}
```

```
augment
"/goam:domains/goam:domain/goam:MA/goam:MA/goam:MEP/goam:session/go
am:destination-mep-address" {

    case sf-mep-ref {

        leaf sf-mep-ref {

            type sfc-sf:service-function-ref;

        }

        leaf sfp-mep-ref {

            type sfc-sfp:service-function-path-ref;

        }

    }

    case sff-mep-ref {

        leaf sff-mep-ref {

            type sfc-sff:service-function-forwarder-ref;

        }

        leaf sfp-mep-ref {

            type sfc-sfp:service-function-path-ref;

        }

    }

}
```

```
augment
"/goam:domains/goam:domain/goam:MA/goam:MA/goam:MEP/goam:session/go
am:context-id" {

    case context-id-sfc {

        leaf context-id-sfp {
```

```
        type sfc-sfp:service-function-path-ref;
    }
}
}
```

```
augment "/goam:domains/goam:domain/goam:MA/goam:MA/goam:remote-
MEP/goam:mep-address" {
```

```
    case sf-mep-ref {
        leaf sf-mep-ref {
            type sfc-sf:service-function-ref;
        }
        leaf sfp-mep-ref {
            type sfc-sfp:service-function-path-ref;
        }
    }
    case sff-mep-ref {
        leaf sff-mep-ref {
            type sfc-sff:service-function-forwarder-ref;
        }
        leaf sfp-mep-ref {
            type sfc-sfp:service-function-path-ref;
        }
    }
}
```

```
//SFC extension of contiuity-check part
augment "/goam:contiuity-check/goam:input/goam:context-id" {
    case context-id-sfc {
        leaf context-id-sfp {
            type sfc-sfp:service-function-path-ref;
        }
    }
}

augment "/goam:contiuity-check/goam:input/goam:source-mep/goam:
mep-addr" {
    case sf-mep-ref {
        leaf sf-mep-ref {
            type sfc-sf:service-function-ref;
        }
        leaf sfp-mep-ref {
            type sfc-sfp:service-function-path-ref;
        }
    }
    case sff-mep-ref {
        leaf sff-mep-ref {
            type sfc-sff:service-function-forwarder-ref;
        }
    }
}
```

```
    }

    leaf sfp-mep-ref {
        type sfc-sfp:service-function-path-ref;
    }
}

augment "/goam:contiuity-check/goam:input/goam:destination-mep/goam:
mep-addr" {

    case sf-mep-ref {
        leaf sf-mep-ref {
            type sfc-sf:service-function-ref;
        }
        leaf sfp-mep-ref {
            type sfc-sfp:service-function-path-ref;
        }
    }

    case sff-mep-ref {
        leaf sff-mep-ref {
            type sfc-sff:service-function-forwarder-ref;
        }
        leaf sfp-mep-ref {
            type sfc-sfp:service-function-path-ref;
        }
    }
}
```

```
}
```

```
augment "/goam:continuity-check/goam:output/goam:source-mep/goam:  
mep-addr" {
```

```
  case sf-mep-ref {
```

```
    leaf sf-mep-ref {
```

```
      type sfc-sf:service-function-ref;
```

```
    }
```

```
    leaf sfp-mep-ref {
```

```
      type sfc-sfp:service-function-path-ref;
```

```
    }
```

```
  }
```

```
  case sff-mep-ref {
```

```
    leaf sff-mep-ref {
```

```
      type sfc-sff:service-function-forwarder-ref;
```

```
    }
```

```
    leaf sfp-mep-ref {
```

```
      type sfc-sfp:service-function-path-ref;
```

```
    }
```

```
  }
```

```
}
```

```
augment "/goam:continuity-check/goam:output/goam:destination-  
mep/goam:mep-addr" {
```

```
  case sf-mep-ref {
```

```
    leaf sf-mep-ref {
```

```
        type sfc-sf:service-function-ref;
    }
    leaf sfp-mep-ref {
        type sfc-sfp:service-function-path-ref;
    }
}
case sff-mep-ref {
    leaf sff-mep-ref {
        type sfc-sff:service-function-forwarder-ref;
    }
    leaf sfp-mep-ref {
        type sfc-sfp:service-function-path-ref;
    }
}
}
```

```
//SFC extension of connectivity-verification part
augment "/goam:contiuity-verification/goam:input/goam:context-id" {
    case context-id-sfc {
        leaf context-id-sfp {
            type sfc-sfp:service-function-path-ref;
        }
    }
}
```

```
}
```

```
augment "/goam:connectivity-verification/goam:input/goam:source-  
mep/goam:mep-addr" {
```

```
  case sf-mep-ref {
```

```
    leaf sf-mep-ref {
```

```
      type sfc-sf:service-function-ref;
```

```
    }
```

```
    leaf sfp-mep-ref {
```

```
      type sfc-sfp:service-function-path-ref;
```

```
    }
```

```
  }
```

```
  case sff-mep-ref {
```

```
    leaf sff-mep-ref {
```

```
      type sfc-sff:service-function-forwarder-ref;
```

```
    }
```

```
    leaf sfp-mep-ref {
```

```
      type sfc-sfp:service-function-path-ref;
```

```
    }
```

```
  }
```

```
}
```

```
augment "/goam:connectivity-verification/goam:input/goam:destination-  
mep /goam:mep-addr" {
```

```
  case sf-mep-ref {
```

```
    leaf sf-mep-ref {
```

```
        type sfc-sf:service-function-ref;
    }
    leaf sfp-mep-ref {
        type sfc-sfp:service-function-path-ref;
    }
}
case sff-mep-ref {
    leaf sff-mep-ref {
        type sfc-sff:service-function-forwarder-ref;
    }
    leaf sfp-mep-ref {
        type sfc-sfp:service-function-path-ref;
    }
}
}

augment "/goam:connectivity-verification/goam:output/goam:source-
mep/goam:mep-addr" {
    case sf-mep-ref {
        leaf sf-mep-ref {
            type sfc-sf:service-function-ref;
        }
        leaf sfp-mep-ref {
            type sfc-sfp:service-function-path-ref;
        }
    }
}
```

```
    }  
    case sff-mep-ref {  
    leaf sff-mep-ref {  
        type sfc-sff:service-function-forwarder-ref;  
    }  
    leaf sfp-mep-ref {  
        type sfc-sfp:service-function-path-ref;  
    }  
    }  
}  
augment "/goam:connectivity-  
verification/goam:output/goam:destination-mep/goam:mep-addr" {  
    case sf-mep-ref {  
    leaf sf-mep-ref {  
        type sfc-sf:service-function-ref;  
    }  
    leaf sfp-mep-ref {  
        type sfc-sfp:service-function-path-ref;  
    }  
    }  
    case sff-mep-ref {  
    leaf sff-mep-ref {  
        type sfc-sff:service-function-forwarder-ref;  
    }  
    }
```

```
    leaf sfp-mep-ref {  
        type sfc-sfp:service-function-path-ref;  
    }  
}  
}
```

//SFC extension of path-discovery part

```
augment "/goam:path-discovery/goam:input/goam:context-id" {  
    case context-id-sfc {  
        leaf context-id-sfp {  
            type sfc-sfp:service-function-path-ref;  
        }  
    }  
}
```

```
augment "/goam:path-discovery/goam:input/goam:source-mep/goam:mep-  
addr" {  
    case sf-mep-ref {  
        leaf sf-mep-ref {  
            type sfc-sf:service-function-ref;  
        }  
        leaf sfp-mep-ref {  
            type sfc-sfp:service-function-path-ref;  
        }  
    }  
}
```

```
    }

    case sff-mep-ref {
    leaf sff-mep-ref {
        type sfc-sff:service-function-forwarder-ref;
    }
    leaf sfp-mep-ref {
        type sfc-sfp:service-function-path-ref;
    }
    }
}

augment "/goam:path-discovery/goam:input/goam:destination-mep/goam:
mep-addr" {

    case sf-mep-ref {
    leaf sf-mep-ref {
        type sfc-sf:service-function-ref;
    }
    leaf sfp-mep-ref {
        type sfc-sfp:service-function-path-ref;
    }
    }

    case sff-mep-ref {
    leaf sff-mep-ref {
        type sfc-sff:service-function-forwarder-ref;
    }
    }
```

```
    leaf sfp-mep-ref {  
        type sfc-sfp:service-function-path-ref;  
    }  
}  
}  
}  
  
augment "/goam:path-discovery/goam:output/goam:source-mep/goam:mep-  
addr" {  
    case sf-mep-ref {  
        leaf sf-mep-ref {  
            type sfc-sf:service-function-ref;  
        }  
        leaf sfp-mep-ref {  
            type sfc-sfp:service-function-path-ref;  
        }  
    }  
    case sff-mep-ref {  
        leaf sff-mep-ref {  
            type sfc-sff:service-function-forwarder-ref;  
        }  
        leaf sfp-mep-ref {  
            type sfc-sfp:service-function-path-ref;  
        }  
    }  
}
```

```
    }

    augment "/goam:path-discovery/goam:output/goam:destination-mep/goam:
mep-addr" {

        case sf-mep-ref {

            leaf sf-mep-ref {

                type sfc-sf:service-function-ref;

            }

            leaf sfp-mep-ref {

                type sfc-sfp:service-function-path-ref;

            }

        }

        case sff-mep-ref {

            leaf sff-mep-ref {

                type sfc-sff:service-function-forwarder-ref;

            }

            leaf sfp-mep-ref {

                type sfc-sfp:service-function-path-ref;

            }

        }

    }

    augment "/goam:path-discovery/goam:input" {

        description

            "adds SFC specific items on the input";

    }
```

```
leaf path-discovery-layer {  
  type SFC-layer;  
  description  
    "Identifying which SFC layer to run path discovery";  
}  
}
```

```
//SFC extension of performance-measurement part  
augment "/goam:performance-measurement/goam:input/goam:context-id" {  
  case context-id-sfc {  
    leaf context-id-sfp {  
      type sfc-sfp:service-function-path-ref;  
    }  
  }  
}
```

```
augment "/goam:performance-measurement/goam:input/goam:source-  
mep/goam:mep-addr" {  
  case sf-mep-ref {  
    leaf sf-mep-ref {  
      type sfc-sf:service-function-ref;  
    }  
  }  
}
```

```
    leaf sfp-mep-ref {
        type sfc-sfp:service-function-path-ref;
    }
}

case sff-mep-ref {
    leaf sff-mep-ref {
        type sfc-sff:service-function-forwarder-ref;
    }

    leaf sfp-mep-ref {
        type sfc-sfp:service-function-path-ref;
    }
}

}

augment "/goam:performance-measurement/goam:input/goam:destination-
mep/goam:mep-addr" {
    case sf-mep-ref {
        leaf sf-mep-ref {
            type sfc-sf:service-function-ref;
        }

        leaf sfp-mep-ref {
            type sfc-sfp:service-function-path-ref;
        }
    }

    case sff-mep-ref {
```

```
    leaf sff-mep-ref {  
        type sfc-sff:service-function-forwarder-ref;  
    }  
  
    leaf sfp-mep-ref {  
        type sfc-sfp:service-function-path-ref;  
    }  
}  
  
augment "/goam:performance-measurement/goam:output/goam:source-  
mep/goam:mep-addr" {  
    case sf-mep-ref {  
        leaf sf-mep-ref {  
            type sfc-sf:service-function-ref;  
        }  
  
        leaf sfp-mep-ref {  
            type sfc-sfp:service-function-path-ref;  
        }  
    }  
  
    case sff-mep-ref {  
        leaf sff-mep-ref {  
            type sfc-sff:service-function-forwarder-ref;  
        }  
  
        leaf sfp-mep-ref {
```

```
        type sfc-sfp:service-function-path-ref;
    }
}

augment "/goam:performance-
measurement/goam:output/goam:destination-mep/goam:mep-addr" {

    case sf-mep-ref {

        leaf sf-mep-ref {

            type sfc-sf:service-function-ref;
        }

        leaf sfp-mep-ref {

            type sfc-sfp:service-function-path-ref;
        }
    }

    case sff-mep-ref {

        leaf sff-mep-ref {

            type sfc-sff:service-function-forwarder-ref;
        }

        leaf sfp-mep-ref {

            type sfc-sfp:service-function-path-ref;
        }
    }
}
```

<CODE ENDS>

Figure 6 YANG module of SFC OAM

6. Security Considerations

TBD

7. IANA Considerations

This document registers the following namespace URI in the IETF XML registry.

URI:TBD

8. References

8.1. Normative References

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9. Acknowledgments

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