Morphological Annotation of Quranic Arabic

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The Quranic Arabic Corpus
http://corpus.quran.com

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Publications

RANLP 2009 INFOS 2010 LREC 2010

The Quran

- 1,400 years old
- The central religious text of Islam
- Written in Quranic Arabic, the direct ancestor language of Modern Arabic
- Highly studied linguistically for over 1,000 years
- Large body of existing published analyses of the Quran, but these are not machine-readable

The Quranic Arabic Corpus

- An international project involving researchers from several institutions
- Aim is to enable further understanding of the Quran through annotation
- Produce highly accurate machine-readable datasets of linguistic analysis

Multi-Level Annotation

- Word-by-word English to Arabic interlinear translation
- Part-of-speech tagging
- Morphological segmentation and inflection features
- Syntactic analysis using dependency grammar

http://corpus.quran.com

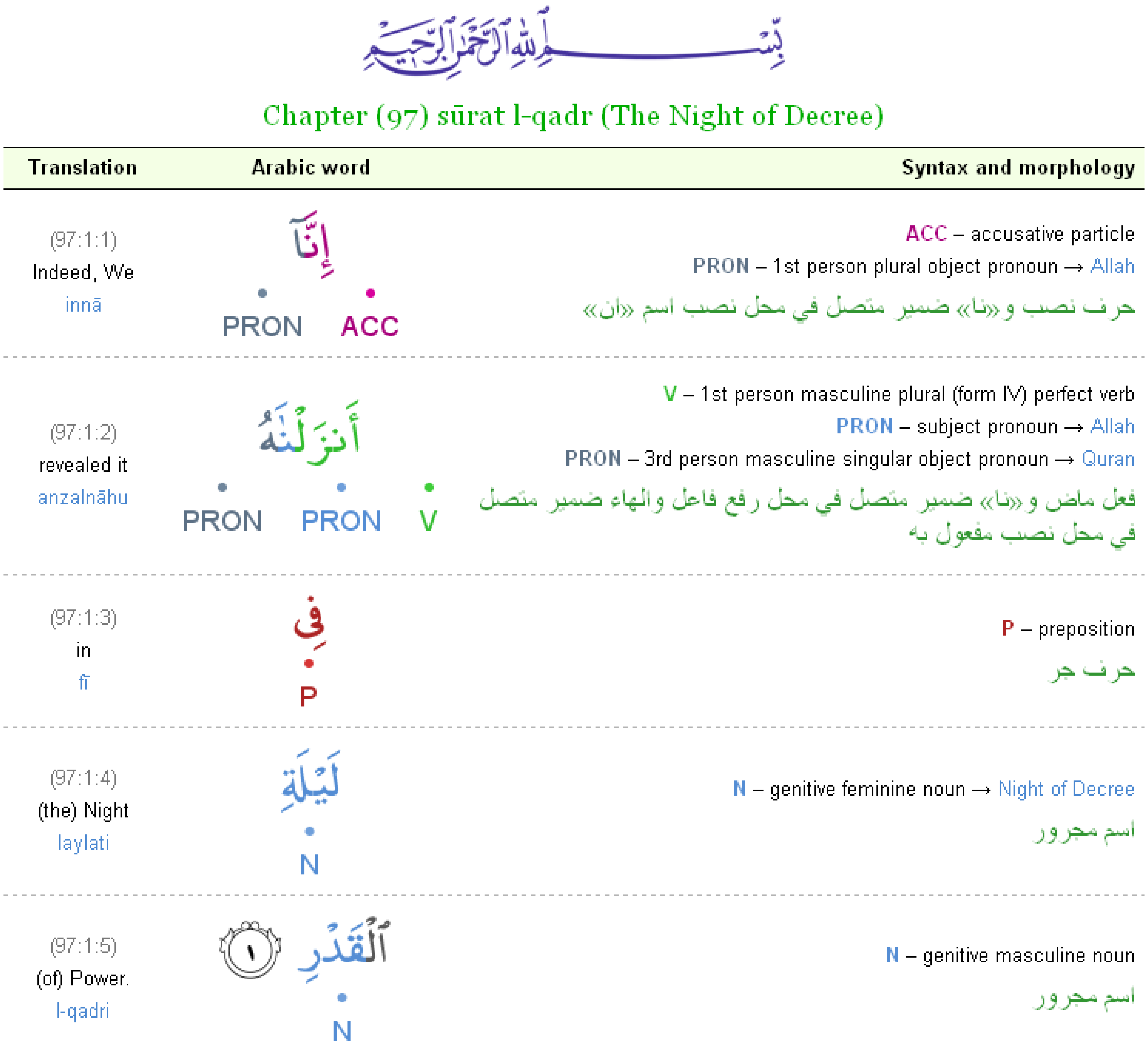
- A popular website (50,000 users per month)
- Used by researchers, scholars and students of the Quran and Arabic

Online Collaborative Annotation

- Anyone can view existing annotation
- Registered users can suggest corrections through a message board

Web-based Tools for Annotators and Researchers

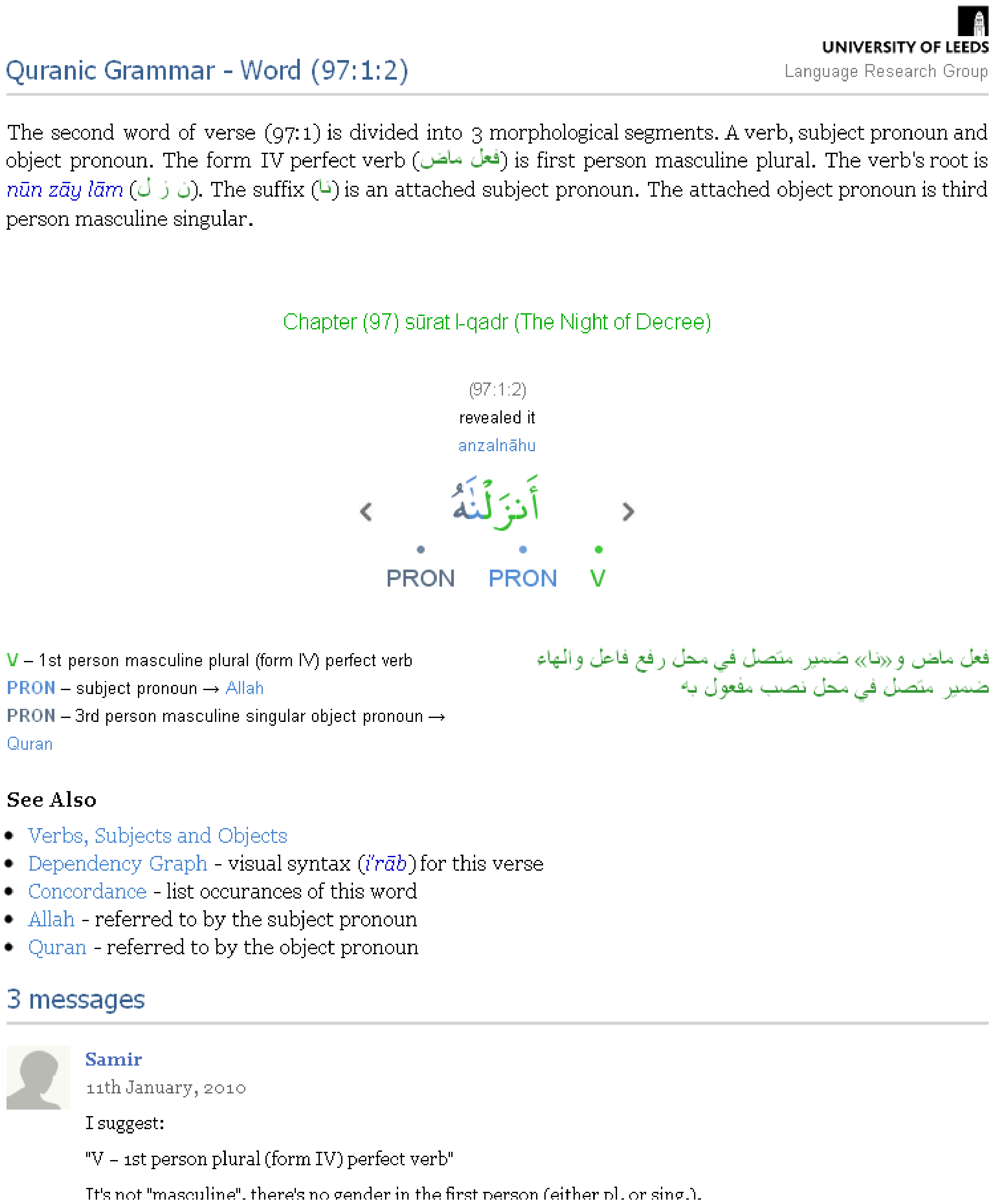
- Concordance of the Quran (to see how related words have been tagged)
- Morphological search by root, lemma or stem
- 7 parallel translations into English for each verse
- Automatically generated phonetic transcription
- Natural language generation used to create grammatical summaries
- Audio recitation in Arabic



بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

Chapter (97) sūrat l-qadr (The Night of Decree)

Translation	Arabic word	Syntax and morphology
(97:1:1) Indeed, We innā	إِنَّآ PRON ACC	ACC – accusative particle PRON – 1st person plural object pronoun → Allah حرف نصب و «نا» ضمير متصل في محل نصب اسم «ان»
(97:1:2) revealed it anzalnāhu	أَنزَلْنَٰهُ PRON PRON V	V – 1st person masculine plural (form IV) perfect verb PRON – subject pronoun → Allah PRON – 3rd person masculine singular object pronoun → Quran فعل ماض و «نا» ضمير متصل في محل رفع فاعل والهاء ضمير متصل في محل نصب مفعول به
(97:1:3) in fī	فِى P	P – preposition حرف جر
(97:1:4) (the) Night laylati	لَيْلَةِ N	N – genitive feminine noun → Night of Decree اسم مجرور
(97:1:5) (of) Power. l-qadri	ٱلْقَدْرِ ١ N	N – genitive masculine noun اسم مجرور



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Language Research Group

Quranic Grammar - Word (97:1:2)

The second word of verse (97:1) is divided into 3 morphological segments. A verb, subject pronoun and object pronoun. The form IV perfect verb (فعل ماض) is first person masculine plural. The verb's root is *nūn zāy lām* (ن ز ل). The suffix (نا) is an attached subject pronoun. The attached object pronoun is third person masculine singular.

Chapter (97) sūrat l-qadr (The Night of Decree)

(97:1:2)
revealed it
anzalnāhu

‹ أَنزَلْنَٰهُ ›

PRON PRON V

V – 1st person masculine plural (form IV) perfect verb
PRON – subject pronoun → Allah
PRON – 3rd person masculine singular object pronoun → Quran

فعل ماض و «نا» ضمير متصل في محل رفع فاعل والهاء ضمير متصل في محل نصب مفعول به

See Also

- Verbs, Subjects and Objects
- Dependency Graph - visual syntax (*i'rāb*) for this verse
- Concordance - list occurances of this word
- Allah - referred to by the subject pronoun
- Quran - referred to by the object pronoun

3 messages

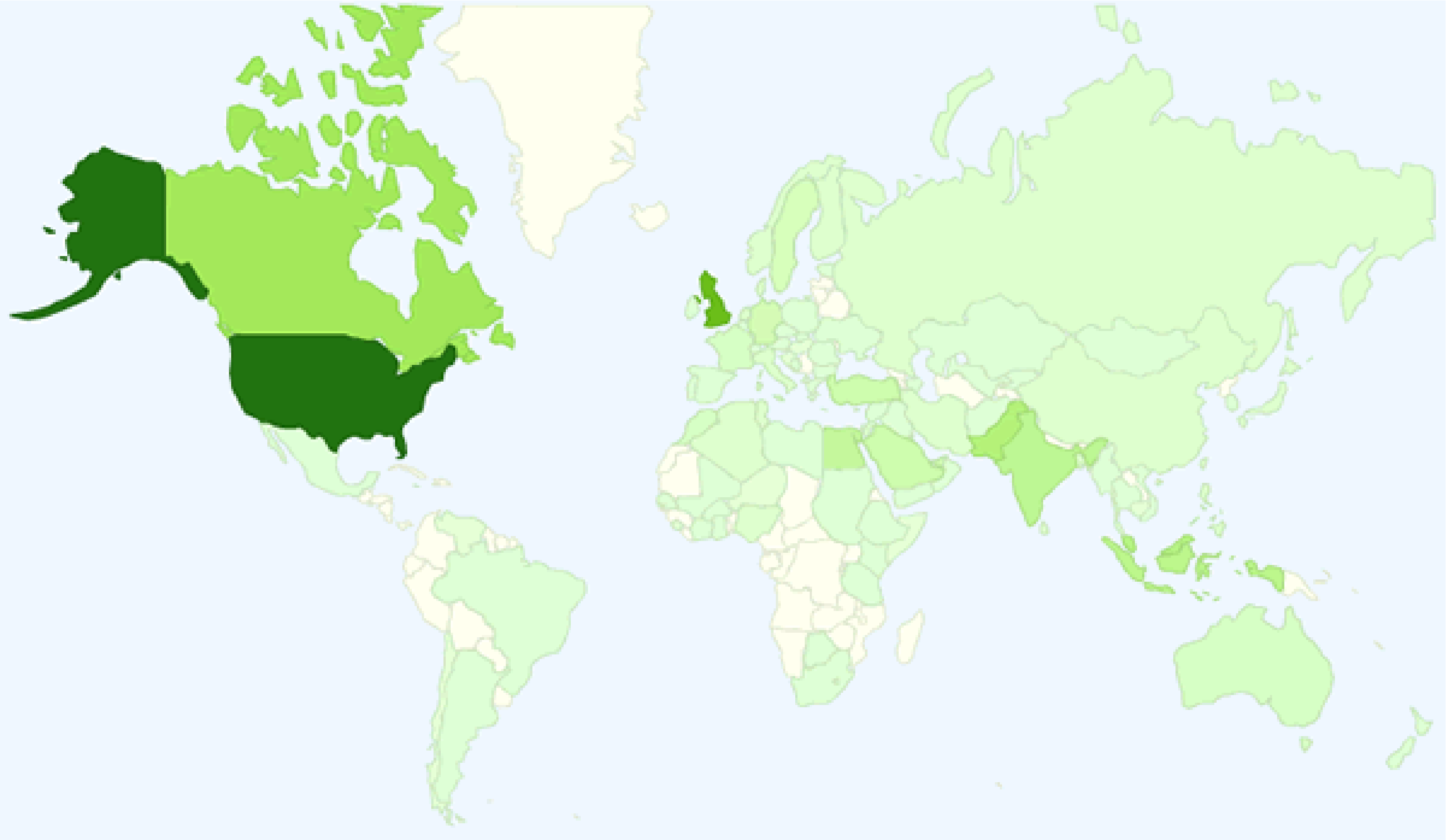
Samir
11th January, 2010

I suggest:

"V – 1st person plural (form IV) perfect verb"

It's not "masculine". there's no gender in the first person (either pl. or sing.).

Online Volunteer Collaboration (يد الله مع الجماعة)



- 50,000 Users per month
- 150 Researchers on the comp-quran mailing list
- Hundreds of online expert volunteers (Quranic Scholars)

Annotating the Quran

- 77,430 words in the Quran
- Each word is part-of-speech tagged, with morphological analysis
- This is initially done off-line, using a morphological analyzer
- Adapted BAMA (Buckwalter Morphological Analyzer)
- Approx 80% accurate

Difficulties in Adapting BAMA

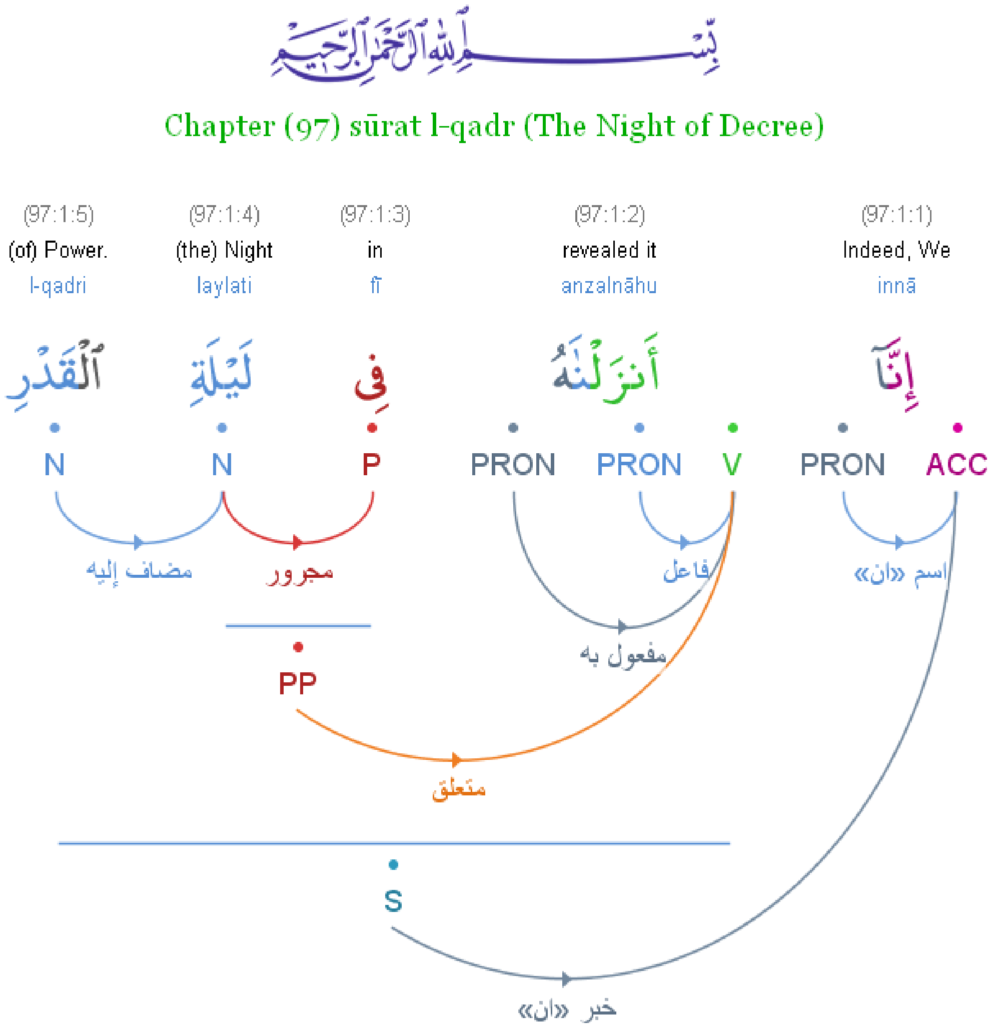
- Quran uses different spelling compared to Modern Arabic
- Out of vocabulary errors
- BAMA does not use context – multiple possible analyses

Solutions

- Diacritic edit-distance, to find best match
- Initial off-line manual verification
- Filtering of BAMA results based on contextual grammatical rules

Syntactic Treebank

- Dependency Grammar (11,000 words completed so far)



Chapter (97) sūrat l-qadr (The Night of Decree)

Novel Contributions of this Research

- NLP and Corpus Linguistics applied to Classical Arabic
- Arabic language processing tools
- Datasets for Further Research
- Methodology - Large-scale online collaborative annotation

Future Work

- Pronoun resolution (in progress, 11,000 words annotated so far)
- Semantic ontology (in progress, 300 concepts defined with relations)
- Quranic PropBank (planned)

Applications

- A popular and unique free online Quranic Arabic study tool
- Datasets enable further automatic computational analysis of the Quran
- Training data for morphological analyzers and parsers for Classical Arabic

Thank You

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