Asiya: An Open Toolkit for Automatic Machine Translation (Meta-)Evaluation

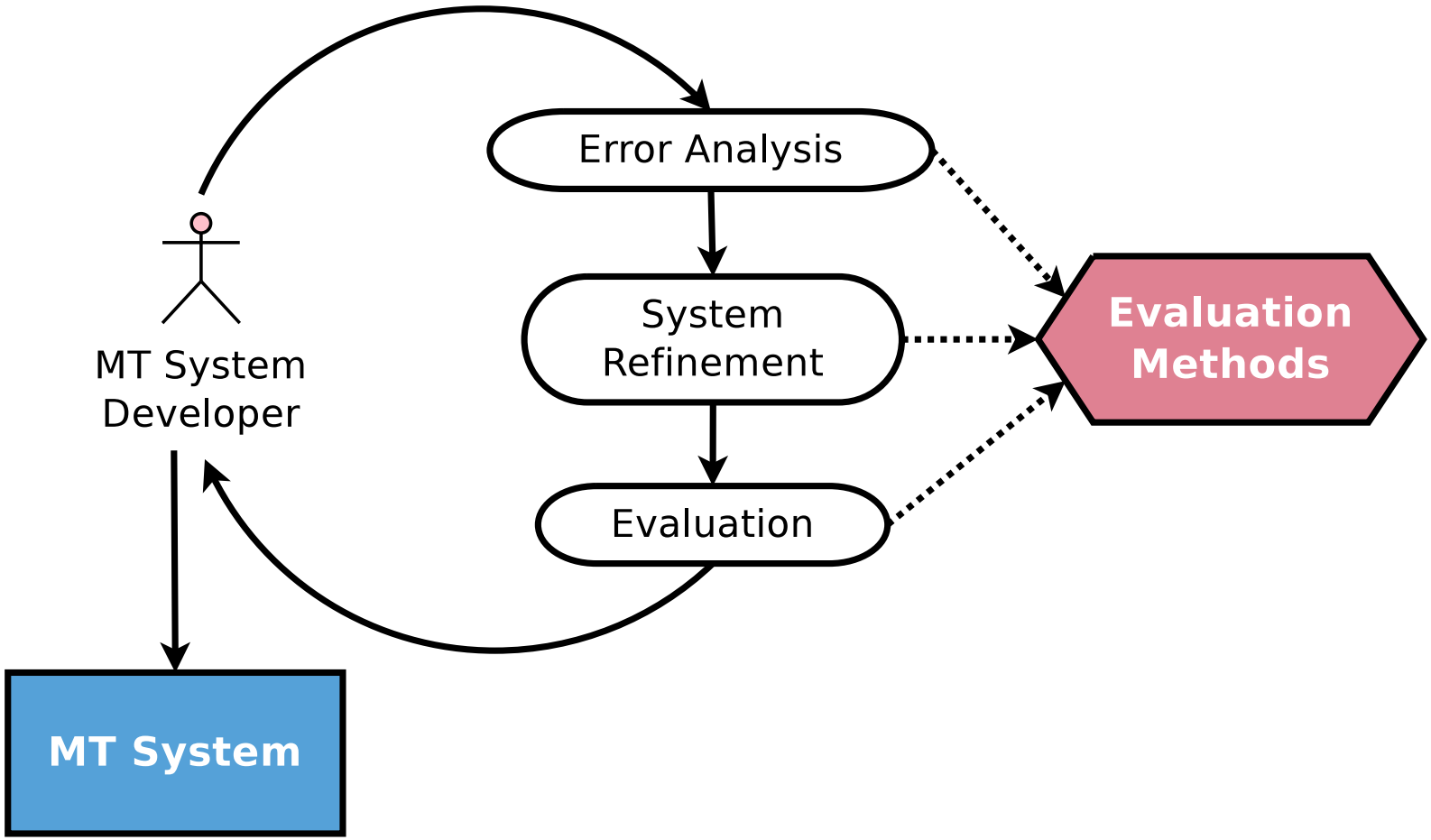
Jesús Giménez and Lluís Màrquez

Universitat Politècnica de Catalunya

Fifth MT Marathon
Le Mans, September 13-18, 2010

MT System Development Cycle

The Role of Evaluation Methods



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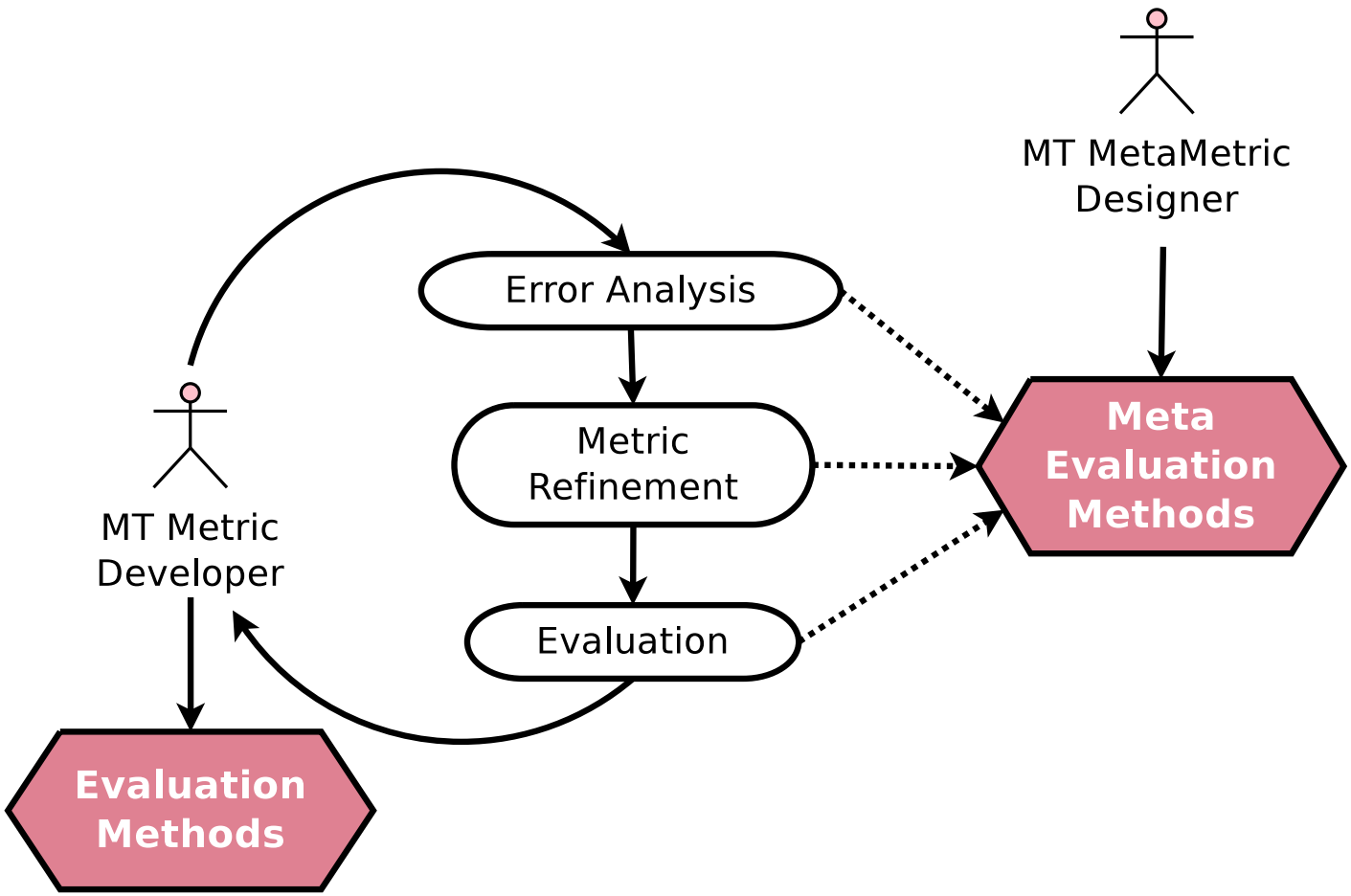

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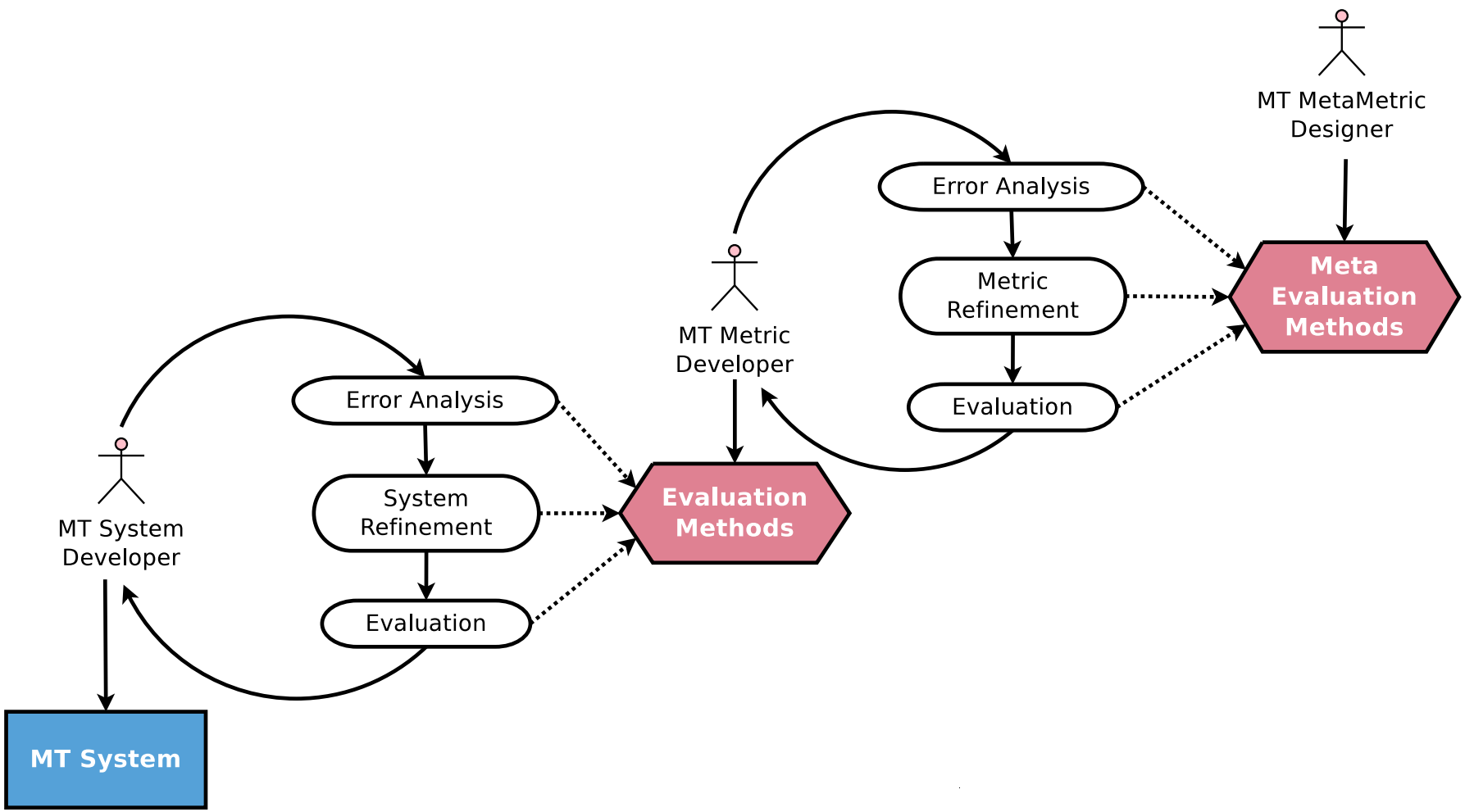

Tool Description

Test Suite Definition

Asiya operates over test suites (or test beds).

$\rightarrow$ a *test suite* is a collection of test cases:

- Source segment
- Candidate translation(s)
- Reference translation(s)

Tool Description

Test Suite Definition

```
Asiya.pl Asiya.config
```

src=source.xml
sys=candidates.xml
ref=references.xml

Table: Sample config file (NIST XML input format)

Tool Description

Test Suite Definition

src=source.sgm
sys=system_01.sgm
sys=system_02.sgm
sys=system_03.sgm
sys=system_04.sgm
sys=system_05.sgm
ref=reference_A.sgm
ref=reference_B.sgm
ref=reference_C.sgm

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src=source.txt
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Table: Sample config file (RAW input format)

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General Options

- **Input Format:** raw text, NIST XML/SGML
- **Language Pair:** source/target language and case sensitivity
- **Predefined Sets** of metrics, systems and references

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[GO TO DEMO]

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Evaluation Options

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Asiya.pl -v -eval single Asiya.config
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Metric Repository:

- **Lexical** (Precision, Recall, F_1, Overlap, Error Rate)
- **Shallow Syntactic** (Lemmatization, PoS Tagging, and Base Phrase Chunking)
- **Syntactic** (Constituency and Dependency Parsing)
- **Shallow Semantic** (Semantic Roles and Named Entities)
- **Semantic** (Discourse Representations)

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Schemes:

- **Single** metric scores
- **Ulc** normalized arithmetic mean of metric scores [GM10]
- **Queen** scores [AGPV05]

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- **Other Options:**
  - Include reference scores
  - Granularity → system/document/segment level
  - LaTeX / PDF output
  - etc...

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`Asiya.pl -v -metaeval` <*schemes*> <*criteria*>
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Criteria:

- Correlation with human assessments
  - Pearson r [Pea14]
  - Spearman ρ [Spe04]
  - Kendall τ [Ken55]
- ORANGE [LO04]
- KING [AGPV05]
- Consistency [CBKMS09]

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Statistical significance tests:

- Fisher [Fis24]
- Bootstrap resampling [ET86]
- Paired bootstrap resampling [Koe04]
- Options:
  - α significance level
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Metric set optimization (greedy):

1. Metrics are ranked by their individual quality
2. They are progressively added to the optimal set if and only if, when doing so, quality increases

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Ongoing and Future Work

Augment the (meta-)metric repositories

Metrics and meta-metrics:

- Port metrics to languages other than English
  (Arabic, Czech, French, German, Czech, Romanian, Spanish)
- More sophisticated metric combination schemes
- Alternative meta-evaluation criteria
- Confidence estimation metrics

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A web interface for Asiya

Interface:

- Upload test suites $\rightarrow$ download results
- (Meta-)Evaluation reports
- Error analysis
  - visualization of linguistic structures
- User authentication/authorization/profile
- This week:
  1. learned Catalyst (`http://www.catalystframework.org/`)
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     - test suite upload
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Thanks For Your Attention!

http://www.lsi.upc.edu/~nlp/Asiya/

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