AAA Data Modeling

What is it?

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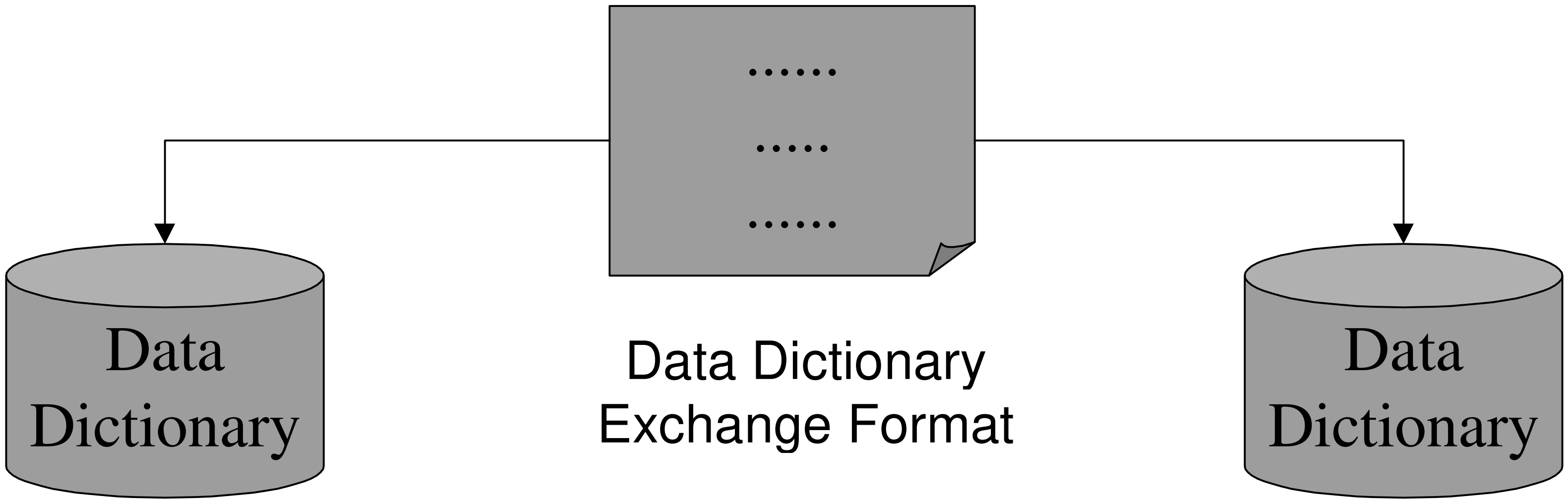
AAA Charter

- Data model.

    The proposal should offer logical separation between the protocol and the data model and should support rich data types.

OK, so lets see what the proposals submitted so far actually try to achieve ...

Dictionary Exchange Format



- Main goal:
  - Simplifies the configuration of AAA tools such as servers, proxies, sniffers, ...) from different vendors
  - <draft-ietf-aaa-solutions-01.txt> seems to address this issue

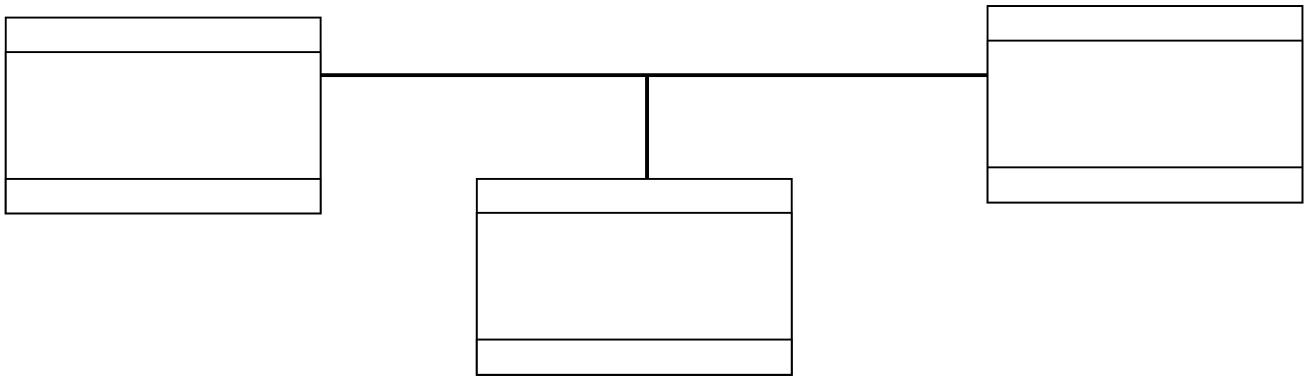
Formal Data Definitions

```
typedef NetworkAccessIdentifier {
     type    Utf8String;
     description      "...";
     reference        "RFC 2486";
};

class HostName {
     attribute NetworkAccessIdentifier name {
         description "...";
     };
     description "...";
};
```

- Main goal:
  - Precise and formal definition of the data structures exchanged between AAA entities
  - Reusable definitions + reuse of definitions
  - <draft-schoenw-sming-diameter-00> addresses this issue

Information Modeling



- Main goal:
  - Conceptual model of the entities in a "universe" and their relationships/associations
  - May be mapped to multiple data models and implementations
  - <draft-spence-aaa-nas-data-model-00> addresses this issue

SMIng Mappings to DIAMETER

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What is SMIng?

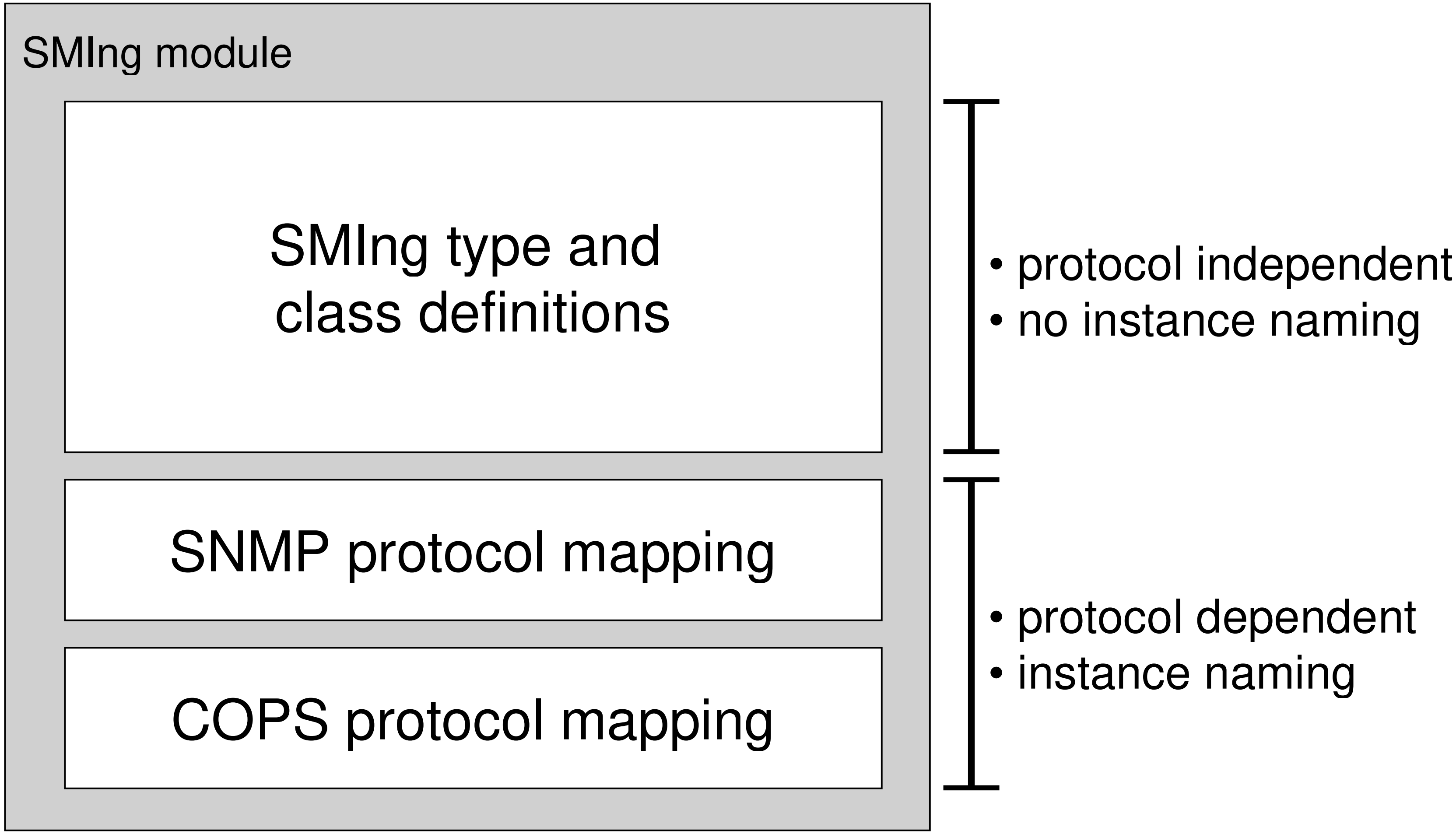
- SMIng is a new data definition language proposed to replace the SMIv2 and the SPPI:
  - object-oriented (classes, attributes, inheritance, containment)
  - protocol independent
  - instance naming independent
  - formal machine readable language (ABNF grammar)
  - compact and consistent syntax to increase human readability
  - controlled language extensibility

SMIng and DIAMETER

- Advantages of using SMIng for AAA data modeling:
  - reuse data definitions provided by other working groups
  - allow other working groups to reuse AAA data definitions
  - common data definitions across several management protocols
  - simplifies applications that have to interface with equipment supporting multiple protocols
  - reuse of tools to verify and transform data definitions
  - benefit from a module concept, an import mechanism, a type system, version handling, ...

- All we need is a DIAMETER protocol mapping!

SMIng Protocol Mappings



Proposed DIAMETER Changes

- The DIAMETER protocol should be modified to support the following primitive base types:
  - Integer32, Unsigned32,
  - Integer64, Unsigned64,
  - Float32, Float64, Float128,
  - OctetString
- In addition, the DIAMETER protocol should support a compound base type AVP which contains an ordered list of AVPs (Group AVP).
- Additional AAA specific types can be introduced by using the SMIng type system.

Data Type Mapping

- Mapping SMIng types to DIAMETER types:
  - OctetString ⇒ OctetString
  - Integer32 ⇒ Integer32
  - Integer64 ⇒ Integer64
  - Unsigned32 ⇒ Unsigned32
  - Unsigned64 ⇒ Unsigned64
  - Float32 ⇒ Float32
  - Float64 ⇒ Float64
  - Float128 ⇒ Float128
  - Enumeration ⇒ Integer32
  - Bits ⇒ OctetString
- Classes with multiple attributes are mapped to the compound type.

Example

```
module TUBS-SMING-DIAMETER {

  import IRTF-NMRG-SMING   (Utf8String);
  import TUBS-DIAMETER-EXT (diameter);

  organization   "...";
  contact        "...";
  description    "...";
  revision {
      date        "2000-11-24";
      description "...";
  };
```

Example (cont.)

```
typedef NetworkAccessIdentifier {
    type        Utf8String;
    description "...";
    reference   "RFC 2486";
};

class HostName {
    attribute NetworkAccessIdentifier name {
        description "...";
    };
    description "...";
};
```

Example (cont.)

```
diameter {
    avp HostNameAVP {
        code 264;  implements HostName;
    };

    avp VendorNameAVP {
        code 266;  implements VendorName;
    };

    avp FirmwareRevisionAVP {
        code 267;  implements FirmwareRevision;
    };
```

Example (cont.)

```
   msg DeviceRebootInd {
        code 257;
        includes NonceAVP;
        includes HostNameAVP;
        includes HostIPAddressAVP;
        includes VendorNameAVP;
        includes ExtensionIdAVP;
        includes FirmwareRevisionAVP;
        includes IntegrityCheckAVP;
        description "...";
   };
};
```

Further Information

- <draft-schoenw-sming-diameter-00.txt>

- <draft-ietf-sming-01.txt>
- <draft-ietf-sming-modules-01.txt>
- <draft-ietf-sming-inet-modules-01.txt>
- <draft-ietf-sming-snmp-01.txt>
- <draft-ietf-sming-copspr-00.txt>
- <draft-ietf-sming-reqs-00.txt>