XQS: a native XQuery Schematron implementation

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About XQS

- XQS = XQuery for Schematron
- Pronounced /ɛksˈkjuːz/
- Written in pure XQuery
- BaseX dialect of v3.1
- Tested under BaseX 10.x

Why do this?

- ISO approved new work to revise standard
- Second "reference" implementation
- XQuery QLB reserved, but not defined
- Rapid development?
- Advocacy at meetups
- End-user benefits

What design goals?

- Conformance over performance
  - No optimization at this stage
- "Dynamic evaluation" of schemas
- Portability of "compiled" schemas
- (SVRL output)

Design decisions

- Schema expects **single** document

- Rule context must be a node(s)
  - Evaluated against **document root**

XSLT: `<sch:rule context="*">`

XQS: `<sch:rule context="//*">`

Evaluate schema

- Assemble prolog of validation context:
  - Namespaces
  - Local variables
  - User-defined functions

- Invoke `xquery:eval()`, passing:
  - Global variables, as external variables
  - Instance document, as `map{"":doc(…)}`

Global read lock

- `xquery:eval()` imposes this
- No issue if not using BaseX as DB
- Otherwise: use compiled schema instead

Compile schema

- Tangible code that can be debugged
- Function for each pattern, rule, assertion
- Output is XQuery main module
- Document or URI as external variable
- Runs under BaseX and Saxon (et al.?)

Compile complications

- Assembled XQuery contains (SVRL) nodes and strings

```
=> serialize(map{'method':'basex'})
```

- Internal variables in XQS namespace
- Currently compiles *per phase*

Other features

- User-defined functions:

```
<function xmlns='http://www.w3.org/2012/xquery'>
declare function myfunc:test($arg as xs:string) as
xs:string{$arg};</function>
```

- Maps as variables:

```
<sch:let name='foo' value="map{'foo':'bar'}}"
as='map(*)'/>
```

Caveats

- Expansion ~~& inclusion~~ deferred
  - BUT *dynamic evaluation* as well as compilation
- Reliant on BaseX
  - BUT compiled schemas (should be) portable
  - No need to store documents in BaseX

Learnings for XQuery QLB?

- Multiple docs as input?
- Specification of rule context
- Typed variables, generally
- User-defined functions
- Maps, arrays, anon functions as variables

Status

- Pre-release (alpha)
- Roadmap in GitHub issues

Questions?

github.com/AndrewSales/XQS