Scoping, Evaluation and Integration of NMT Use Cases on Company Level

Agenda

Introduction: berns language consulting

Scoping NMT Use Cases

Evaluation of NMT Engines

Integrating NMT

Conclusions

**For better language consulting.**   blc

blc

Christian Eisold
## Computational Linguist M.A.

- Natural Language Processing & „Smart Data"

- Scoping & Evaluation of MT Use Cases

- Data analysis & Data Migration (TMS Systems)

- Terminology & Ontology Use Cases

For better language consulting.   blc

blc services for perfectly connected language services
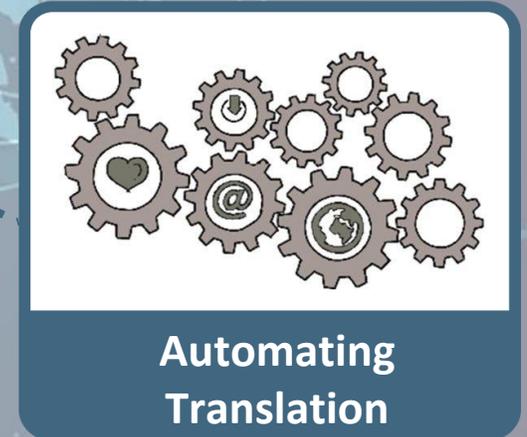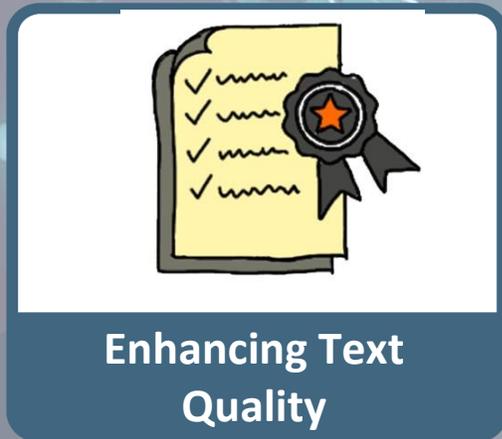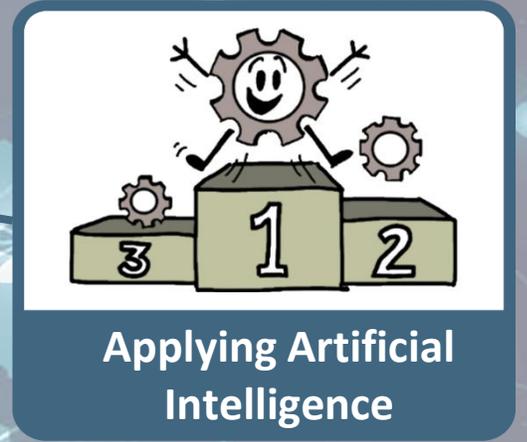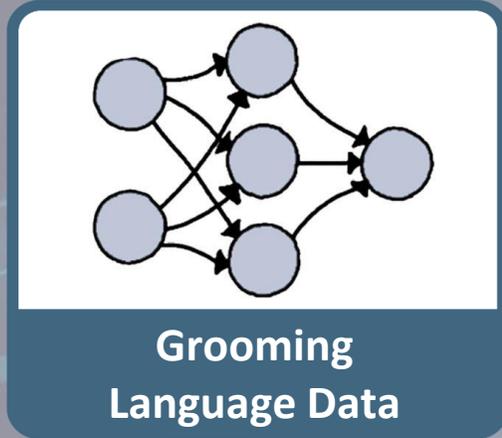
Increasing the efficiency and quality of your processes

Objective and independent, *no* system sales, *no* commission

Gap analysis
Data analysis
System selection

Market monitoring
System strategy
Best practice

Strategy workshops
Team know-how
System training

Acceptance testing
Second level support
Process support

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc

SCOPING NMT USE CASES

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc

Scoping NMT Use Cases

How does one scope NMT Use Cases?

Is he scoping NMT use cases?
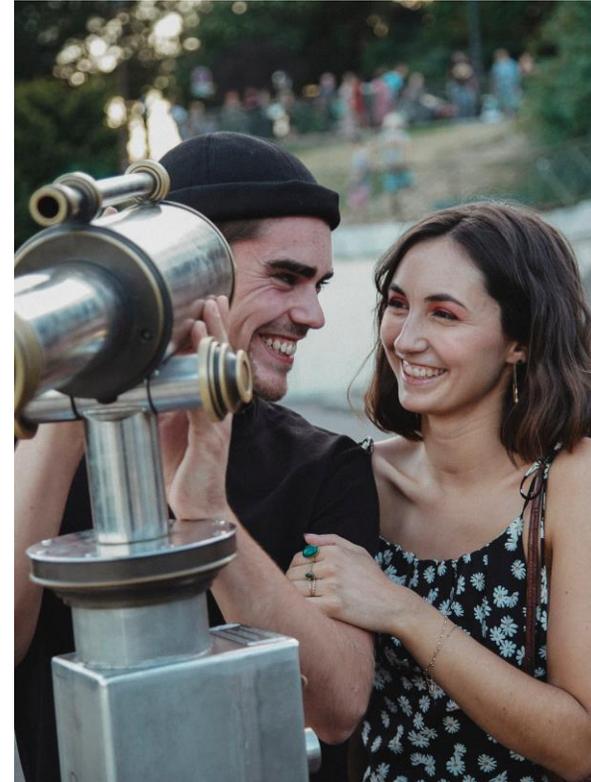
Did they scope a lovely NMT use case? Maybe...

For better language consulting. blc

Scoping NMT Use Cases

„My Boss wants to use MT engines…'

Situation in companies

- The **quality of generic NMT** has been tested by employees via free services: Substantial advantages over SMT

- **Most customers** know: There are lots of MT systems around (cloud & onprem)

- **Some customers** know: You can train your own engines with some of these systems

- **Few customers** know: How to use and prepare resources for customized NMT training

- **Very few customers** know: How to test customized engines properly

For better language consulting. blc

Scoping NMT Use Cases

Starting the NMT Journey: Beyond Use Cases

1 **Collecting use cases**
- – User groups
- – Applications/Integrations

2 **Linguistic & formal requirements**
- – Languages, file formats
- – MT quality & expectation management

3 **IT & Financial requirements**
- – Internal IT landscape
- – Budget & Business cases

4 **System Selection**
- – RFI & Evaluation
- – Selection of best fitting system(s)

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc

Scoping NMT Use Cases

Important first questions

Is my data suitable for MT training?

How much prior knowledge is available on the MT process?

Can we use the cloud?

What quality level is expected?

How much data is available for MT training?

Internal resources available for MT process?

Which languages should be translated?

Which systems should use MT?

For better language consulting   blc
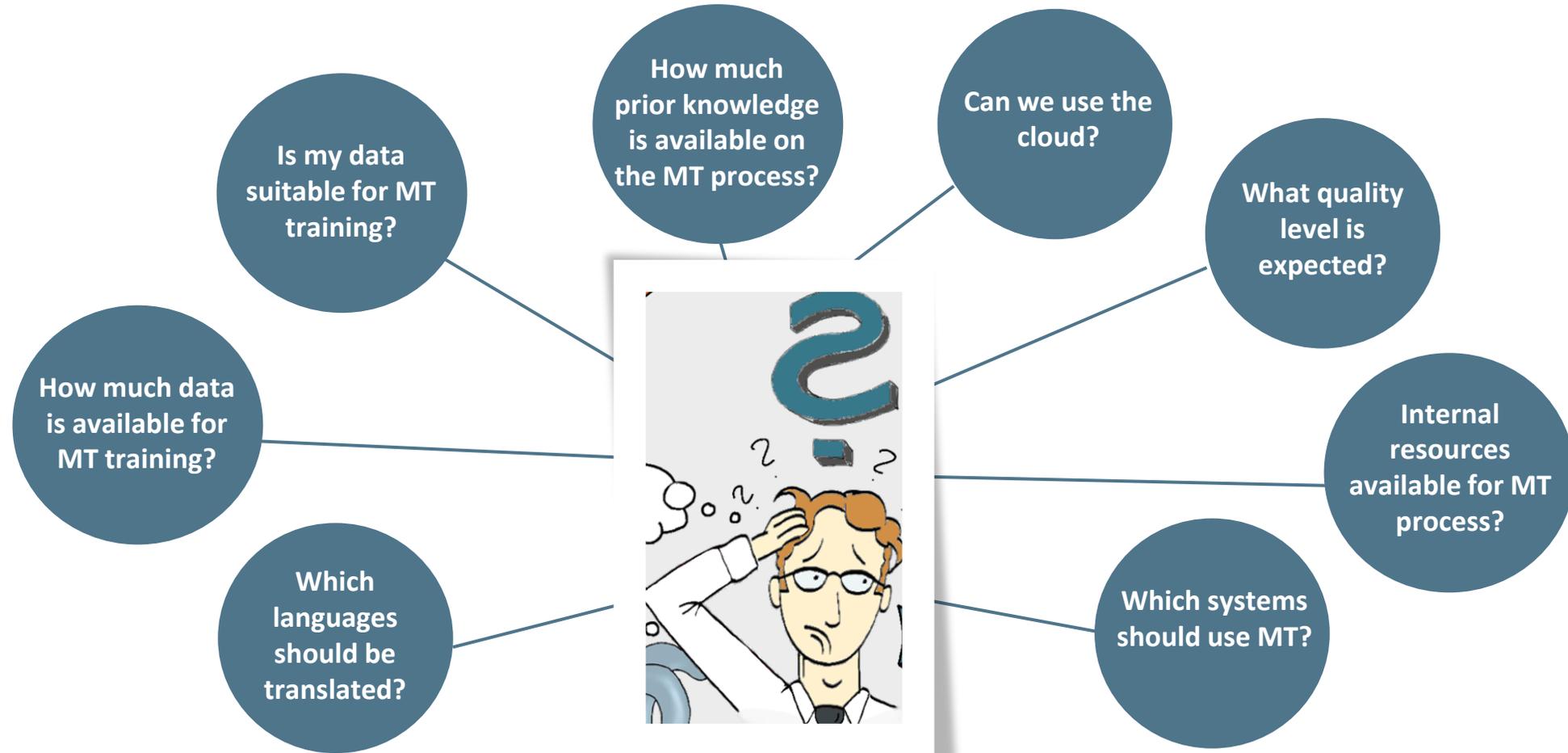
Scoping NMT Use Cases

MT Workshops
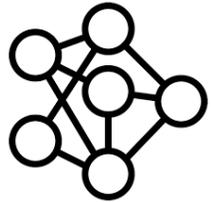
MT Approaches
- RBMT
- SMT
- NMT
- Word Embeddings
- Pre-processing
- MT Training

MT Evaluation
- Automatic Evaluation
- Holistic Evaluation
- Analytic Evaluation
- Post-Editing-Distance
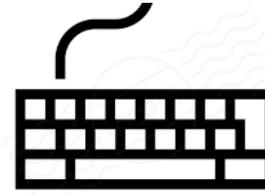
Post-Editing MT
- PE-Types
- PE-Tools
- PE-Effort
- Guidelines
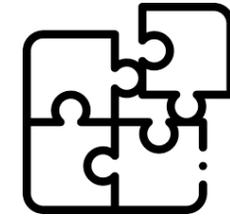
MT Use Cases
- Languages/ Engines
- Training resources
- MT-Integration
- Translation Workflows

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc

Scoping NMT Use Cases

Language Resources & Workflows

Language Direction	Parallel data	Translation Volume	Terminology	Domains	MT UseCases	Workflows
EN<>DE	TM/150k TUs	250k words/month	TBX/300 Terms	Internal, Techdoc, Legal	TMS CMS MT Portal	Full-Post-Editing (internal) Self-Service Self-Service
DE<>FR	DOCX/100 Files	100k words/month	Excel/ 100 Terms	Marketing	MT Portal	Self-Service
Tasks	Merging TMs Alignin parallel data Anonymize Clean up data	Business Cases - Licensing - API - Throughput	Merging termbanks & glossaries	Filtering Domains in training data	Check API integrations & connectors	Check current translation systems & process

For better language consulting. blc

Scoping NMT Use Cases

MT Landscape

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc
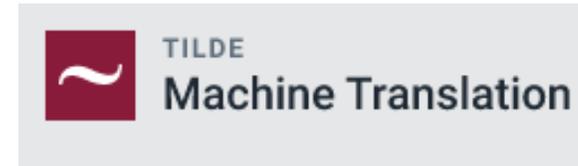
Scoping NMT Use Cases

Business Cases

Translation Volume

- Words day/month/year
- API throughput
- Number of connectors/users

Hosting

- Server locations
- Number of engines

Licensing

- Cloud/Onprem licenses
- Engines
- Users

Trainings

- Initial trainings
- Retrainings
- Services

Customization

- Portal customization
- UI customization

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc

Scoping NMT Use Cases

Request for Information

MT Vendor	MT Vendor	MT Vendor	MT Vendor	MT Vendor

- Pricing
- Hosting
- Security
- Pretrained Engines
- Training resources
- Training capabilities
- Preprocessing
- Post processing
- Terminology
- Automatic metrics
- Human evaluation
- Post editing
- User interface
- Service
- User Trainings

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc

Scoping NMT Use Cases

Introducing machine translation in four Steps!

Preprocessing **01**

- Extraction of training sets
- Cleansing of training texts
- Creation of test sets

Training **02**

- Compilation of training texts
- Configuration and training
- Use of terminology

Machine Translation

Integration & Go-Live **04**

- Workflow integration
- Interface connection
- Post-Editing Process

Evaluation & Optimization **03**

- Automatic and human evaluation
- Optimizations and re-tests

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc

Evaluation of NMT Engines

For better language consulting.   blc

# Evaluation of NMT Engines

Guiding Questions

- **What MT quality level is expected for a given use case?**
  - Gisting
  - Publishing

- **Who will be evaluating the engines?**
  - Internal domain experts
  - LSPs

- **What features to focus on in the evaluation?**
  - Terminology
  - Style
  - Numbers
  - Named entities
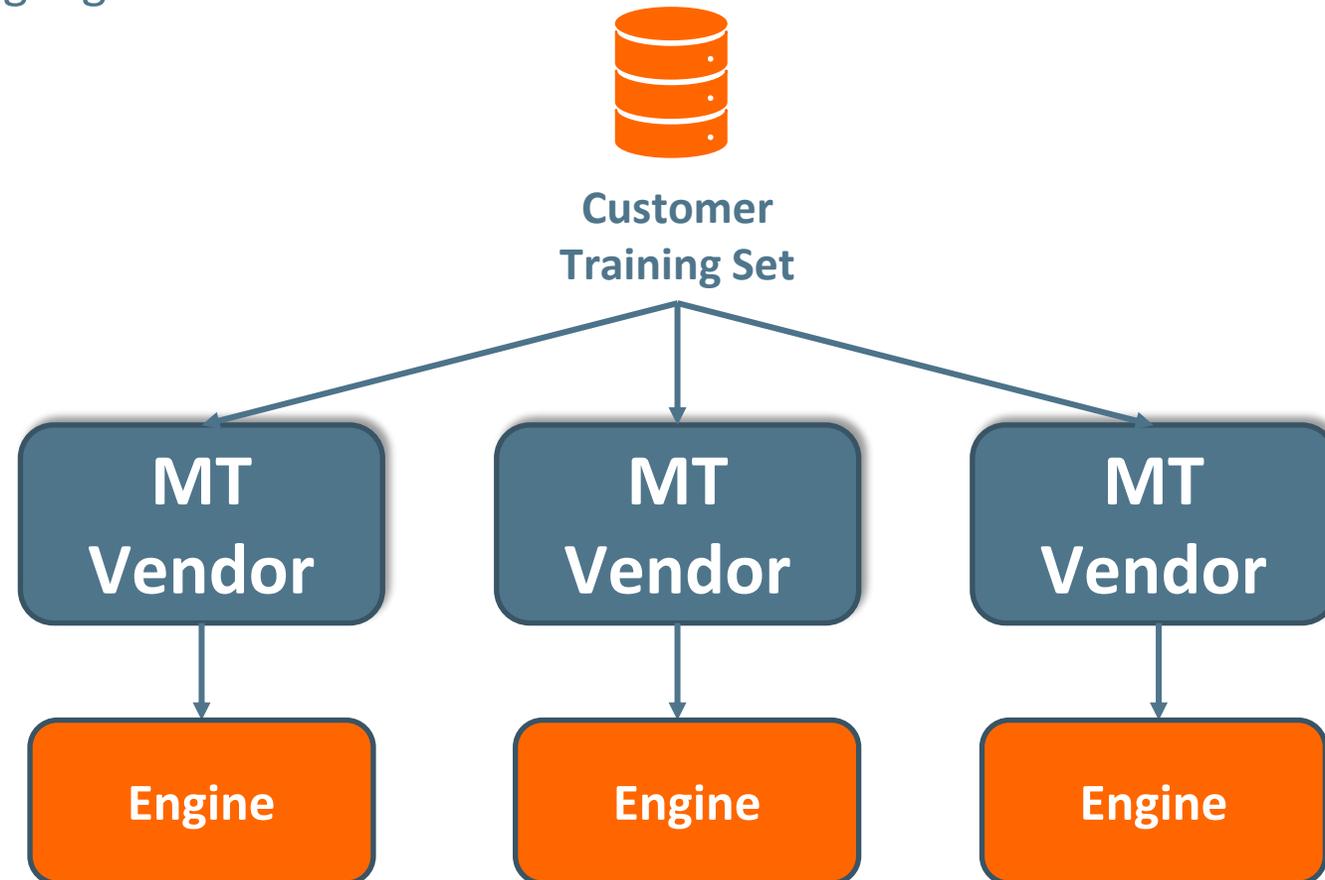
For better language consulting.   blc

Evaluation of NMT Engines

MT-Training: One language direction

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting.

Evaluation of NMT Engines

MT-Training: Three language directions

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc
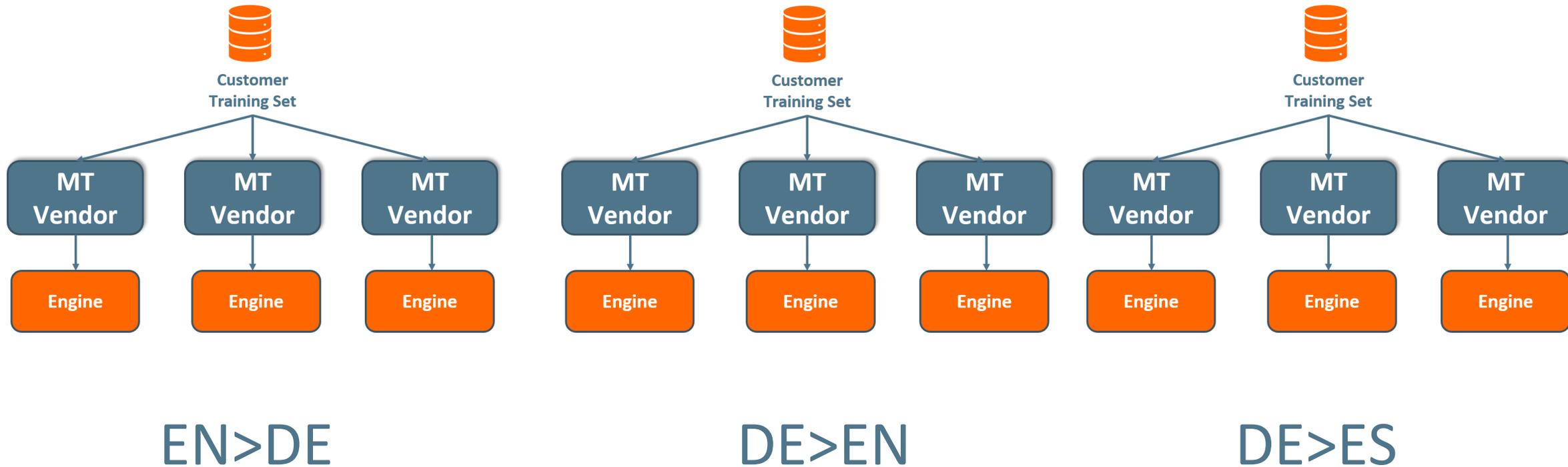
Evaluation of NMT Engines

MT-Training: One language direction, different domains

EN>DE

TechDoc

EN>DE

Legal

EN>DE

Marketing

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc
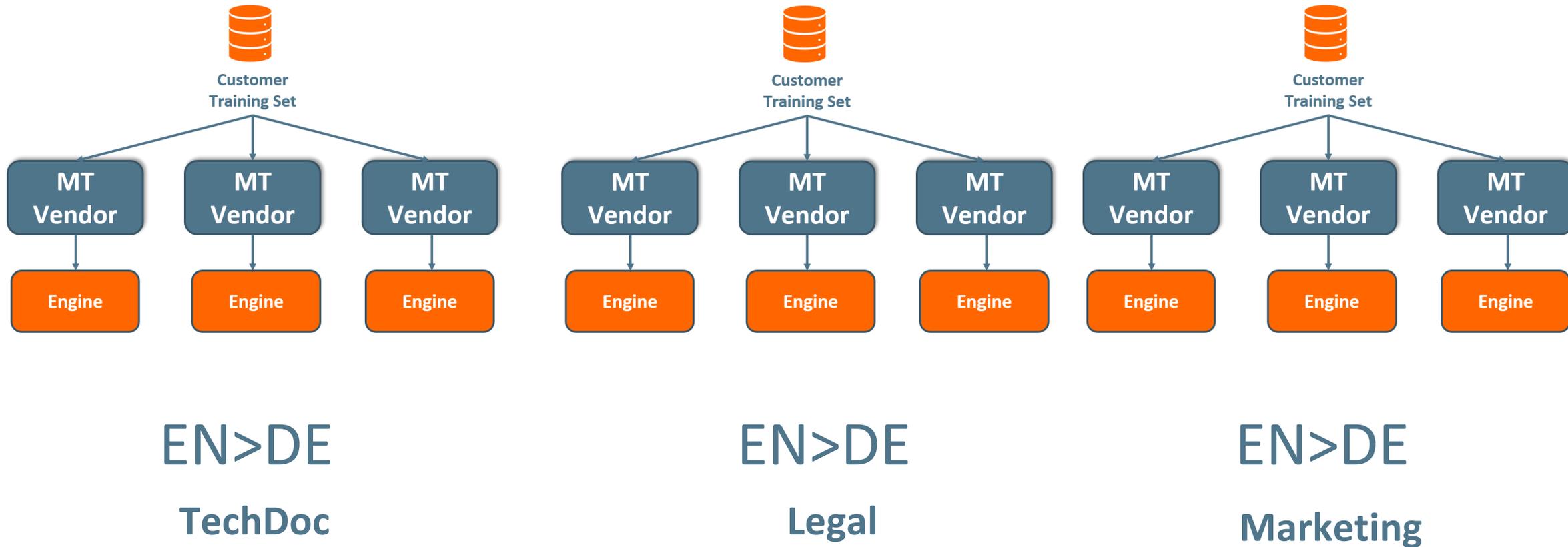
Evaluation of NMT Engines

MT-Training: Three language directions, mixed domains

EN>DE

TechDoc
Legal
Marketing

DE>EN

TechDoc
Legal
Marketing

DE>ES

TechDoc
Legal
Marketing

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc
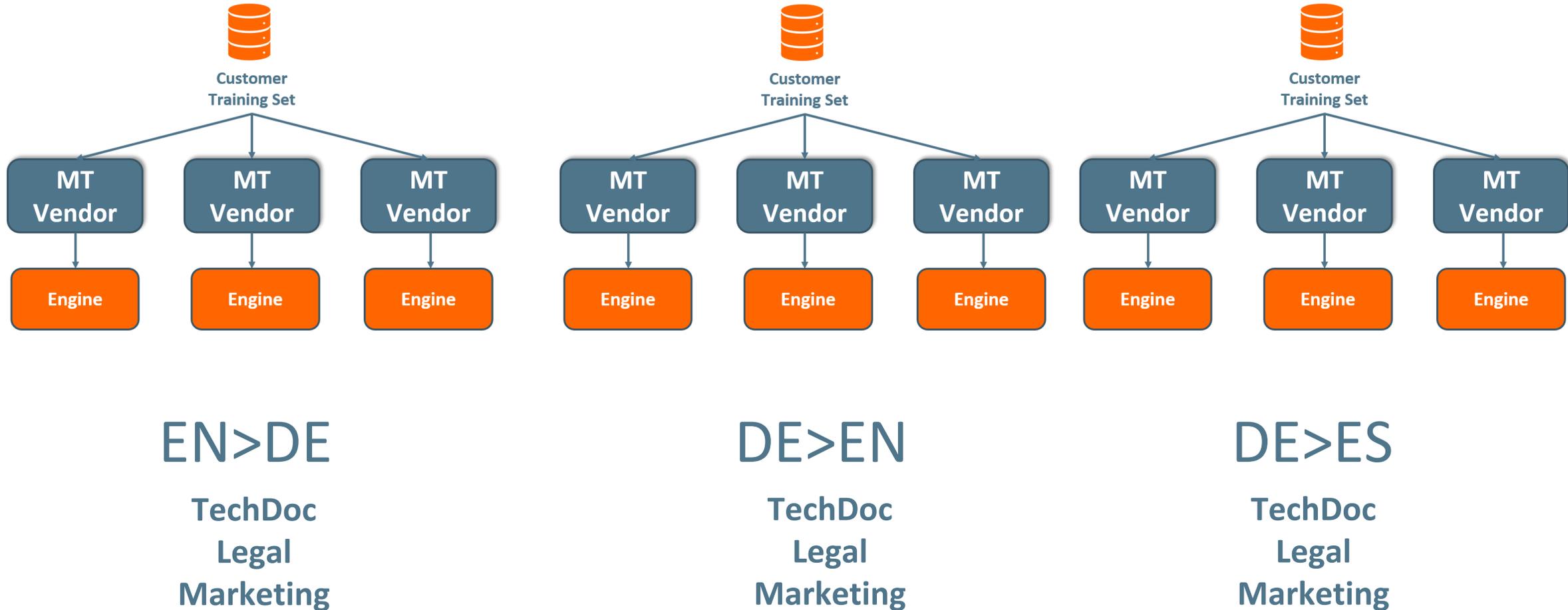
Evaluation of NMT Engines

Human Evaluation

Accuracy

Readability

Terminology

Style
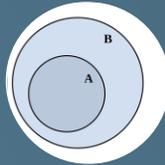
Human test set
- Subset of the automatic set
- Variable size

Error metric
MQM
- Set of error types and severities
- Scale based ratings: accuracy & readability

Evaluators
- Annotate Errors on sentence/word level
- Use Guidelines / Cat Tools / Excel

Post-Editing
- Translators post-edit human test set
- Use Guidelines / Cat Tools / Excel

For better language consulting. blc

Evaluation of NMT Engines

Evaluating MT Systems

Quality Reports

| Error Type	Severity	Domain	Source	MT	Reference	Post-Editing	BLEU	PED	PED%
-	-	Marketing	Das Produkt ist bei den Kunden sehr beliebt.	The product is very popular among customers.	The product is very popular among customers.	The product is very popular among customers.	1.00	0	0%
Word order Terminology	Major Minor	Techdoc	Das Produkt zunächst ausschalten und dann vorsichtig öffnen.	First **turn off** the product and then open **carefully it**.	First **switch off** the product and then **open it carefully.**	First switch off the product and then open it carefully.	0.66	12	27%
Source Text Error Agreement	Major	Techdoc	Entsorgen Sie **den** Produkt bitte fachgerecht.	Please dispose of the product properly.	Please dispose of the product properly.	Please dispose of the product properly.	0.00	0	0%

Error annotations are

- a prerequisite for engine-approvals

- important feedback for the NMT development team in order to optimize the engines

- insightful with regards to post-editing strategies and source-text quality -> Guidelines

For better language consulting. blc

Scoping NMT with blc: Requirements & Evaluation

Evaluating MT Systems: Overall impression

	System A	System B	System C
Pricing	3	5	2
Functional Requirements	4	3	2
Evaluation	2	4	1
Impression	3	4	3
Score	12	16	8

For better language consulting. ⊣ blc

Integrating NMT

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc

Integrating NMT

NMT User Groups

— **Configure** (green)
— **Traffic** (blue)
— **Use** (purple)

Language Services · **MT System** · **MT Portal**

LSP · **TMS System**

Customer A
- Domain: Technical
- Workflows:
  - Self-Service

Customer B
- Domain: Technical
- Workflows:
  - Internal (FPE), External (FPE)
  - Self-Service

Customer C
- Domain: Legal
- Workflow: Internal (FPE)

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc

Integrating NMT

NMT User Groups

— **Configure** (green)
— **Traffic** (blue)
— **Use** (purple)

Language Services → **MT System** ⇄ **MT Portal**

LSP → **TMS System**

Customer A
- Domain: Technical
- Workflows:
  - Self-Service

Customer B
- Domain: Technical
- Workflows:
  - Internal (FPE), External (FPE)
  - Self-Service

Customer C
- Domain: Legal
- Workflow: Internal (FPE)

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc
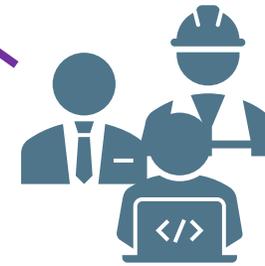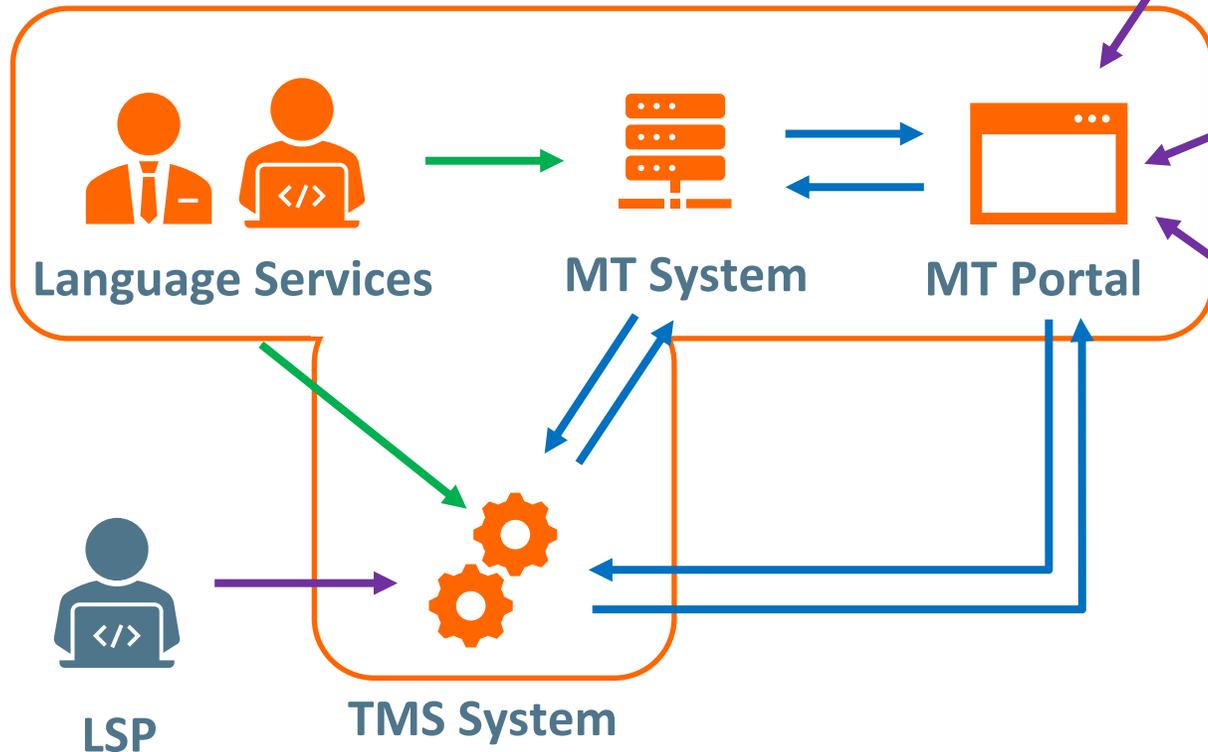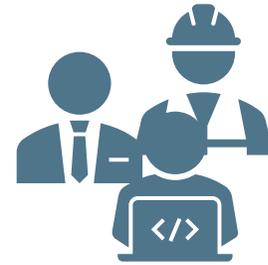
Integrating NMT

Guidelines

Post-Editing-Guidelines

General Guidelines
- Rules of thumb
- Light editing rules
- Full editing rules

Customer Specific Guidlines
- Terminology
- Style
- Normalizations

Evaluation-Guidelines

General Guidelines
- Error typology
- Error examples

Stakeholder Specific Guidlines
Terminology
Style
Normalizations

For better language consulting. blc

Integrating NMT

Tracking & Improving MT Quality

Track Quality

TASKS

- Get Post-Editing-Distance
- Get Quality Feedback from LSP
- Quality within expectations?

Evaluate

TASKS

- Compile testsets
- Annotate errors
- Prioritize errors

Improve

TASKS

- Feedback errors to MT vendor
- Discuss strategies
- Re-train and re-test engines

For better language consulting. blc
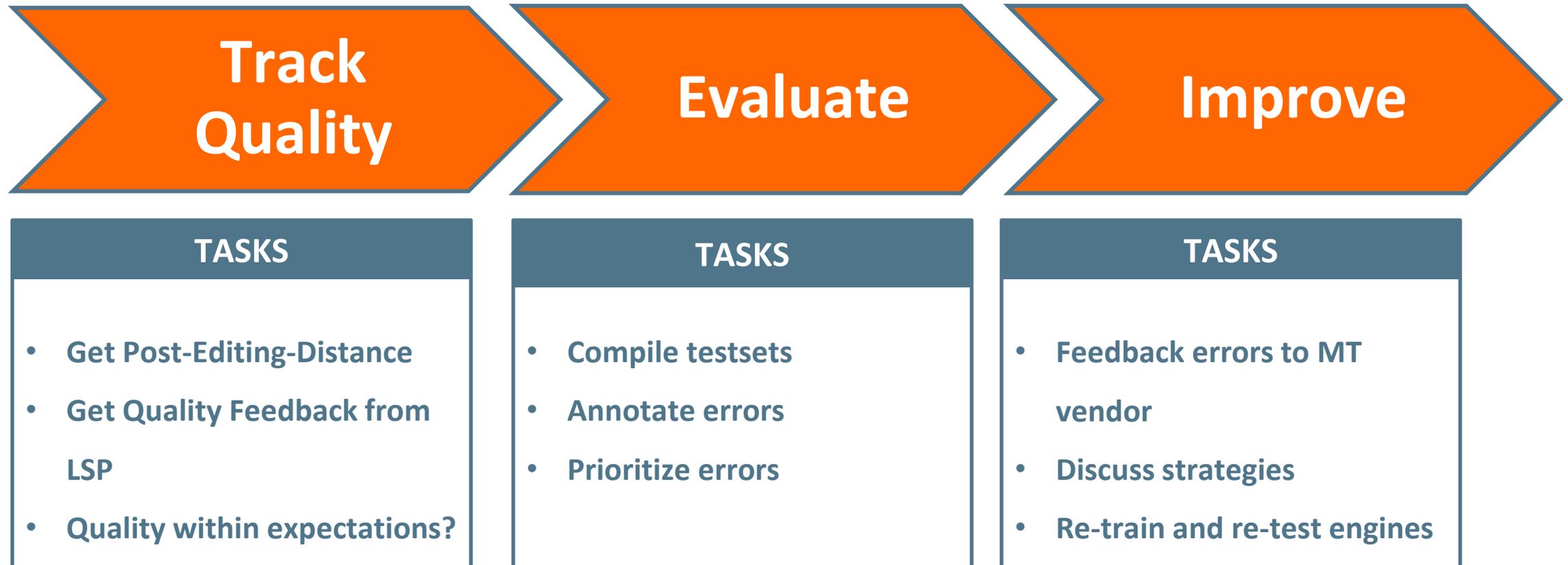
Integrating NMT

MT Strategy

LSP Pricing

- Word/Time based pricing
- Languages & Domains
- Quality levels

Business Cases
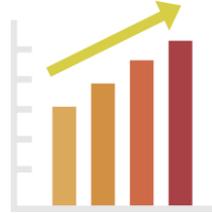
- Hard benefits
- Soft benefits
- One time costs
- Running fixed costs
- Running variable costs

Risk Management

- Which risks can occur?
- Probability of risks
- How severe would the consequences be?

Change Management
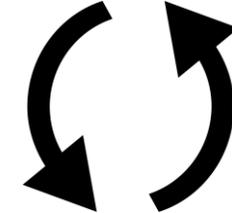
- MT service naming
- Quality process
- Roles and tasks

For better language consulting. blc

Integrating NMT

More Tasks

Configuration
- MT system (Roles/Rules/Resources)
- TMS (Workflows/Resources)

Resource management
- Data handling
- Coordinaton of evaluations
- Trainings/Retrainings

Workshops
- Evaluator workshops
- Post-Editing workshops
- Strategy workshops

IT
- Portal customization
- Security

Documentation
- Guidelines
- Process documentation

For better language consulting.   blc

CONCLUSIONS

Scoping, Evaluation and Integration of NMT Use Cases on Company Level

For better language consulting. blc

Conclusions

How to get started with NMT?

Discuss your MT requirements & Use Cases

Communication between PMs, IT, stakeholders, LSPs

Collect resources, evaluate MT vendors & engines, integrate and go life!

For better language consulting.   blc

Need more information?

Please contact us!

🌐 www.berns-language-consulting.de

✉ info@berns-language-consulting.de

📞 +49 (0) 211 22 06 77 0