SQL Server Konferenz 2016

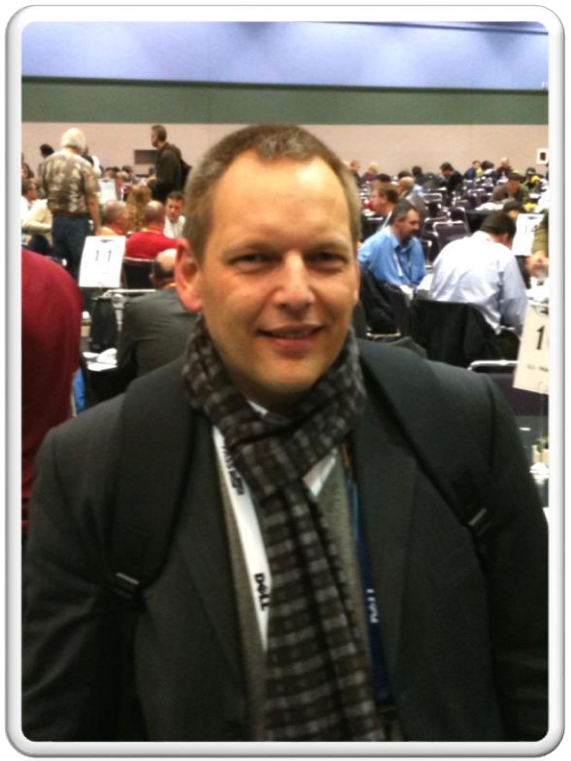
powered by PASS Deutschland e.V.

JSON, das neue und bessere <xml> ?

Alexander Karl & Sascha Dittmann

PASS DEUTSCHLAND e.V.

About me



Alexander Karl

.net - CDE

SQL + BI Consultant

Microsoft CERTIFIED Trainer

Microsoft CERTIFIED IT Professional

Database Administrator 2008
Server Administrator on Windows Server® 2008
Database Administrator on SQL Server® 2005

... and „2012er“ SQL MCSE

About me

Sascha Dittmann

Microsoft

Cloud Solution Architect

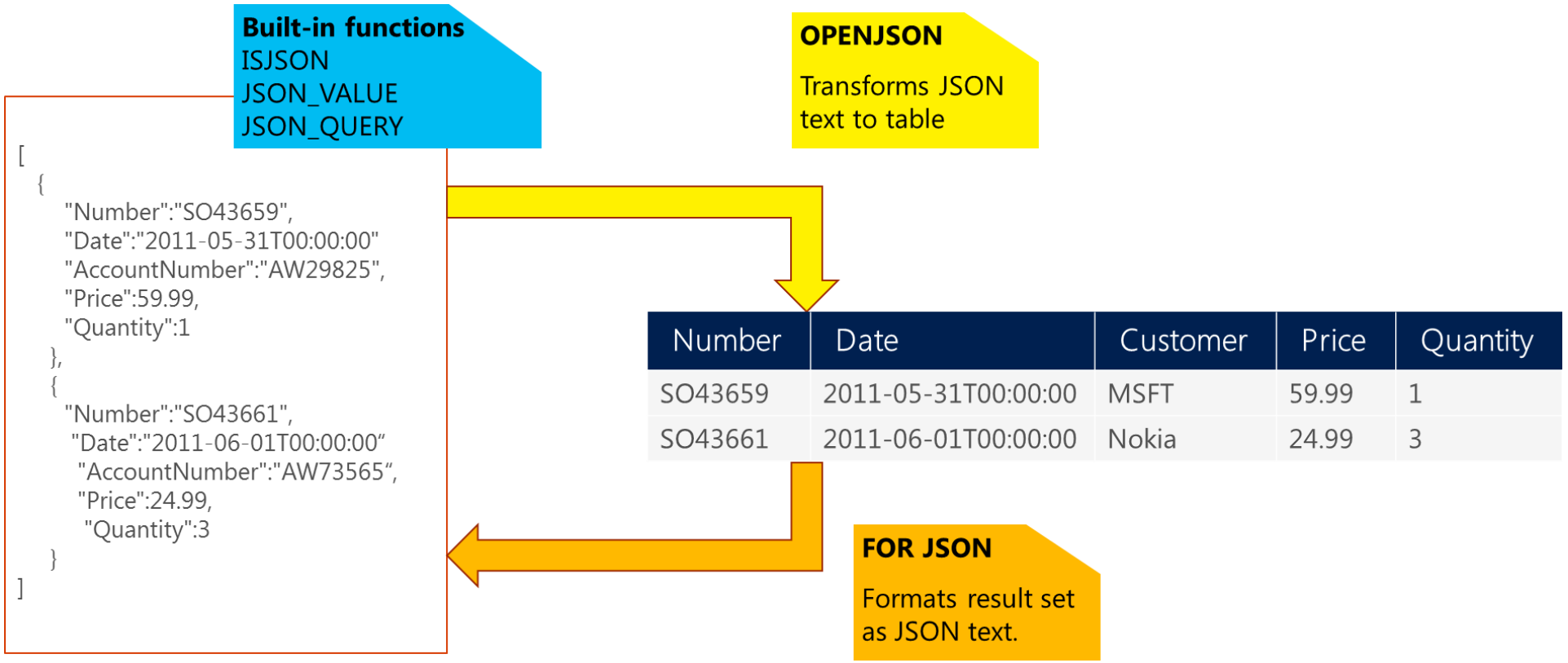
Microsoft CERTIFIED Trainer

Twitter: @SaschaDittmann
Blog: http://www.sascha-dittmann.de

Agenda

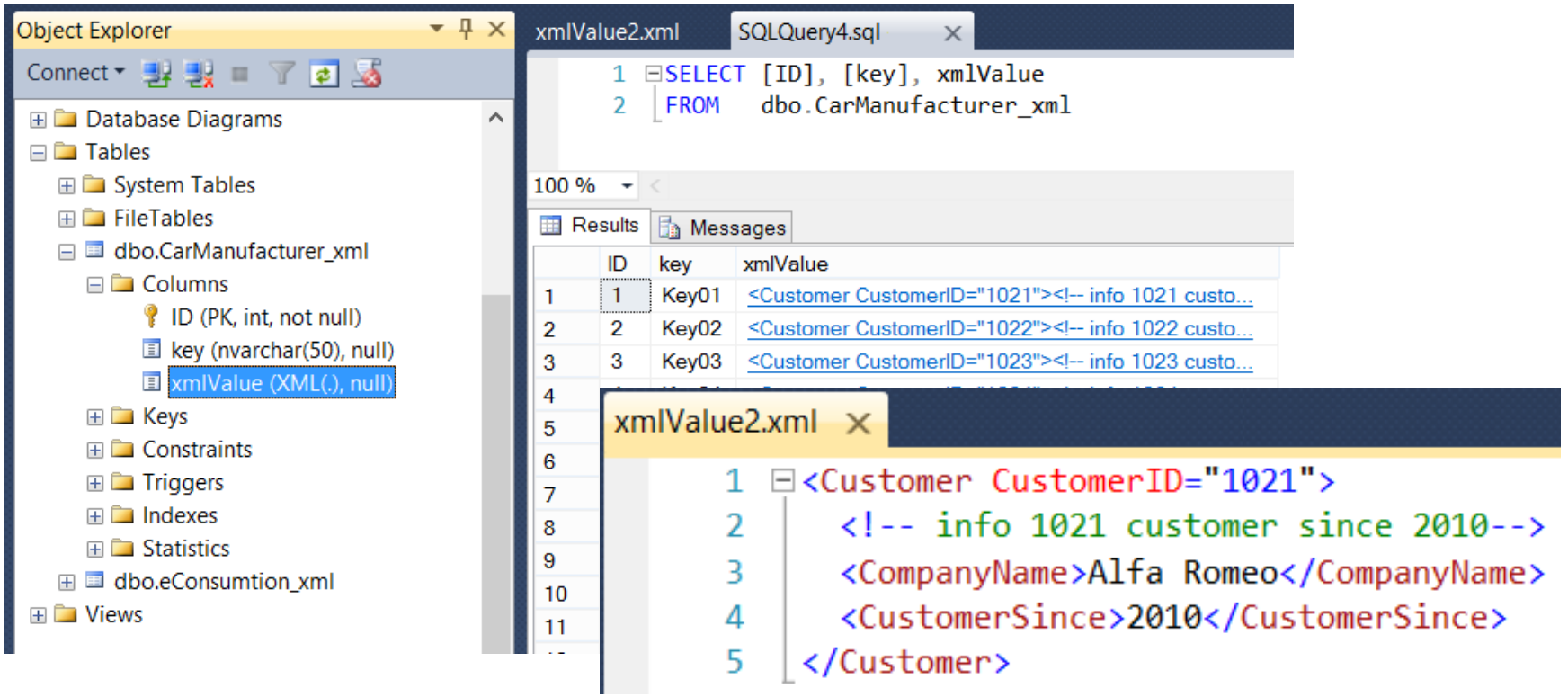
- JSON „neu im SQL Server 2016“
- passende Tools
- Syntax For JSON / For XML
- Syntax OpenJSON / OpenXML
- Datentyp ? JSON / XML
- Indexierung

JSON „round trip“



https://msdn.microsoft.com/en-us/library/dn921897.aspx

<xml/> Tooling


Object Explorer
Connect
Database Diagrams
Tables
System Tables
FileTables
dbo.CarManufacturer_xml
Columns
ID (PK, int, not null)
key (nvarchar(50), null)
xmlValue (XML(.), null)
Keys
Constraints
Triggers
Indexes
Statistics
dbo.eConsumtion_xml
Views
xmlValue2.xml
SQLQuery4.sql
SELECT [ID], [key], xmlValue
FROM dbo.CarManufacturer_xml
100 %
Results
Messages
ID
key
xmlValue
1 1 Key01 <Customer CustomerID="1021"><!-- info 1021 custo...
2 2 Key02 <Customer CustomerID="1022"><!-- info 1022 custo...
3 3 Key03 <Customer CustomerID="1023"><!-- info 1023 custo...
xmlValue2.xml
<Customer CustomerID="1021">
<!-- info 1021 customer since 2010-->
<CompanyName>Alfa Romeo</CompanyName>
<CustomerSince>2010</CustomerSince>
</Customer>

{JSON} Tooling

```
1  SELECT name                  as 'name'
2       , database_id           as 'database_id'
3       , create_date           as 'create_date'
4       , is_published          as 'replication.is_published'
5       , is_subscribed         as 'replication.is_subscribed'
6       , is_merge_published    as 'replication.is_merge_published'
7       , is_distributor        as 'replication.is_distributor'
8  FROM   sys.databases
9  FOR    JSON  PATH, ROOT('databases'), Include_NULL_Values;
10
```

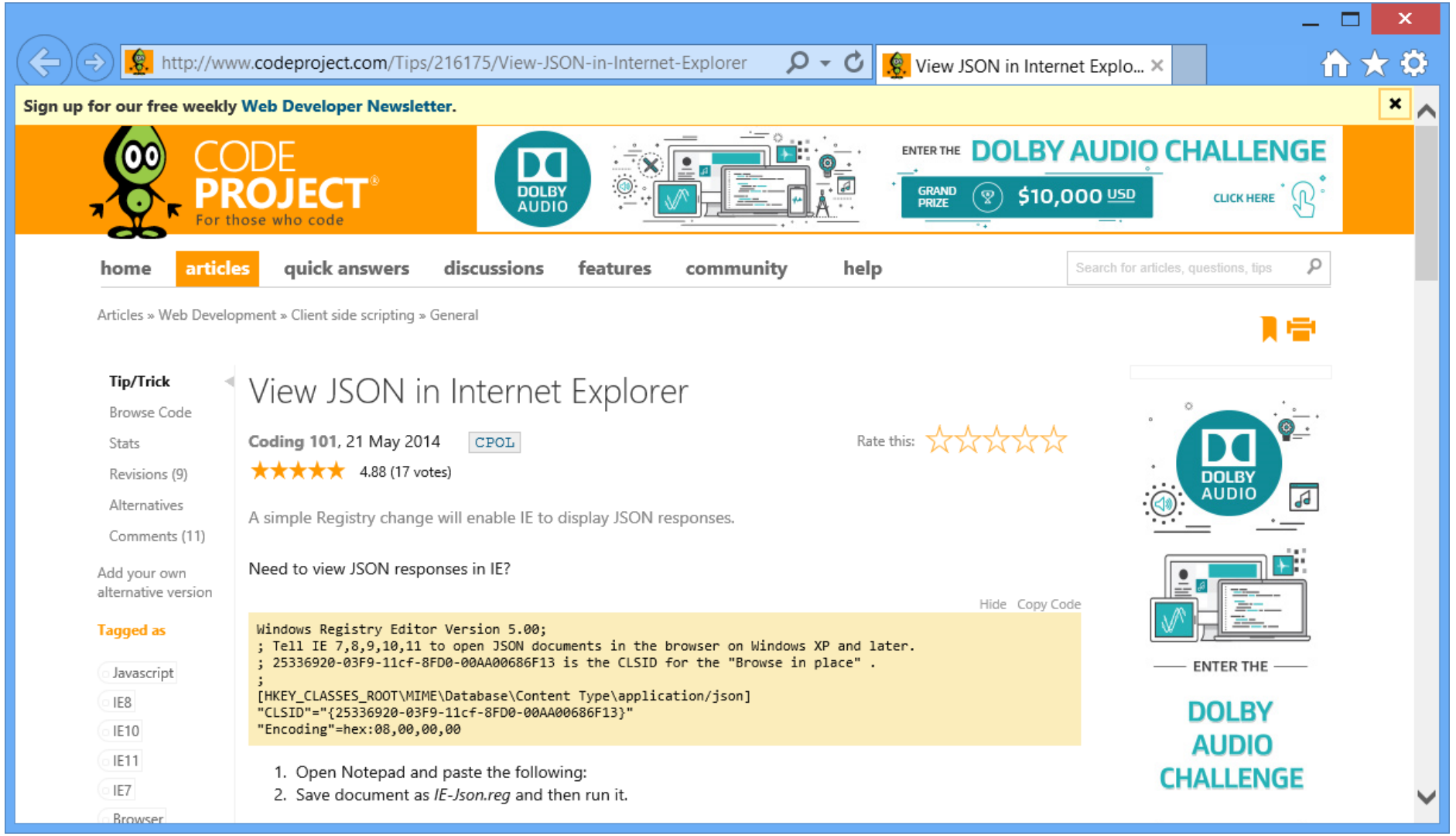
100 %

Results | Messages

	JSON_F52E2B61-18A1-11d1-B105-00805F49916B
1	{"databases":[{"name":"master","database_id":1,"create_date":...

JSON_F52E2B61-18...00805F49916B1.xml | demo01.sql

```
1  {"databases":[{"name":"master","database_id":1,"create_date":"2003-04-08T09:13:36.390"
```


http://www.codeproject.com/Tips/216175/View-JSON-in-Internet-Explorer
View JSON in Internet Explo...
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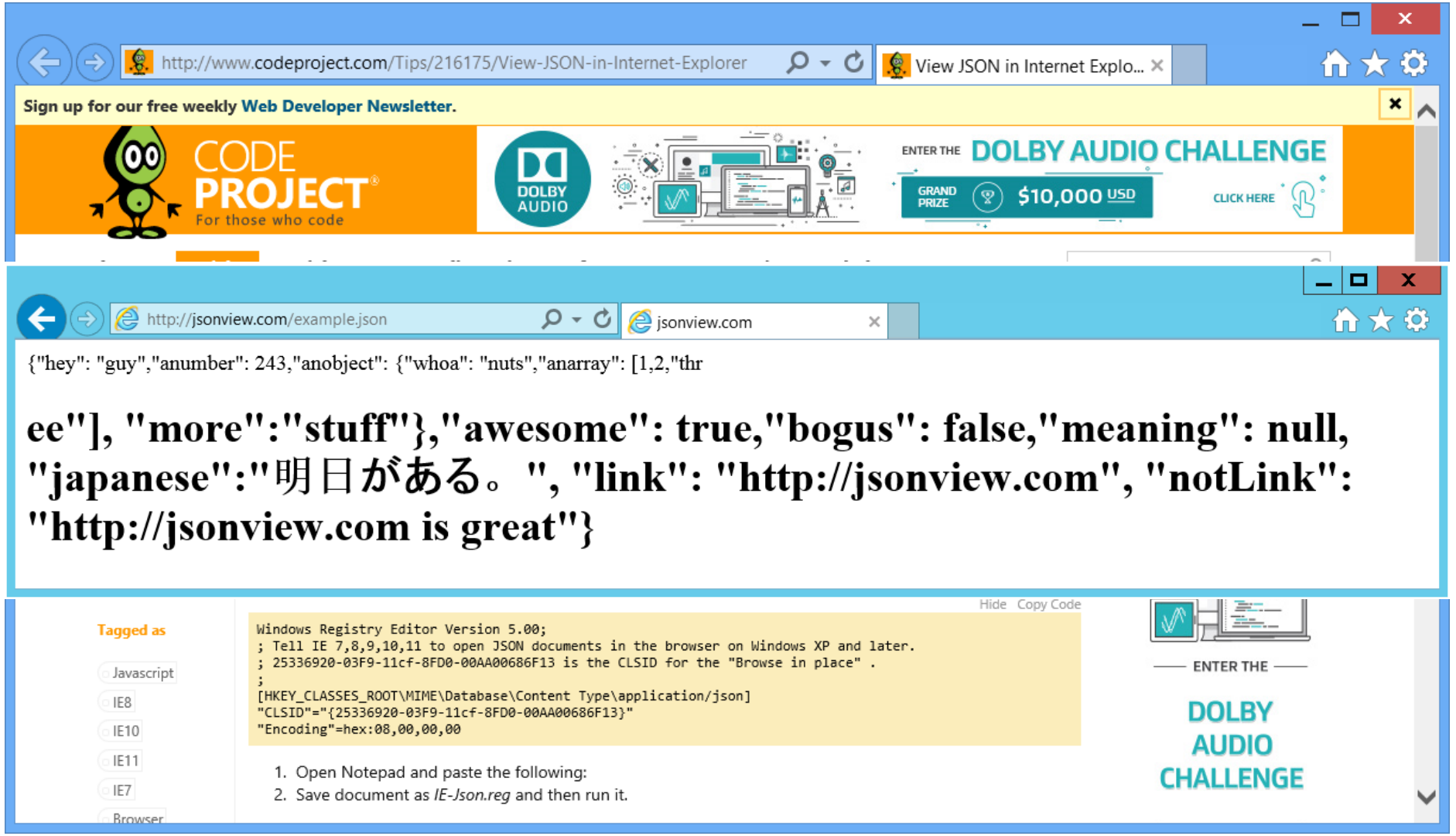
Articles » Web Development » Client side scripting » General
Tip/Trick
Browse Code
Stats
Revisions (9)
Alternatives
Comments (11)
Add your own alternative version
Tagged as
Javascript
IE8
IE10
IE11
IE7
Browser
View JSON in Internet Explorer
Coding 101, 21 May 2014 CPOL
4.88 (17 votes)
Rate this:
A simple Registry change will enable IE to display JSON responses.
Need to view JSON responses in IE?
Hide Copy Code
Windows Registry Editor Version 5.00;
; Tell IE 7,8,9,10,11 to open JSON documents in the browser on Windows XP and later.
; 25336920-03F9-11cf-8FD0-00AA00686F13 is the CLSID for the "Browse in place" .
;
[HKEY_CLASSES_ROOT\MIME\Database\Content Type\application/json]
"CLSID"="{25336920-03F9-11cf-8FD0-00AA00686F13}"
"Encoding"=hex:08,00,00,00
1. Open Notepad and paste the following:
2. Save document as IE-Json.reg and then run it.
DOLBY AUDIO
ENTER THE
DOLBY AUDIO CHALLENGE


http://www.codeproject.com/Tips/216175/View-JSON-in-Internet-Explorer
View JSON in Internet Explo...
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CODE PROJECT
For those who code
DOLBY AUDIO
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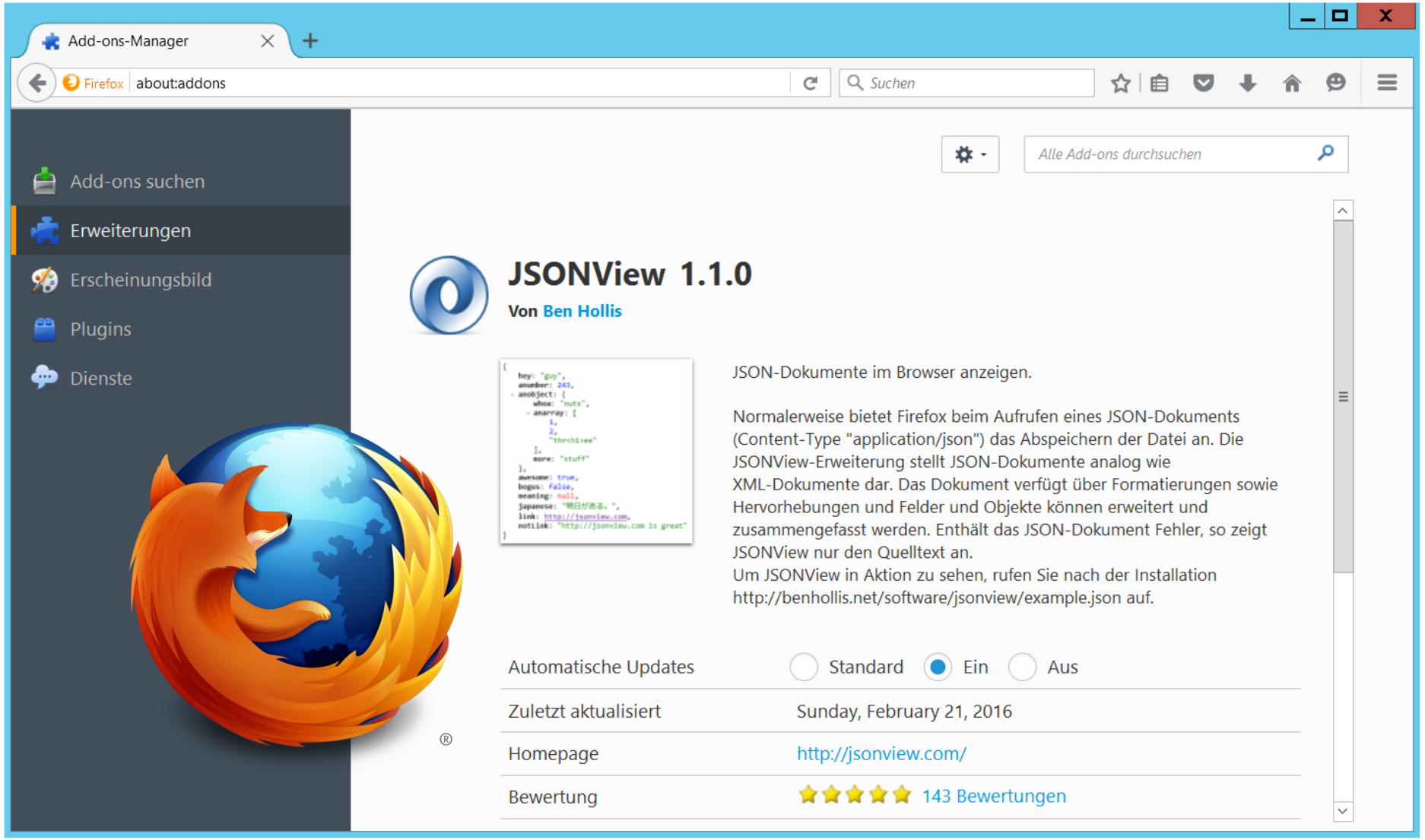
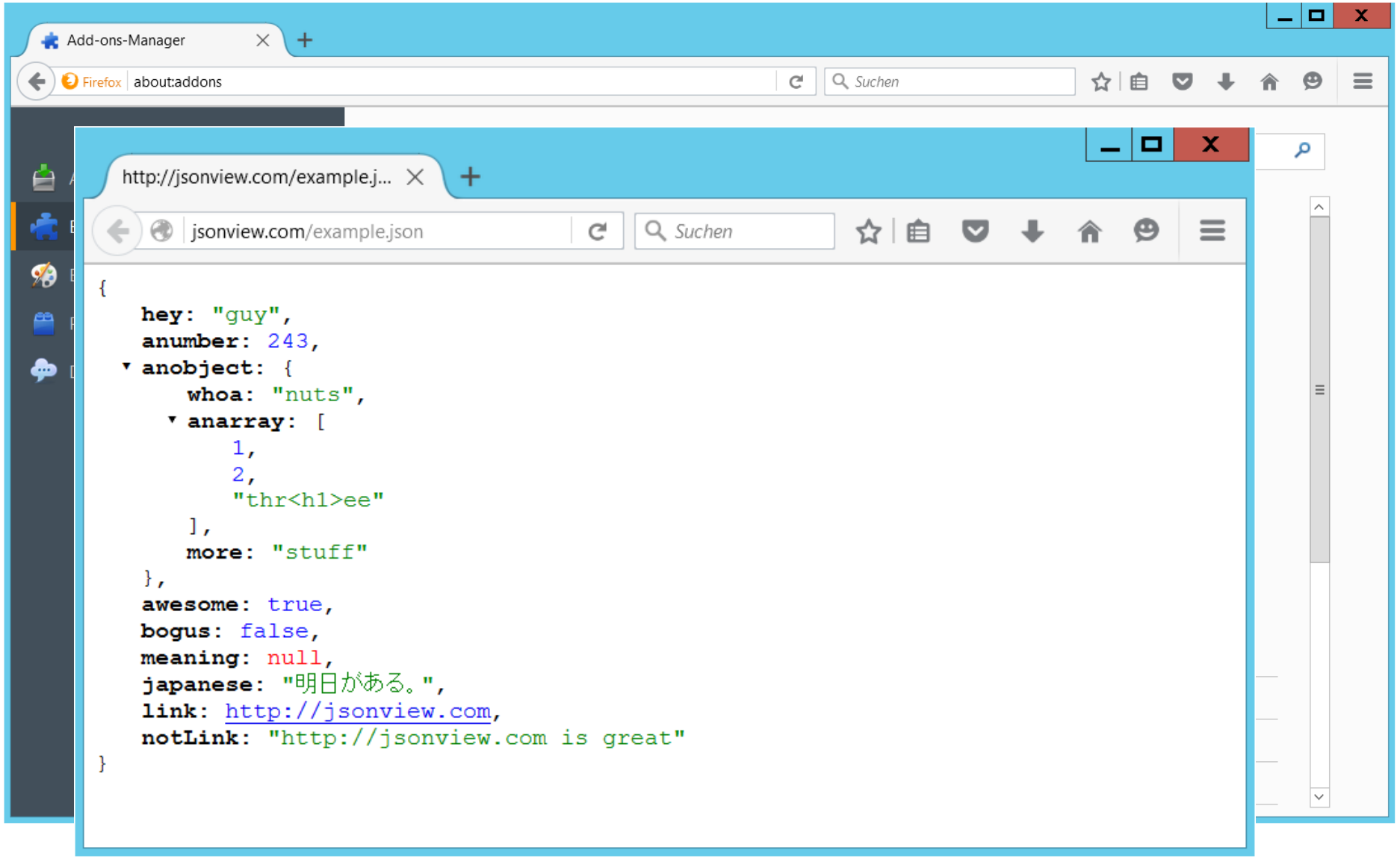
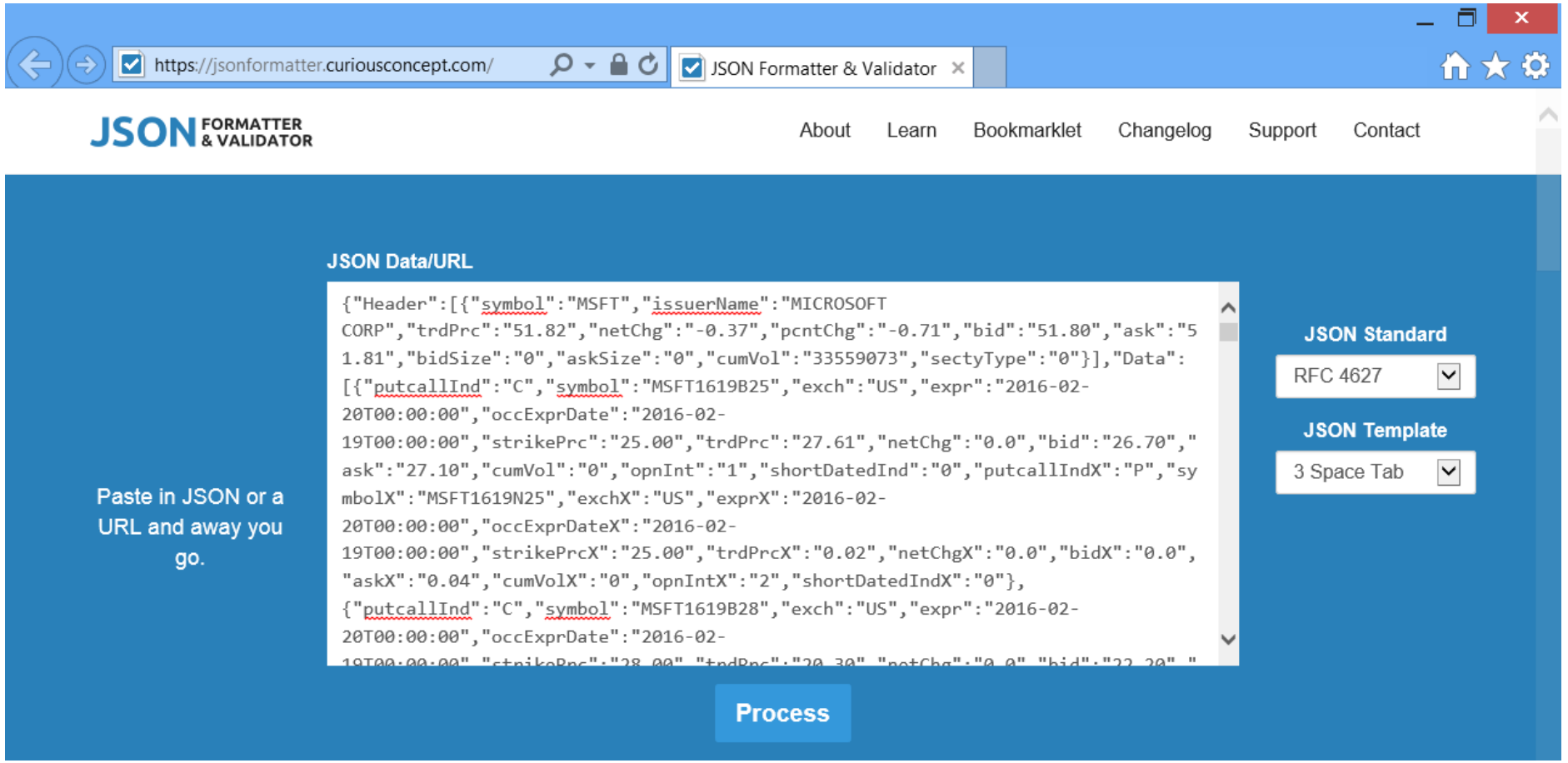
GRAND PRIZE $10,000 USD
CLICK HERE
http://jsonview.com/example.json
jsonview.com
{"hey": "guy","anumber": 243,"anobject": {"whoa": "nuts","anarray": [1,2,"thr
ee"], "more":"stuff"},"awesome": true,"bogus": false,"meaning": null, "japanese":"明日がある。", "link": "http://jsonview.com", "notLink": "http://jsonview.com is great"}
Tagged as
Javascript
IE8
IE10
IE11
IE7
Browser
Hide Copy Code
Windows Registry Editor Version 5.00;
; Tell IE 7,8,9,10,11 to open JSON documents in the browser on Windows XP and later.
; 25336920-03F9-11cf-8FD0-00AA00686F13 is the CLSID for the "Browse in place" .
;
[HKEY_CLASSES_ROOT\MIME\Database\Content Type\application/json]
"CLSID"="{25336920-03F9-11cf-8FD0-00AA00686F13}"
"Encoding"=hex:08,00,00,00
1. Open Notepad and paste the following:
2. Save document as IE-Json.reg and then run it.
ENTER THE
DOLBY AUDIO CHALLENGE

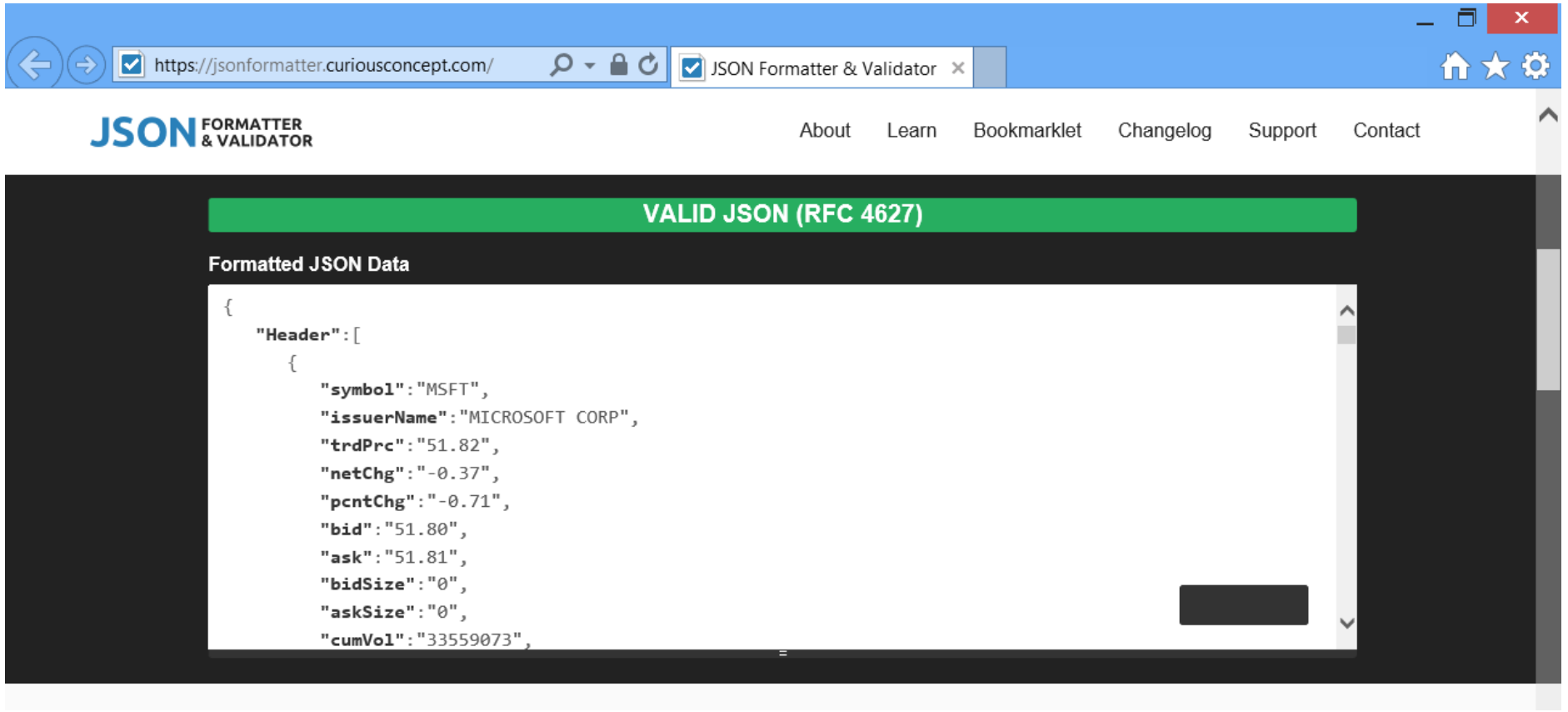

Add-ons-Manager
Firefox
about:addons
Suchen
Alle Add-ons durchsuchen
Add-ons suchen
Erweiterungen
Erscheinungsbild
Plugins
Dienste
JSONView 1.1.0
Von Ben Hollis
JSON-Dokumente im Browser anzeigen.
Normalerweise bietet Firefox beim Aufrufen eines JSON-Dokuments (Content-Type "application/json") das Abspeichern der Datei an. Die JSONView-Erweiterung stellt JSON-Dokumente analog wie XML-Dokumente dar. Das Dokument verfügt über Formatierungen sowie Hervorhebungen und Felder und Objekte können erweitert und zusammengefasst werden. Enthält das JSON-Dokument Fehler, so zeigt JSONView nur den Quelltext an.
Um JSONView in Aktion zu sehen, rufen Sie nach der Installation http://benhollis.net/software/jsonview/example.json auf.
Automatische Updates
Standard
Ein
Aus
Zuletzt aktualisiert
Sunday, February 21, 2016
Homepage
http://jsonview.com/
Bewertung
143 Bewertungen


Add-ons-Manager
Firefox about:addons
Suchen
http://jsonview.com/example.j...
jsonview.com/example.json
Suchen
{
hey: "guy",
anumber: 243,
anobject: {
whoa: "nuts",
anarray: [
1,
2,
"thr<h1>ee"
],
more: "stuff"
},
awesome: true,
bogus: false,
meaning: null,
japanese: "明日がある。",
link: http://jsonview.com,
notLink: "http://jsonview.com is great"
}

JSON Formatter & Validator (input)



JSON Formatter & Validator (result)



Demo

FOR JSON

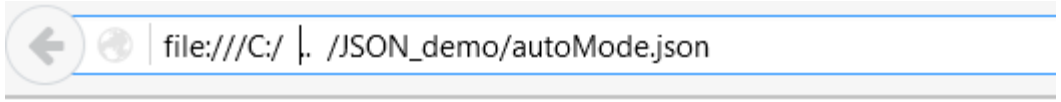
- **AUTO Mode**

```
SELECT name, database_id, create_date
FROM   sys.databases
FOR    JSON  Auto
```

- **PATH Mode**

```
SELECT name                  as 'name,
     , database_id           as 'database_id,
     , create_date           as 'create_date,
     , is_published          as 'replication.is_published,
     , is_subscribed         as 'replication.is_subscribed,
     , is_distributor        as 'replication.is_distributor,
FROM   sys.databases
FOR    JSON  PATH, ROOT('databases'), Include_NULL_Values;
```

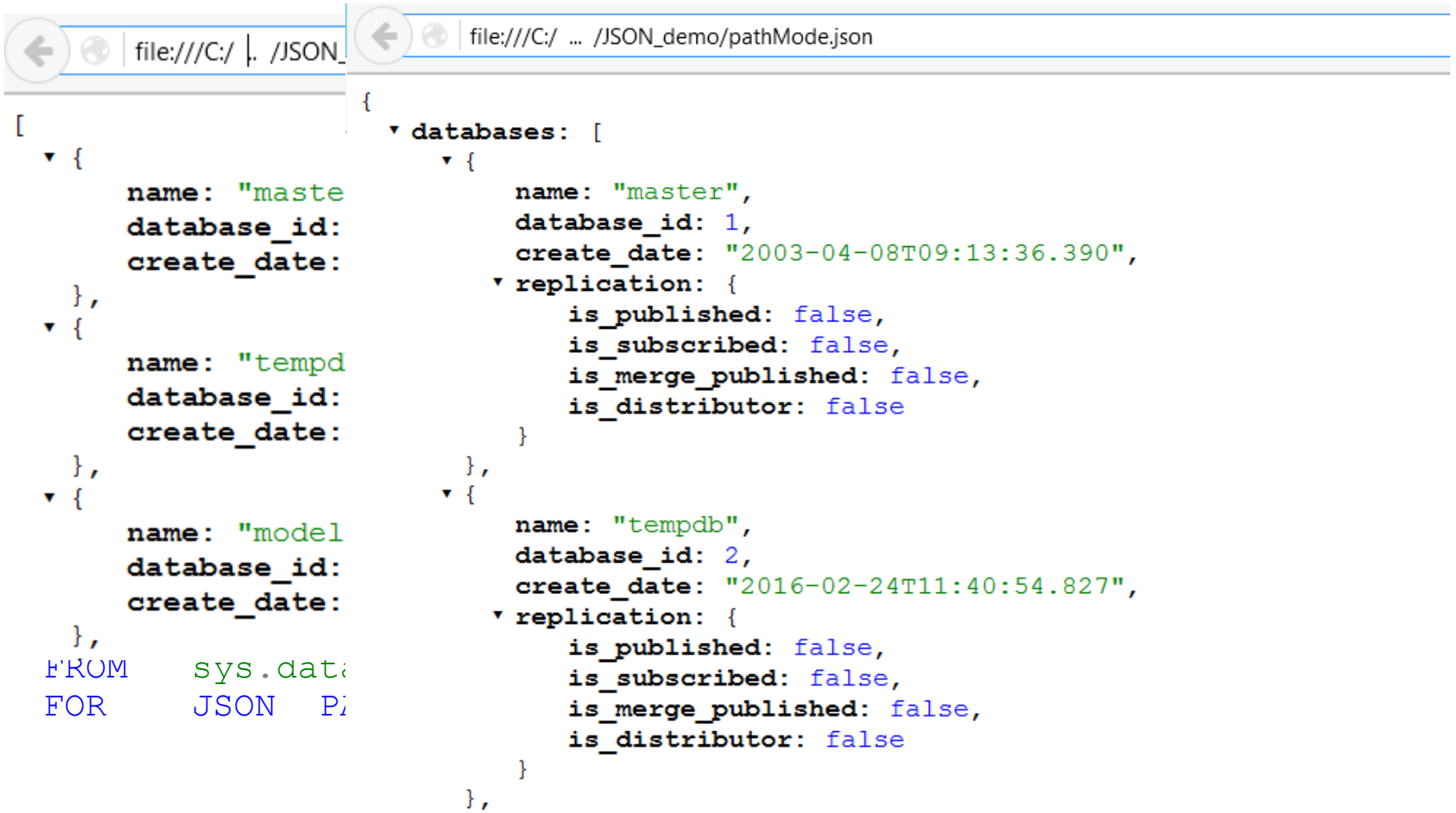
FOR JSON / Result




```
[
  ▾ {
        name: "master",
        database_id: 1,
        create_date: "2003-04-08T09:13:36.390"
    },
  ▾ {
        name: "tempdb",
        database_id: 2,
        create_date: "2016-02-24T11:40:54.827"
    },
  ▾ {
        name: "model",
        database_id: 3,
        create_date: "2003-04-08T09:13:36.390"
    },
```


```
                                        _id,
                                        ate,
                                        ion.is_published,
                                        ion.is_subscribed,
                                        ion.is_distributor,
FROM    sys.databases
FOR     JSON  PATH, ROOT('databases'), Include_NULL_Values;
```

FOR JSON / Result



OpenJSON

```
DECLARE @json NVARCHAR(MAX)
SET @json ='{
        "Name"     :"PASS Deutschland e.V.",
        "addInfo"  : null,
        "ID"       : 828,
        "Current"  : true,
        "Skills"   :["SQL","SSIS","SSRS",42,"MDX"],
        "Region"   :{"Country":"Germany","Territory":"Hessen"}
        }';

SELECT * -- [key], [value], type
FROM   OpenJSON(@json);

SELECT *
FROM   OpenJSON(@json, '$.Skills')

SELECT *
FROM   OpenJSON(@json, '$.Region')
```

OpenJSON / Result

Results | Messages

	key	value	type
1	Name	PASS Deutschland e.V.	1
2	addInfo	NULL	0
3	ID	828	2
4	Current	true	3
5	Skills	["SQL","SSIS","SSRS",42,"MDX"]	4
6	Region	{"Country":"Germany","Territory":"Hessen"}	5

	key	value	type
1	0	SQL	1
2	1	SSIS	1
3	2	SSRS	1
4	3	42	2
5	4	MDX	1

	key	value	type
1	Country	Germany	1
2	Territory	Hessen	1

```
.",

42,"MDX"],
"Territory":"Hessen"}
```

OpenJSON Data Type

```
DECLARE @json NVARCHAR(MAX)
SET @json = '{
                "Name"     :"PASS Deutschland e.V.",
                "addInfo"  : null,
                "ID"       : 828,
                "Current"  : true,
                "Skills"   :["SQL","SSIS","SSRS",42,"MDX"],
                "Region"   :{"Country":"Germany","Territory":"Hessen"}
            }';
```

100 %

Results | Messages

	key	value	type	Data Type
1	Name	PASS Deutschland e.V.	1	string
2	addInfo	NULL	0	null
3	ID	828	2	int
4	Current	true	3	true/false
5	Skills	["SQL","SSIS","SSRS",42,"MDX"]	4	array
6	Region	{"Country":"Germany","Territory":"Hessen"}	5	object

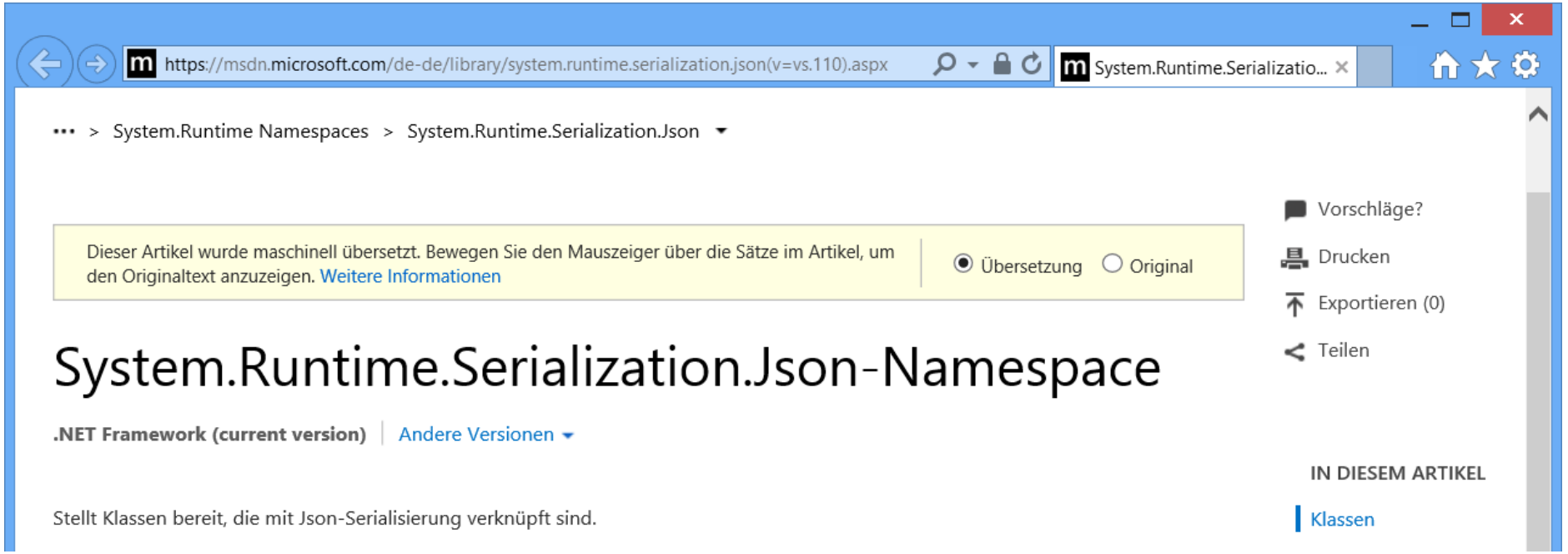
Storing JSON

- `NVARCHAR(MAX)`

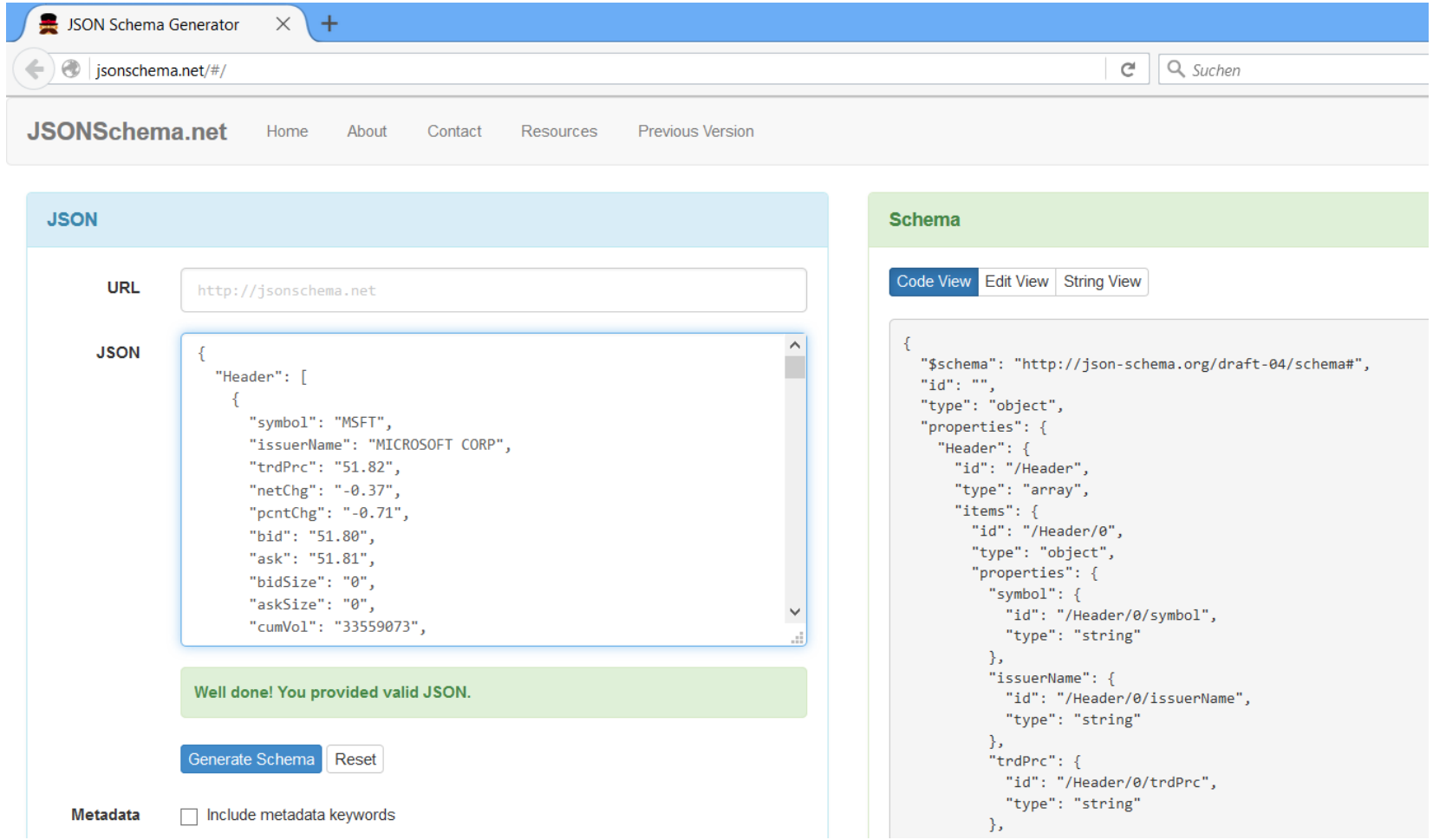
- **Index**
  „abgeleitete Spalte“
  mit `JSON_VALUE( @JsonCol, '$. … . …')`

  >> `CREATE INDEX …`

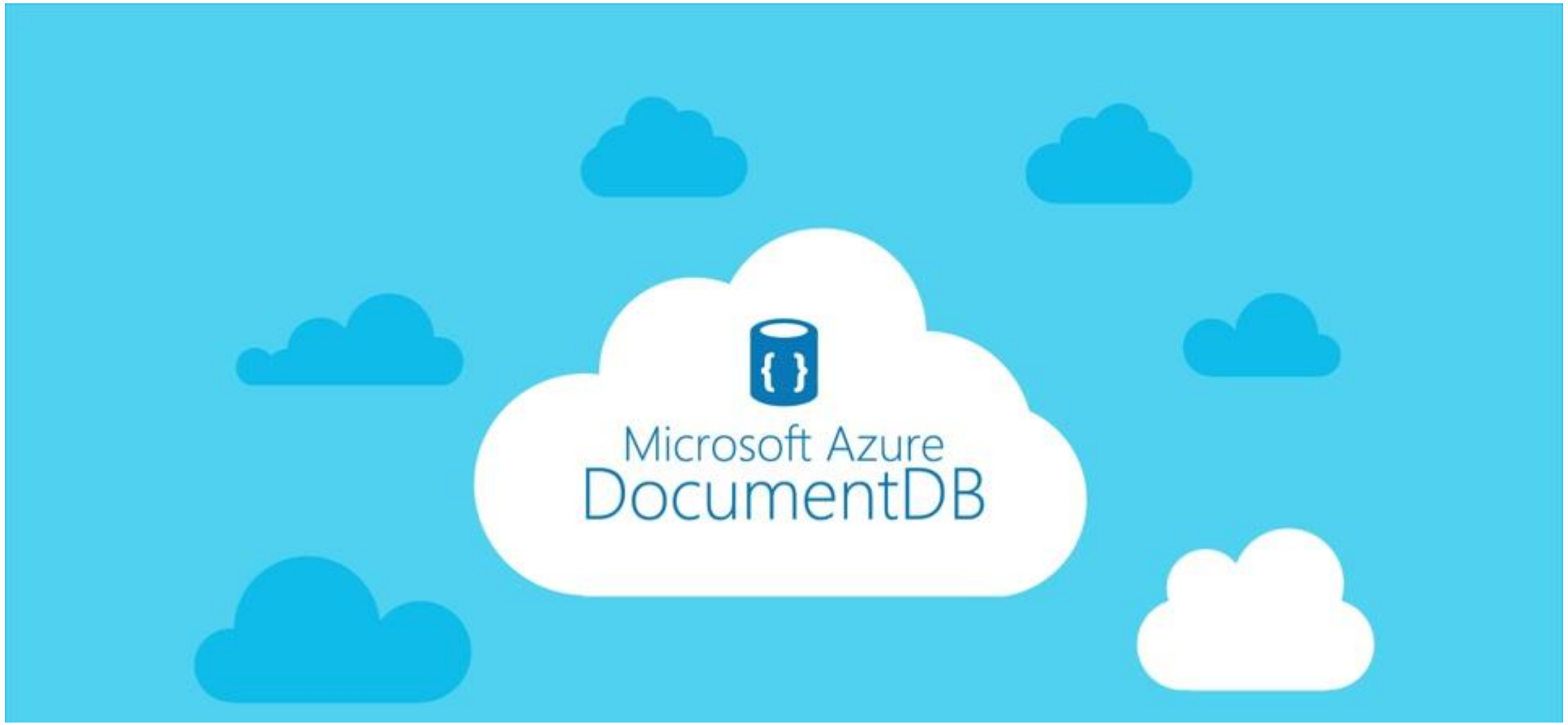
JSON Namespaces



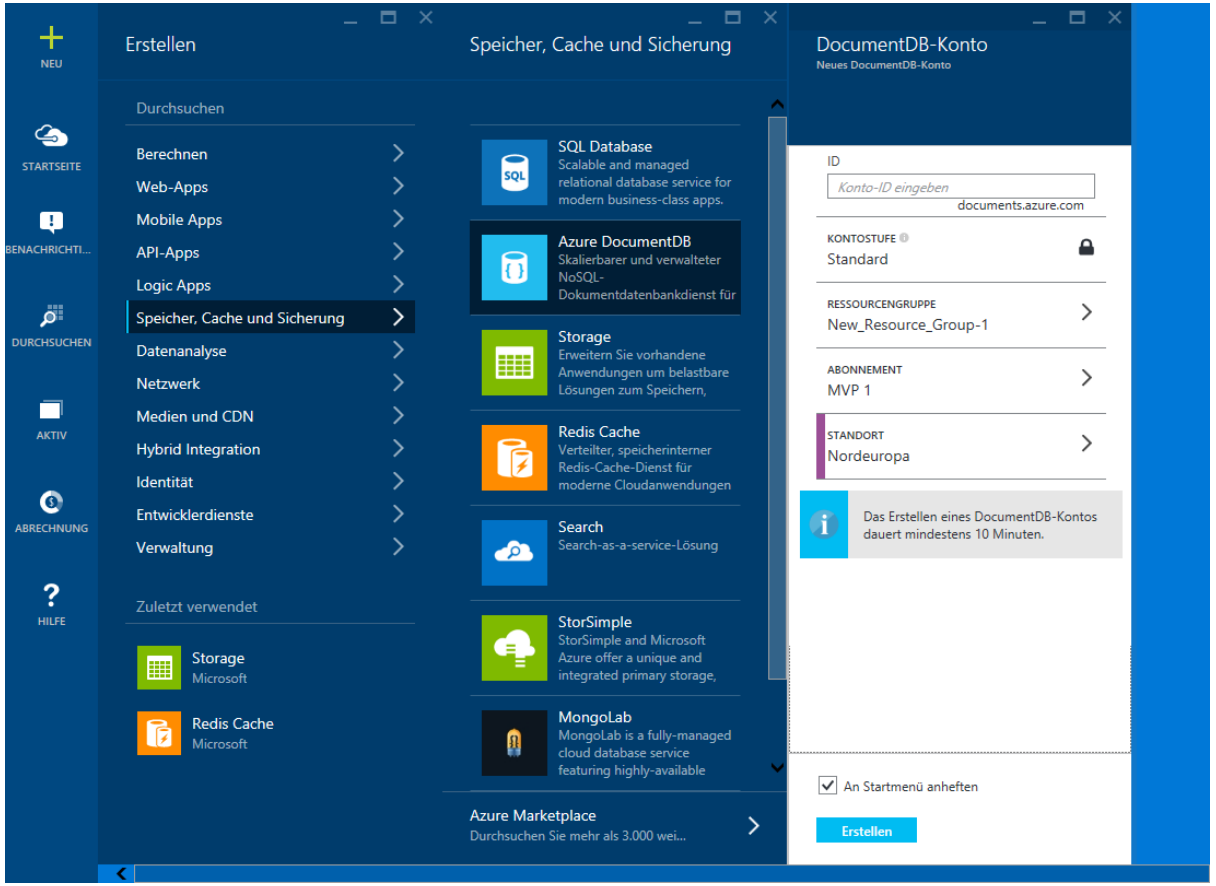
JSON schema validation



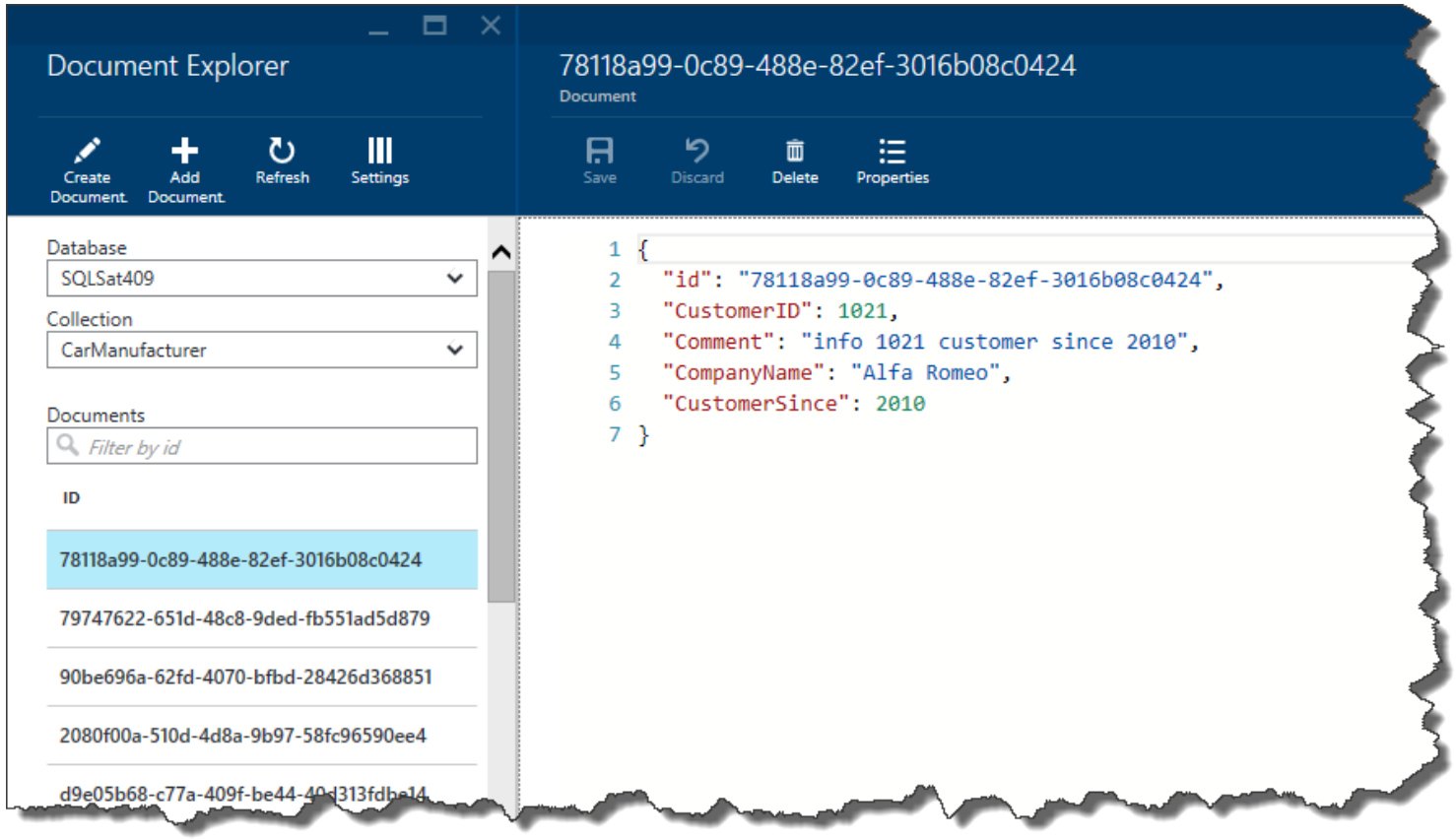
switch to



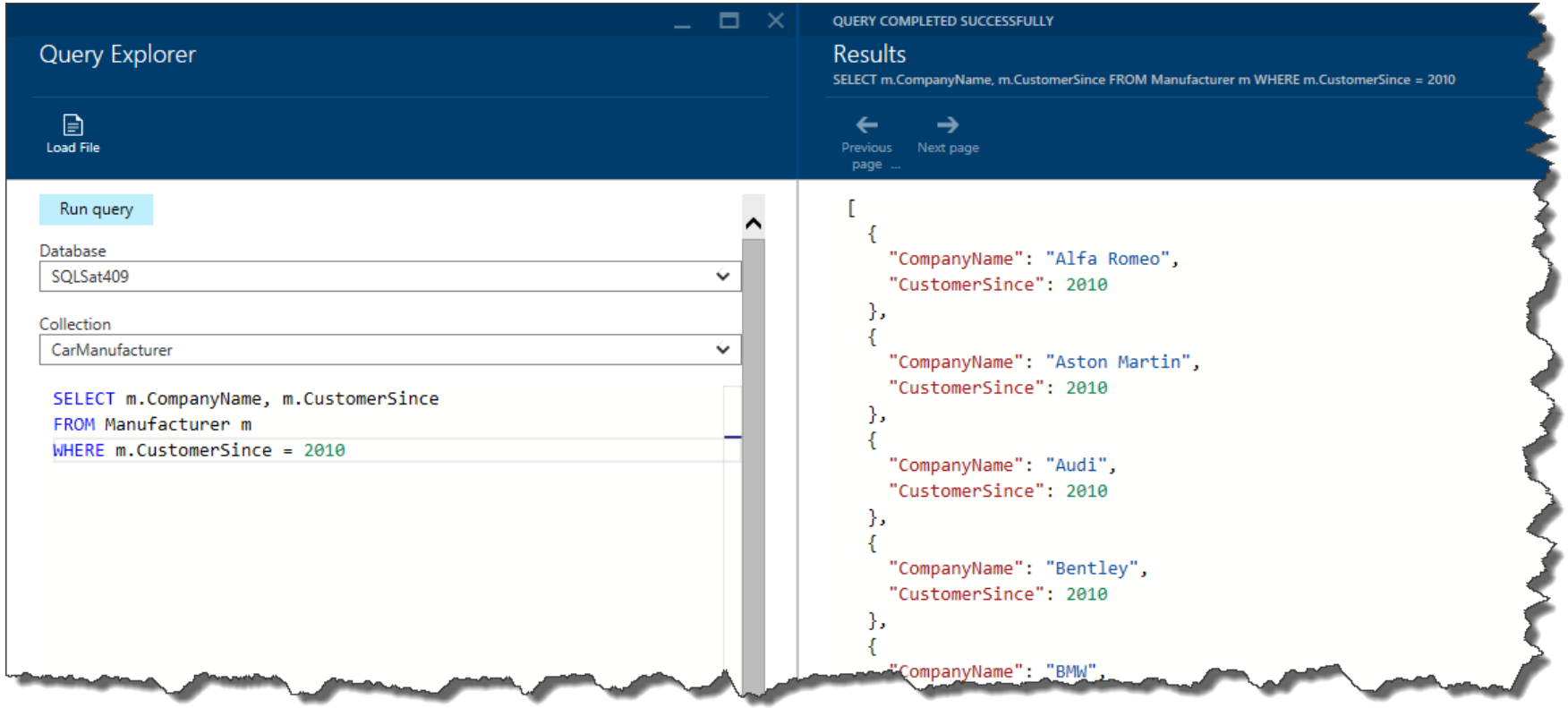
Setup


NEU
STARTSEITE
BENACHRICHTI...
DURCHSUCHEN
AKTIV
ABRECHNUNG
HILFE
Erstellen
Durchsuchen
Berechnen
Web-Apps
Mobile Apps
API-Apps
Logic Apps
Speicher, Cache und Sicherung
Datenanalyse
Netzwerk
Medien und CDN
Hybrid Integration
Identität
Entwicklerdienste
Verwaltung
Zuletzt verwendet
Storage
Microsoft
Redis Cache
Microsoft
Speicher, Cache und Sicherung
SQL Database
Scalable and managed relational database service for modern business-class apps.
Azure DocumentDB
Skalierbarer und verwalteter NoSQL-Dokumentdatenbankdienst für
Storage
Erweitern Sie vorhandene Anwendungen um belastbare Lösungen zum Speichern,
Redis Cache
Verteilter, speicherinterner Redis-Cache-Dienst für moderne Cloudanwendungen
Search
Search-as-a-service-Lösung
StorSimple
StorSimple and Microsoft Azure offer a unique and integrated primary storage,
MongoLab
MongoLab is a fully-managed cloud database service featuring highly-available
Azure Marketplace
Durchsuchen Sie mehr als 3.000 wei...
DocumentDB-Konto
Neues DocumentDB-Konto
ID
Konto-ID eingeben
documents.azure.com
KONTOSTUFE
Standard
RESSOURCENGRUPPE
New_Resource_Group-1
ABONNEMENT
MVP 1
STANDORT
Nordeuropa
Das Erstellen eines DocumentDB-Kontos dauert mindestens 10 Minuten.
An Startmenü anheften
Erstellen

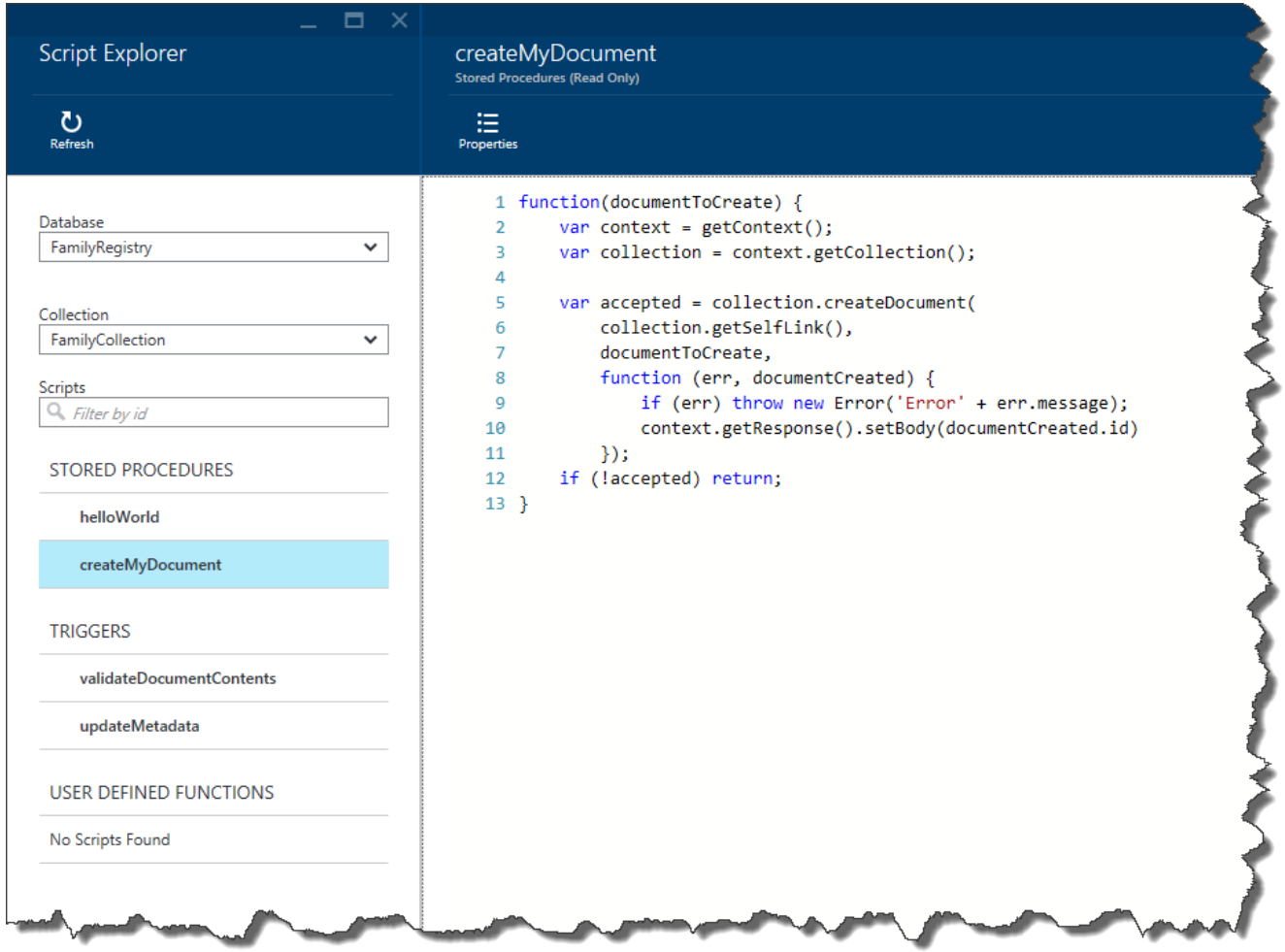
Tooling


Document Explorer
Create Document
Add Document
Refresh
Settings
Database
SQLSat409
Collection
CarManufacturer
Documents
Filter by id
ID
78118a99-0c89-488e-82ef-3016b08c0424
79747622-651d-48c8-9ded-fb551ad5d879
90be696a-62fd-4070-bfbd-28426d368851
2080f00a-510d-4d8a-9b97-58fc96590ee4
78118a99-0c89-488e-82ef-3016b08c0424
Document
Save
Discard
Delete
Properties
{
"id": "78118a99-0c89-488e-82ef-3016b08c0424",
"CustomerID": 1021,
"Comment": "info 1021 customer since 2010",
"CompanyName": "Alfa Romeo",
"CustomerSince": 2010
}

Tooling


Query Explorer
Load File
Run query
Database
SQLSat409
Collection
CarManufacturer
SELECT m.CompanyName, m.CustomerSince
FROM Manufacturer m
WHERE m.CustomerSince = 2010
QUERY COMPLETED SUCCESSFULLY
Results
SELECT m.CompanyName, m.CustomerSince FROM Manufacturer m WHERE m.CustomerSince = 2010
Previous page
Next page
[
{
"CompanyName": "Alfa Romeo",
"CustomerSince": 2010
},
{
"CompanyName": "Aston Martin",
"CustomerSince": 2010
},
{
"CompanyName": "Audi",
"CustomerSince": 2010
},
{
"CompanyName": "Bentley",
"CustomerSince": 2010
},
{
"CompanyName": "BMW",

Tooling


Script Explorer
Refresh
createMyDocument
Stored Procedures (Read Only)
Properties
Database
FamilyRegistry
Collection
FamilyCollection
Scripts
Filter by id
STORED PROCEDURES
helloWorld
createMyDocument
TRIGGERS
validateDocumentContents
updateMetadata
USER DEFINED FUNCTIONS
No Scripts Found
function(documentToCreate) {
var context = getContext();
var collection = context.getCollection();
var accepted = collection.createDocument(
collection.getSelfLink(),
documentToCreate,
function (err, documentCreated) {
if (err) throw new Error('Error' + err.message);
context.getResponse().setBody(documentCreated.id)
});
if (!accepted) return;
}

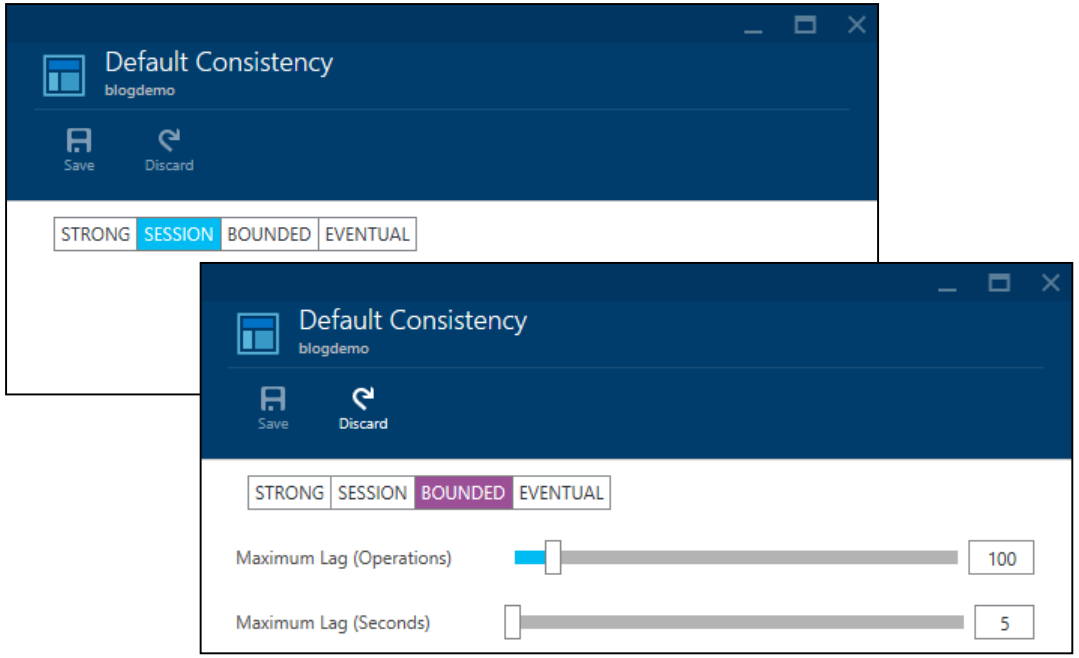
Consistency (BASE)

B asically

A vailable

S oft state

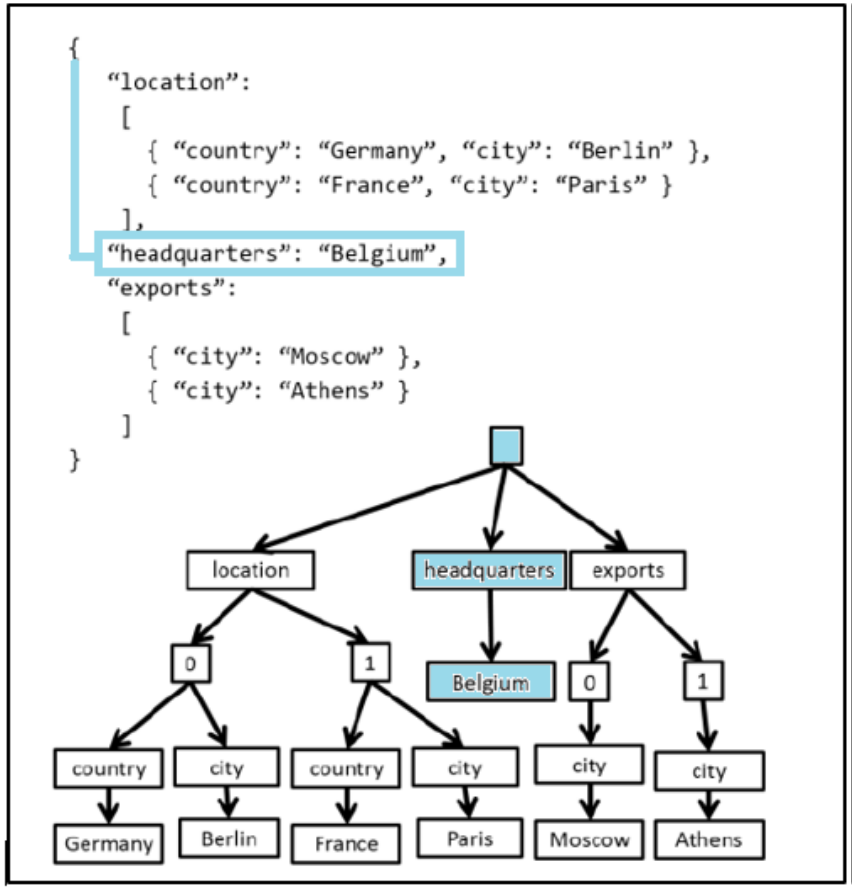
E ventual consistency

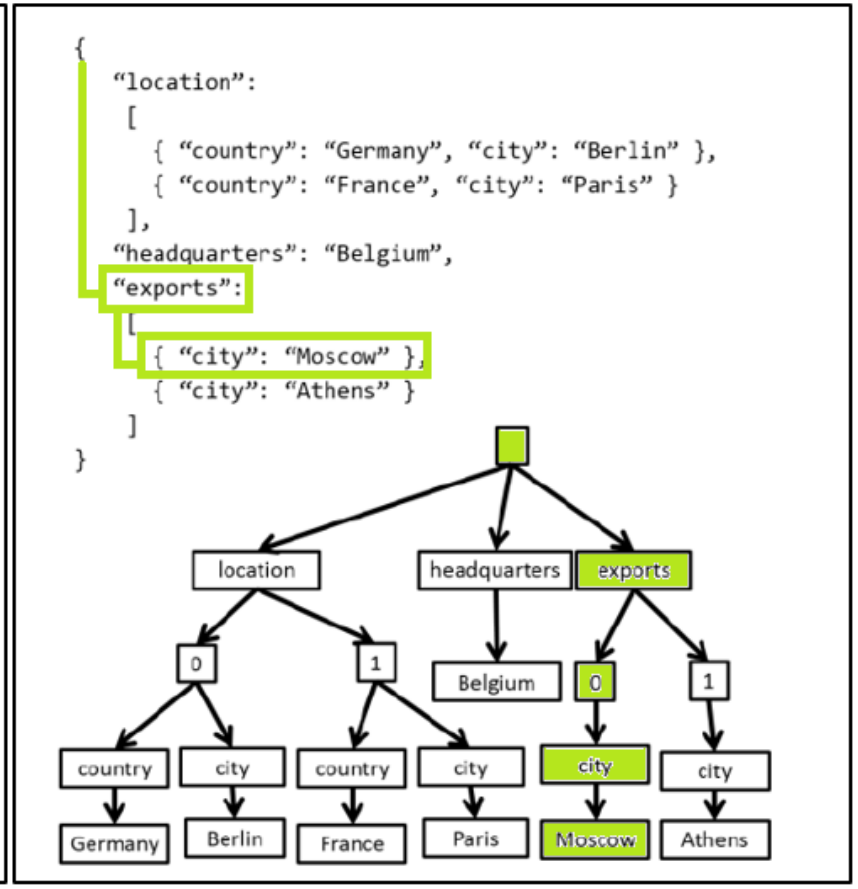


Select & Ins/Upd/Del

- LINQ, SQL
- REST API over HTTPS
  - .NET
  - Node.js
  - JavaScript
  - Python
  - ...

Indexing


{
"location":
[
{ "country": "Germany", "city": "Berlin" },
{ "country": "France", "city": "Paris" }
],
"headquarters": "Belgium",
"exports":
[
{ "city": "Moscow" },
{ "city": "Athens" }
]
}
location
headquarters
exports
0
1
Belgium
0
1
country
city
country
city
city
city
Germany
Berlin
France
Paris
Moscow
Athens


{
"location":
[
{ "country": "Germany", "city": "Berlin" },
{ "country": "France", "city": "Paris" }
],
"headquarters": "Belgium",
"exports":
[
{ "city": "Moscow" },
{ "city": "Athens" }
]
}
location
headquarters
exports
0
1
Belgium
0
1
country
city
country
city
city
city
Germany
Berlin
France
Paris
Moscow
Athens

Indexing Policies

```
{
    "id":"customIndexCollection",
    "indexingPolicy":
    {
        "automatic":true,
        "indexingMode":"Consistent",
        "IncludedPaths":
        [
            {
                "IndexType":"Hash",
                "Path":"/"
            }
        ],
        "ExcludedPaths":
        [
            "/\"nonIndexedContent\"/*"
        ]
    }
}
```

server side code

```
function(documentToCreate) {
    var context = getContext();
    var collection = context.getCollection();

    var accepted = collection.createDocument(
        collection.getSelfLink(),
        documentToCreate,
        function (err, documentCreated) {
            if (err) throw new Error('Error' + err.message);
            context.getResponse().setBody(documentCreated.id)
        });
    if (!accepted) return;
}
```

compl. queries

```
SELECT c.id, v.ConsumptionDay
FROM Customer c
JOIN v IN c.Consumptions
WHERE v.ConsumptionValue = 5
```

???

PASS
DEUTSCHLAND e.V.