1. What is Model-Driven Engineering?

- Model-Driven Engineering is a software engineering method powered by domain-specific modeling languages (DSMLs) that capture the semantics and constraints of the target domain.
- DSMLs are used to create models of solutions for the target domain.
- **Example MDE environments:** The Generic Modeling Environment (GME), Microsoft DSML Tools, & The Generic Eclipse Modeling System (GEMS)

2. Benefits of MDE

- Simplifies and accelerates the software design, implementation, & maintenance process
- Alleviates the complexity of target domain
- Bridges the problem-implementation gap
- Express domain concepts effectively
- Code generation

3. Current Approach and Drawbacks

The Constraint Manager built into GME is used for Constraint Evaluations has the following limitations:

1. Not fast enough for real-time analysis
2. Does not scale to large models (i.e., 10s of 1000s of elements).
3. Hard to evaluate constraints on-the-fly

4. Our Approach

- Use best practices and principles in software design and engineering
- Software design patterns
- Avoiding software performance anti-patterns like excessive memory allocation
- Model caching
- Perfect hashing

5. Performance Results

![Graph showing performance results](image)

- **Meta-Model**
  - used to construct

- **Model**
  - evaluated by

- **Constraint Manager**

Example OCL Constraints

```
self.State="Indiana"
self.CreditRating>=600
```

6. Applications

- It would help in Real-Time Evaluation of the OCL Constraints.
- It would give quick results for large scale models.
- Help in applications like Constraint Recommendations where the Constraint Solver Interpreter would run fast enough to evaluate all the constraints as the user adds more to complete the model as per his requirements.