YANG XPath Extensions

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Problem Description

Experience with XPath 1.0 in "must" and "when" expressions in YANG modules shows that some YANG types are problematic to use with XPath's built-in types (strings, booleans and numbers).

For example, YANG supports hierarchical identities, but there is no way to check if an identity is derived from a certain base identity.

Solution Proposal

- Introduce a few YANG extension statements that can be used to define new XPath functions in YANG modules.

- Use the new YANG extension statements to define XPath functions to inspect the built-in YANG types that cannot easily be inspected with the core XPath functions, specifically *identityref*, *leafref*, *instance-identifier*, *bits* and *enumeration*.

- Make the new XPath functions available in NETCONF filters, if the server advertises the new YANG module in its hello message.

Example

```
// define the function
//   boolean
//   derived-from(nodes, module-name, identity-name)

yangxp:xpath-function derived-from {
  yangxp:xpath-argument nodes {
    yangxp:xpath-type node-set;
  }
  yangxp:xpath-argument module-name {
    yangxp:xpath-type string;
  }
  yangxp:xpath-argument identity-name {
    yangxp:xpath-type string;
  }
  yangxp:xpath-result boolean;
}

// use it
when 'yangxp:derived-from(., "ex-eth", "ethernet")';
```