

A Growing Mongo Problem

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MongoDB Use in the Present

- News websites. Examples: Business Insider (<http://www.businessinsider.com/>), The Guardian UK (<http://www.slideshare.net/tackers/why-we-chose-mongodb-for-guardiancouk>)
- Massively Multiplayer Online Games (MMORPGs): EA's FIFA Online 3 (<http://www.mongodb.com/blog/post/ea-scores-mongodb-based-fifa-online-3>)
- Countless companies including Adobe, Craigslist, Dropbox, eBay, MetLife (<http://www.mongodb.com/mongodb-scale>)

MongoDB Use in the Future

- The Internet of Things (IoT)
 - Embedded devices
 - For real-time data from sensors, connected devices
 - References:
 - <http://www.mongodb.com/use-cases/internet-of-things>
 - <http://www.usatoday.com/story/tech/2014/07/01/mongodb-oracle-battle-of-the-databases-google-internet-of-things/11305863/>
 - <http://blogs.wsj.com/cio/2014/06/24/expect-internet-of-things-to-bring-new-data-demands-mongodb-ceo/>

Why Target MongoDBs?

- For the *enormous* amount of data stored.
- Naive developers and administrators => they hardly care about security; defaults are almost never changed
 - Learning curve of using MongoDB is low
- 10Gen is oblivious to security issues: *"...We were on with...the MongoDB guys talking about the security of the platform, and...it was really clear that they just didn't care, because their customers weren't asking for it."* - Rich Mogull, Security Weekly Podcast Episode 345

The Reality of MongoDB and Security: It Is That Bad

- “Just walk in”
- No authentication out-of-the-box
- Lots of blind trust
 - User input
 - Connections from other computers
- No encryption used for data or for transmission of data from server to client by default

On SHODAN

The screenshot shows a web browser with two tabs: 'SHODAN - Computer Search' and 'A Growing Mongo Problem'. The address bar shows 'www.shodanhq.com/search?q=mongodb'. The page has a navigation bar with links to 'Shodan', 'Exploits', 'Scanhub', 'Maps', 'Blog', and 'Membership'. Below the navigation bar is a search bar with the text 'mongodb' and a 'Search' button. The main content area displays search results for 'mongodb'. On the left, there are two sections: 'Services' and 'Top Countries'. The 'Services' section lists 'MongoDB' (25,991), 'SMTP' (12), 'HTTP' (2), 'VNC' (1), and 'SMB' (1). The 'Top Countries' section lists 'United States' (10,065), 'China' (5,478), 'Russian Federation' (1,146), 'Germany' (975), and 'France' (546). On the right, there is a detailed entry for '83.98.138.135' under 'Reasonnet IP Networks B.V.', added on 05.08.2014. This entry includes a 'MongoDB Server Information' section with a JSON object containing metrics, getLastError, wtime, num, totalMillis, wtimeouts, queryExecutor, scanned, and record.

Like living on the

Shodan Exploits Scanhub Maps Blog Membership

SHODAN mongodb Search

Services

MongoDB	25,991
SMTP	12
HTTP	2
VNC	1
SMB	1

Top Countries

United States	10,065
China	5,478
Russian Federation	1,146
Germany	975
France	546

83.98.138.135
Reasonnet IP Networks B.V.
Added on 05.08.2014

MongoDB Server Information

```
{
  "metrics": {
    "getLastError": {
      "wtime": {
        "num": 0,
        "totalMillis": 0
      },
      "wtimeouts": 0
    },
    "queryExecutor": {
      "scanned": 10887074067
    },
    "record": {
```

On SHODAN (continued)

The screenshot shows a web browser window with two tabs: 'SHODAN - Computer Search' and 'A Growing Mongo Problem'. The address bar shows 'www.shodanhq.com/search?q=mongo'. The page has a navigation bar with links: Shodan, Exploits, Scanhub, Maps, Blog, and Membership. Below the navigation bar is a search bar with the text 'mongo' and a 'Search' button. The main content area displays search results for 'mongo'. It is organized into three columns: 'Services', 'Top Countries', and a list of specific IP addresses with their associated services and details.

Like living on the edge?

Shodan Exploits Scanhub Maps Blog Membership

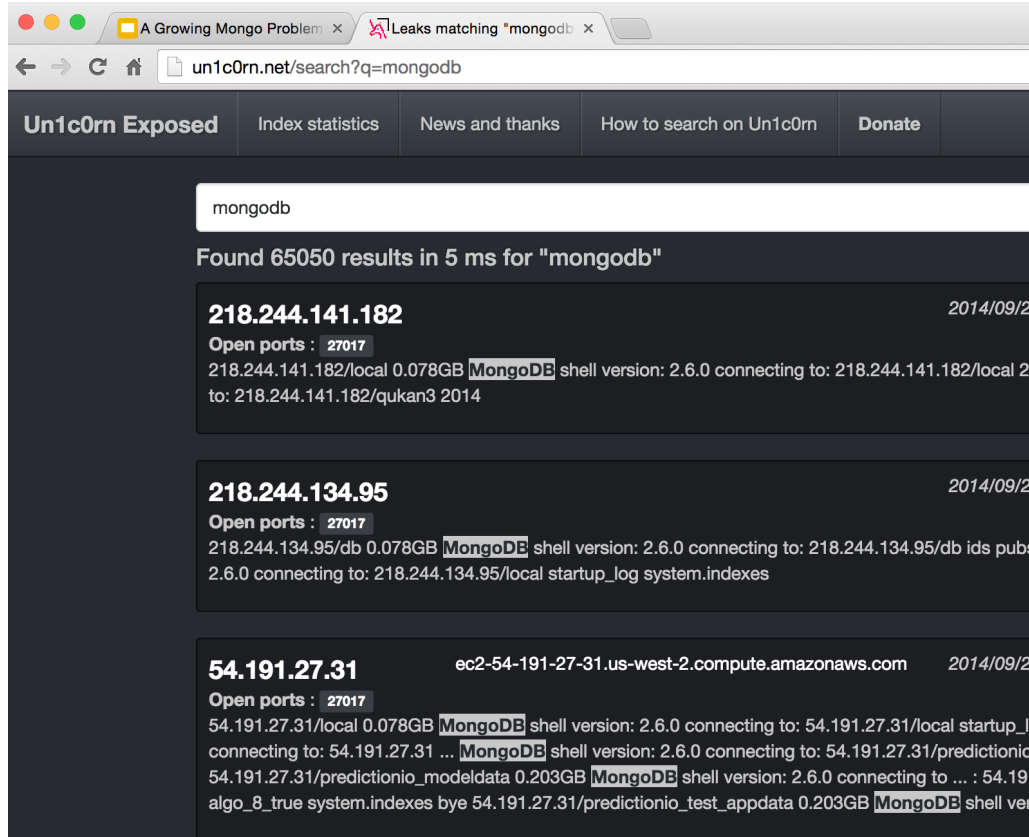
SHODAN mongo Search

Services			
MongoDB Web Interface	8,550	74.91.20.66 DataShack, LC Added on 10.10.2014 Kansas City	HTTP/1.0 401 WWW-Authenticate: Digest realm="mongo", Content-Type: text/plain;charset=utf-8 Connection: close Content-Length: 12
MongoDB	610		
Finger	21		
SMTP	17		
NetBIOS	7		

Top Countries			
United States	4,571	84.16.67.141 Infomaniak Network SA Added on 10.10.2014 ice13.infomaniak.ch	HTTP/1.0 401 WWW-Authenticate: Digest realm="mongo", Content-Type: text/plain;charset=utf-8 Connection: close Content-Length: 12
Russian Federation	874		
China	849		
Germany	348		
France	298		

50.56.220.58 Rackspace Hosting Added on 10.10.2014 San Antonio			HTTP/1.0 401 WWW-Authenticate: Digest realm="mongo", Content-Type: text/plain;charset=utf-8 Connection: close Content-Length: 12

On Project Un1c0rn (<http://un1c0rn.net/>)

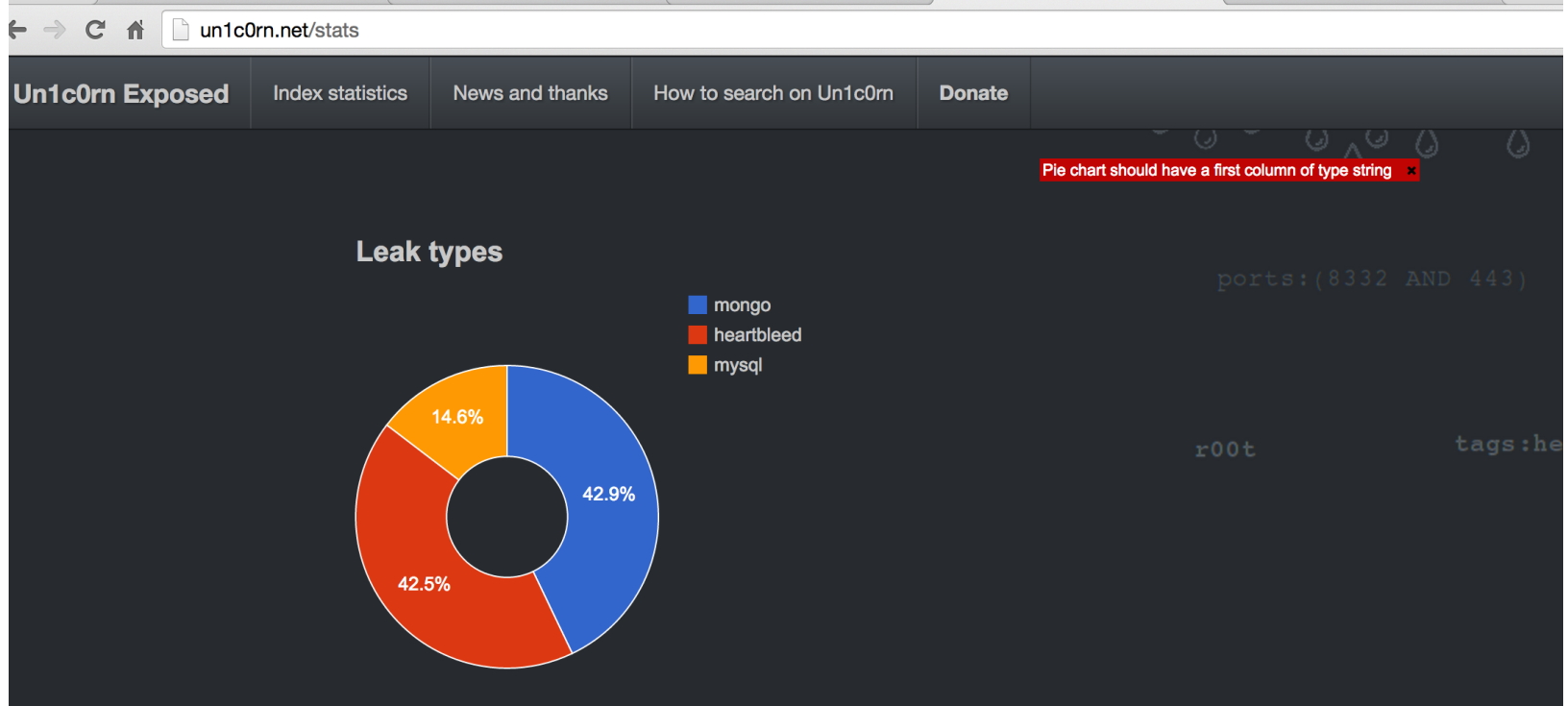


The screenshot shows a web browser window with two tabs: "A Growing Mongo Problem" and "Leaks matching 'mongodb'". The address bar shows the URL `un1c0rn.net/search?q=mongodb`. The page has a navigation bar with links: "Un1c0rn Exposed", "Index statistics", "News and thanks", "How to search on Un1c0rn", and "Donate".

The search results for "mongodb" show 65050 results found in 5 ms. The results are displayed in a list format with the following details:

- 218.244.141.182** (2014/09/2)
Open ports : 27017
218.244.141.182/local 0.078GB MongoDB shell version: 2.6.0 connecting to: 218.244.141.182/local 2 to: 218.244.141.182/qukan3 2014
- 218.244.134.95** (2014/09/2)
Open ports : 27017
218.244.134.95/db 0.078GB MongoDB shell version: 2.6.0 connecting to: 218.244.134.95/db ids pub 2.6.0 connecting to: 218.244.134.95/local startup_log system.indexes
- 54.191.27.31** (2014/09/2) `ec2-54-191-27-31.us-west-2.compute.amazonaws.com`
Open ports : 27017
54.191.27.31/local 0.078GB MongoDB shell version: 2.6.0 connecting to: 54.191.27.31/local startup_ connecting to: 54.191.27.31 ... MongoDB shell version: 2.6.0 connecting to: 54.191.27.31/predictionio 54.191.27.31/predictionio_modeldata 0.203GB MongoDB shell version: 2.6.0 connecting to ... : 54.19 algo_8_true system.indexes bye 54.191.27.31/predictionio_test_apdata 0.203GB MongoDB shell ver

On Project Un1c0rn (continued)



On the Application Side

Classes of Injection Attacks

1. **Query**: creating unsafe queries via string concatenation
2. **Schema**: inserting a record into a schema that does not exist will automatically create the new schema
3. **JavaScript**: `$where`, `db.eval()` take in JavaScript functions as parameters

Russell Butturini's NoSQLMap

- <http://www.nosqlmap.net/>
- Automates injection attacks and exploit default configuration
- Supports MongoDB and now also CouchDB
- Notable features on MongoDB:
 - Database enumeration and cloning attacks
 - Extracts database names, users, and password hashes
 - Scans subnets or IP lists for MongoDB databases with default access and enumerating versions
 - Dictionary and brute force password cracking of recovered MongoDB hashes

Now What?

- What I underestimated: the flexibility and scaling of MongoDB.
- With the growing concerns of security of the “Internet of Things”, this only adds fuel to the fire.
- The future is ripe for attackers.

References

- Chow, M. “Abusing NoSQL Databases” DEF CON 21, Las Vegas, NV
<https://www.defcon.org/images/defcon-21/dc-21-presentations/Chow/DEFCON-21-Chow-Abusing-NoSQL-Databases.pdf>
- Butterini, R. “Making Mongo Cry: NoSQL for Penetration Testers”
DerbyCon 2014, Louisville, KY <http://slideplayer.us/slide/2510942/>, Video:
<http://www.irongeek.com/i.php?page=videos/derbycon4/t408-making-mongo-cry-attacking-nosql-for-pen-testers-russell-butturini>