

DAT326

AWS re:INVENT

How DynamoDB Powered Amazon Prime Day 2017

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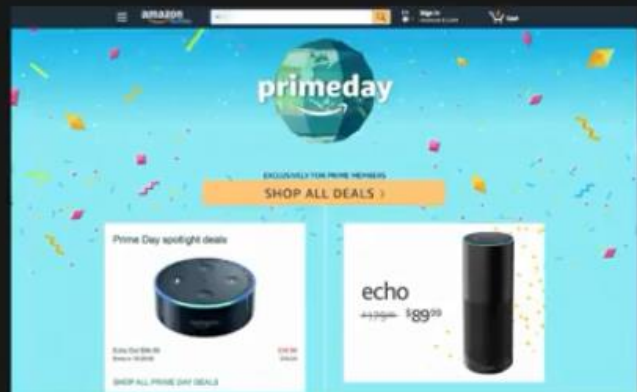
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Sales on Prime Day 2017 surpassed Black Friday and Cyber Monday, making it the biggest day ever in Amazon history. An event of this scale requires infrastructure that can easily scale to match the surge in traffic. In this session, learn how AWS and Amazon DynamoDB powered Prime Day 2017. DynamoDB requests from Amazon Alexa, the Amazon.com sites, and the Amazon fulfillment centers peaked at 12.9 million per second, a total of 3.34 trillion requests. Learn how the extreme scale, consistent performance, and high availability of DynamoDB let Amazon.com meet the needs of Prime Day without breaking a sweat.

Prime Day 2017

- 30 hours to shop for deals
- Sales on July 11 surpassed Black Friday and Cyber Monday 2016
- The Prime Day 2017 event grew by more than 60% compared to last year
- Tens of millions of Amazon Prime members made a purchase
- More than 200,000 lightbulbs were purchased by customers on Prime Day 2017

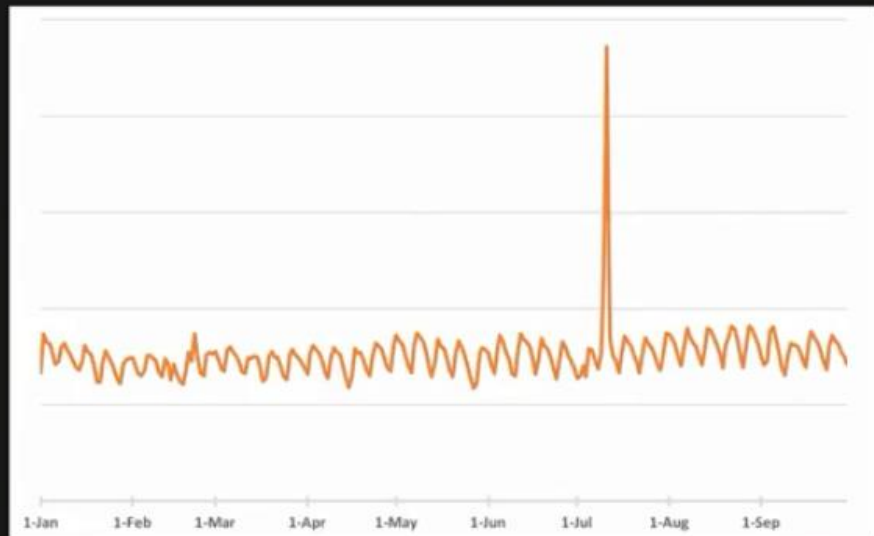


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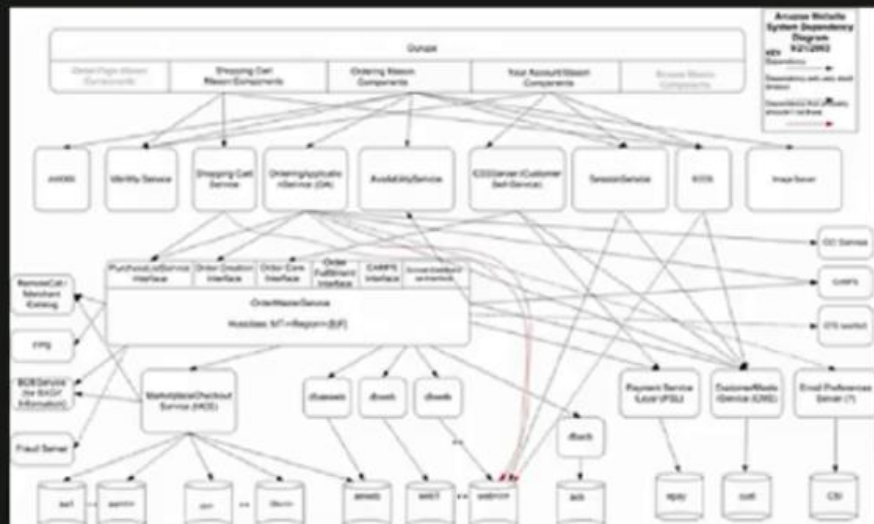
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Prime Day



Services



Prime day was run with lots of *stateless services* running and several *databases*

Services with data

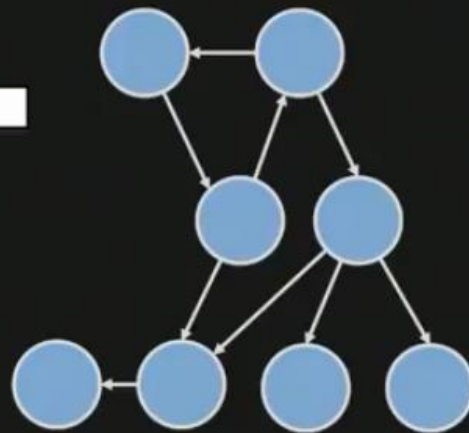
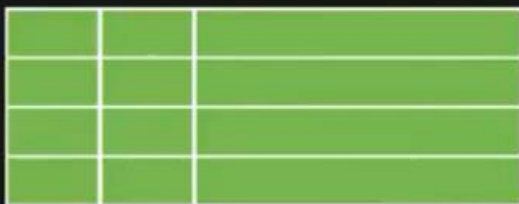
Databases here is ***DynamoDB***!

What is a database?

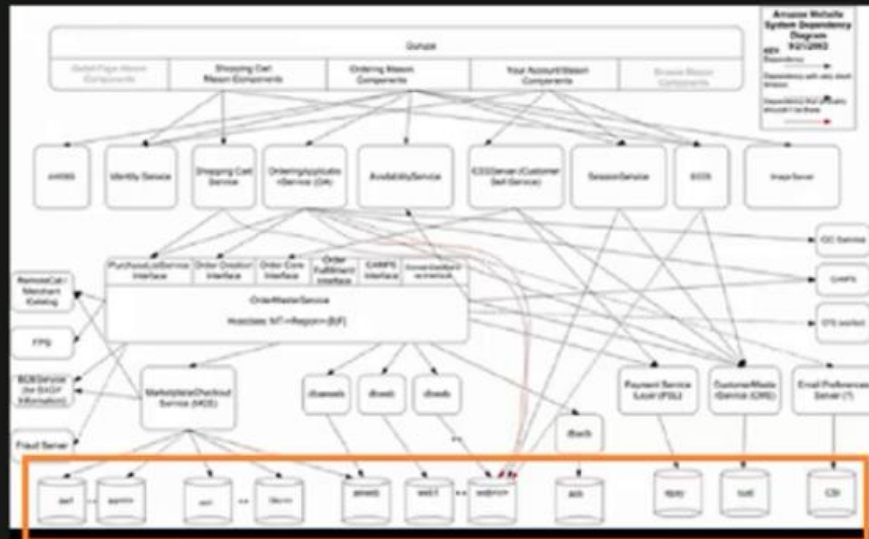
The diagram illustrates three different database models:

- Hierarchical (Top Left):** A tree structure where a single parent node (a long yellow rectangle) points to multiple child nodes (three smaller yellow rectangles).
- Relational (Bottom Left):** A table structure with 4 rows and 3 columns, represented by a grid of blue rectangles.
- NoSQL (Right):** A graph structure with 8 circular nodes connected by directed edges, representing a network of data.

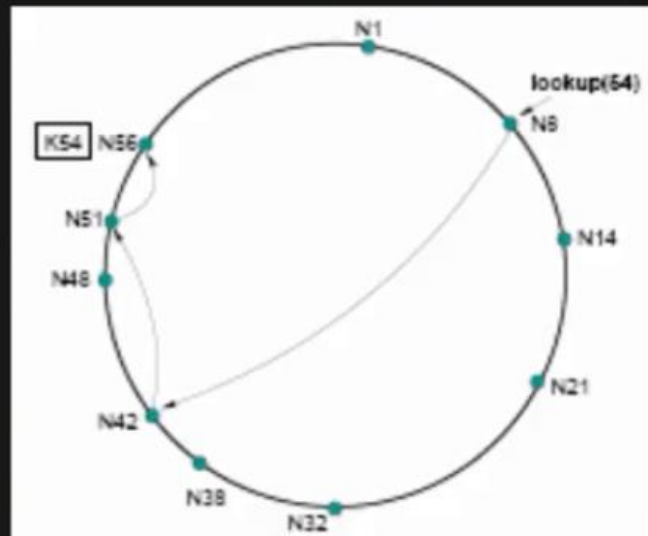
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Scale (circa 2003)



Scale (circa 2000)



Instead of using just one huge server, we can wire up several servers together and use distributed hash tables for achieving massive scale

Catalog

AN EXCEPTIONALLY COMFORTABLE RECLINING SWING CHAIR.

No. 1K5738 This Adjustable Reclining Rocker is made of solid oak, thoroughly seasoned and kiln dried, in high gloss golden finish. The seat is attached to the platform base by heavy steel rods in such a manner that it gives a perfect swinging motion. The back is adjustable to any position by means of a steel rod attached to the arm on either side of rocker. This combined with the foot rest makes one of the most comfortable reclining chairs and an indispensable invalid chair. It has full spring seat and spring back, covered with a fine quality of flax fiber and clean, new cotton. Upholstered with the best quality of figured velour, fancy brocade velour in red, green or brown colors, or fabricoid leather in black. Foot rest in illustration is shown extended and when not in use folds back beneath the chair out of sight. This reclining chair should be compared with those offered in retail stores at \$12.00 to \$15.00. Shipping weight, about 60 pounds. Shipped direct from our factory in Western New York. When ordering be sure to state color of cushions wanted.

\$6.25

THE MOST WONDERFUL VALUE EVER OFFERED IN A RECLINING SWING CHAIR.

THE EQUAL OF CHAIRS SOLD ELSEWHERE AT \$12.00 TO \$15.00

| | |
|----------------------------|--------|
| Price, Figured Velour | \$6.25 |
| Price, Fancy Brocade Plush | 6.45 |
| Price, Fabricoid Leather | 7.15 |



Amazon has a **Catalog service** of about 600 hundred million items with their individual 7000 attributes data in it

Catalog (cont'd.)



DynamoDB is a **distributed hash table DHT** or simply a **key/value store**. If you work with a DHT, there is no single master or point of failure and you can do read and write data as a single record or operation.

Data in

```
{ customer_id: 207808519,
  sku:" 207808519",
  version:2,
  product:{
    can_be_giftwrapped:true,
    binding:shoes,
    brand:"DISCOS",
    bullet_point:[
      {value:"Outdoor-ready runner with mesh",lang:en_US},
      {value:"Rearfoot GEL cushioning",lang:en_US},
      {value:"Removable sockliner accommodates orthotics",lang:en_US}
    ],
    upc:"887649299485",
  }
}
```

Key (hash):
207808519/C00K2DG90

This is a sample catalog data in a simple document, the key here is the **sku**. The hash algorithm takes the key and computes a hash that is uniform from the document data.

Data out

```
{ customer_id: 207808519,
  sku:" 207808519",
  version:2,
  product:{
    can_be_giftwrapped:true,
    binding:shoes,
    brand:"DISCOS",
    bullet_point:[
      {value:"Outdoor-ready runner with mesh",lang:en_US},
      {value:"Rearfoot GEL cushioning",lang:en_US},
      {value:"Removable sockliner accommodates orthotics",lang:en_US}
    ],
    upc:"887649299485",
  }
}
```

Key (hash):
207808519/C00K2DG90

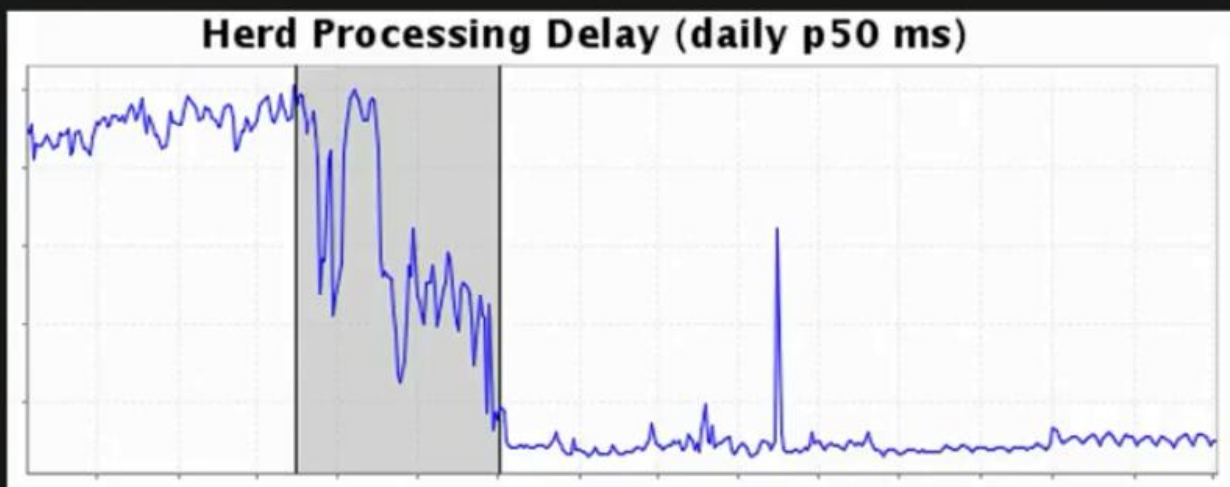
Anything else?



Ordering

Proceed to checkout (1 item)

Ordering (cont'd.)



Now...

Auto Scaling

| | <input checked="" type="checkbox"/> Read capacity | <input checked="" type="checkbox"/> Write capacity |
|------------------------------|---|---|
| | <input checked="" type="checkbox"/> Same settings as read | |
| Target utilization | <input type="text" value="50"/> % | <input type="text" value="50"/> % |
| Minimum provisioned capacity | <input type="text" value="5"/> units | <input type="text" value="5"/> units |
| Maximum provisioned capacity | <input type="text" value="1000"/> units | <input type="text" value="1000"/> units |
| | <input checked="" type="checkbox"/> Apply same settings to global secondary indexes | <input checked="" type="checkbox"/> Apply same settings to global secondary indexes |



Summary

Prime Day is big

Single instance doesn't cut it

DynamoDB for scale—up *and* down

Remember: schema, ACID, streams

