

# Now It's Obvious to The Eye—Visually Explaining XQuery Evaluation in a Native XML Database Management System

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## XML Transaction Coordinator (XTC)

### Key Aspects

- Native XML data management
- XML query processing
- ACID transactions for dynamic XML
- Adaptivity and energy efficiency aspects



## The XTC XQuery Compiler (XTCcmp)

- Exploration of classical QP techniques to treat XQuery
- Rule-based query rewriting and plan generation
- Support for a rich physical XML algebra (approx. 50 physical operators)
- Cost-based query optimization and cost modeling (Future Work)

## The XTC Explain Tool (XPlain)

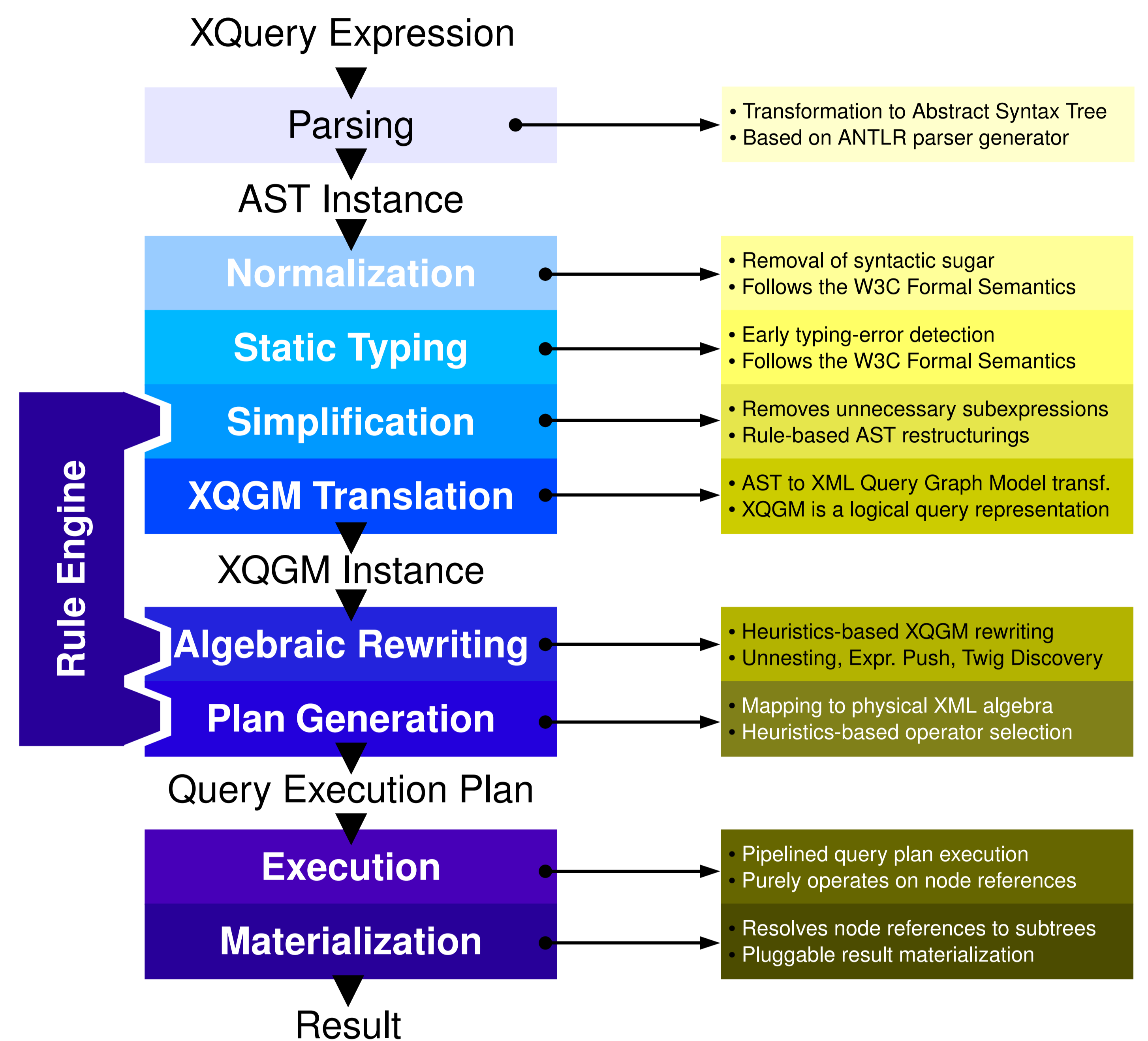
- Allows to follow the complete query evaluation process from head to toe
- Easy to understand—even for XQuery novices and non-database experts
- Dynamic rule selection and configuration of the query compiler

XPlain supports different types of users in improving their work:

- Developers** Immediately see the impact of different rewrite and optimization strategies
- Lecturers** Teach XQuery classes supported by our self-explanatory graphical XQuery representation
- Administrators** Focus only on the query execution plan and speed-up query evaluation by creating new indexes

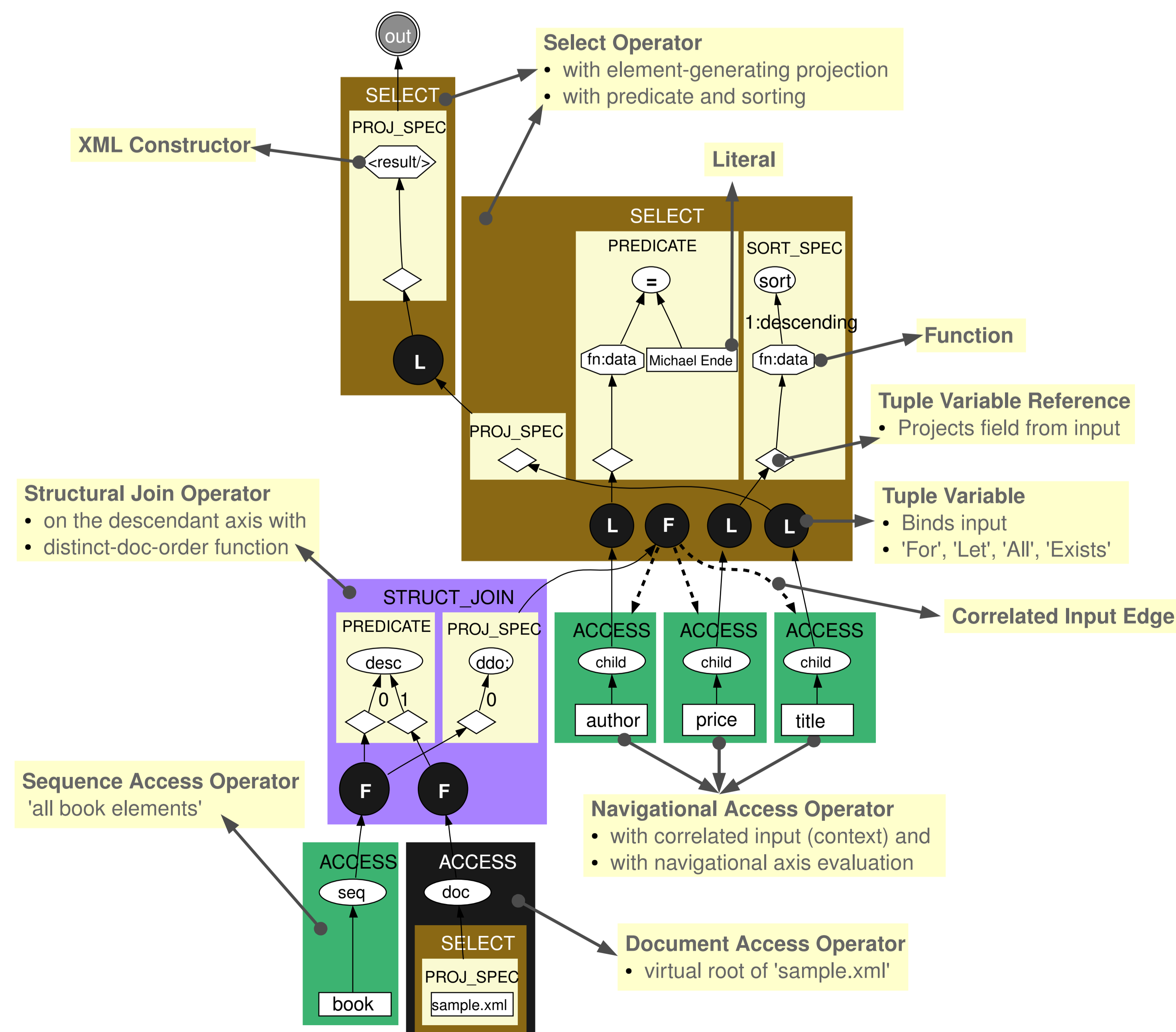
## XQuery Compilation on XTC

- Follows the classical query processing approach
- Separates logical/algebraic optimization from physical optimization
- Initial stages follow the XQuery Formal Semantics to ensure correctness
- Rule engine used as common infrastructure for various stages



## The XML Query Graph Model (XQGM)

- Operator graph that hides physical/system-dependent aspects
- Each operator consumes and produces (nested) tuple sequences
- Operators: SELECT, ACCESS, STRUCT\_JOIN, SPLIT, MERGE, SET, GROUP\_BY, UNNEST, HTJ, REVERSE, and TUP\_VAR\_REF



## Demo Setup

