

Yandex

Text formats

CSV, TSV, JSON, XML

Example: web server logs

23.77.200.125 - - [06/Apr/2017:00:00:03 +0400] "GET /favicon.ico HTTP/1.1" 404 0 "-" "Mozilla/5.0 (N
62.141.70.177 - - [06/Apr/2017:00:00:03 +0400] "GET /id44951?like=1 HTTP/1.1" 200 10323 "-" "Moz
176.107.59.119 - - [06/Apr/2017:00:00:03 +0400] "GET /logout HTTP/1.1" 200 3006 "-" "Mozilla/5.0 (l
212.44.138.243 - - [06/Apr/2017:00:00:03 +0400] "GET /logout HTTP/1.1" 200 3006 "-" "Mozilla/5.0 (l
23.67.39.41 - - [06/Apr/2017:00:00:03 +0400] "GET /id52839 HTTP/1.1" 200 22921 "-" "Mozilla/5.0 (W
185.50.79.3 - - [06/Apr/2017:00:00:03 +0400] "GET /id19963?like=1 HTTP/1.1" 200 32587 "-" "Mozilla
185.75.5.169 - - [06/Apr/2017:00:00:03 +0400] "GET /login HTTP/1.1" 200 4946 "-" "Mozilla/4.0 (com
109.111.1.243 - - [06/Apr/2017:00:00:03 +0400] "GET / HTTP/1.1" 200 31508 "-" "Mozilla/5.0 (Window
109.111.1.243 - - [06/Apr/2017:00:00:03 +0400] "GET /favicon.ico HTTP/1.1" 404 0 "-" "Mozilla/5.0 (W
94.26.239.229 - - [06/Apr/2017:00:00:03 +0400] "GET /id33463 HTTP/1.1" 200 28800 "-" "Mozilla/5.0
213.110.62.235 - - [06/Apr/2017:00:00:03 +0400] "GET / HTTP/1.1" 200 31508 "-" "Mozilla/5.0 (Wind
213.110.62.235 - - [06/Apr/2017:00:00:03 +0400] "GET /favicon.ico HTTP/1.1" 404 0 "-" "Mozilla/5.0 (l
146.66.151.121 - - [06/Apr/2017:00:00:03 +0400] "GET /inbox HTTP/1.1" 200 15440 "-" "Mozilla/5.0 (l
62.210.224.237 - - [06/Apr/2017:00:00:03 +0400] "GET / HTTP/1.1" 200 31508 "-" "Mozilla/5.0 (Linux;
62.210.224.237 - - [06/Apr/2017:00:00:03 +0400] "GET /favicon.ico HTTP/1.1" 404 0 "-" "Mozilla/5.0 (l
87.247.224.172 - - [06/Apr/2017:00:00:03 +0400] "GET /id63012 HTTP/1.1" 200 5078 "-" "Mozilla/5.0
109.248.222.142 - - [06/Apr/2017:00:00:03 +0400] "GET / HTTP/1.1" 200 31508 "-" "Mozilla/5.0 (Winc
109.248.222.142 - - [06/Apr/2017:00:00:03 +0400] "GET /favicon.ico HTTP/1.1" 404 0 "-" "Mozilla/5.0
185.64.130.251 - - [06/Apr/2017:00:00:03 +0400] "GET /id14483 HTTP/1.1" 200 17523 "-" "Mozilla/5.
91.197.11.242 - - [06/Apr/2017:00:00:03 +0400] "GET /about HTTP/1.1" 200 11886 "-" "Mozilla/5.0 (V
195.254.131.155 - - [06/Apr/2017:00:00:03 +0400] "GET / HTTP/1.1" 200 31508 "-" "Mozilla/5.0 (Winc
195.254.131.155 - - [06/Apr/2017:00:00:03 +0400] "GET /favicon.ico HTTP/1.1" 404 0 "-" "Mozilla/5.0

Example: CSV

Ticker,Date,Open,High,Low,Close,Adj Close,Volume

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^IXIC,2014-01-03,4148.560059,4152.959961,4124.959961,4131.910156,4131.910156,1667480000
^IXIC,2014-01-06,4137.029785,4139.779785,4103.750000,4113.680176,4113.680176,2292840000
^IXIC,2014-01-07,4128.569824,4158.180176,4126.479980,4153.180176,4153.180176,2278220000
^IXIC,2014-01-08,4154.279785,4171.750000,4145.000000,4165.609863,4165.609863,2345220000
^IXIC,2014-01-09,4179.040039,4182.740234,4142.700195,4156.189941,4156.189941,2214770000
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^IXIC,2014-01-13,4167.410156,4179.470215,4097.990234,4113.299805,4113.299805,2322240000
^IXIC,2014-01-14,4129.600098,4183.839844,4125.810059,4183.020020,4183.020020,2034180000
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^IXIC,2014-01-16,4209.589844,4219.279785,4204.160156,4218.689941,4218.689941,2005850000
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^IXIC,2014-01-21,4222.979980,4227.930176,4193.169922,4225.759766,4225.759766,2034030000
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^IXIC,2014-01-27,4132.220215,4136.459961,4052.629883,4083.610107,4083.610107,2398280000
^IXIC,2014-01-28,4067.860107,4099.810059,4067.689941,4097.959961,4097.959961,2091180000
^IXIC,2014-01-29,4060.610107,4091.270020,4044.760010,4051.429932,4051.429932,2231850000
^IXIC,2014-01-30,4098.810059,4135.839844,4094.169922,4123.129883,4123.129883,2168410000
^IXIC,2014-01-31,4068.629883,4124.919922,4067.610107,4103.879883,4103.879883,2300570000
```

Example: TSV

Ticker	Date	Open	High	Low	Close	Adj Close	Volume
^IXIC	2014-01-02	4160.029785	4160.959961	4131.790039	4143.069824	4143.069824	1738820000
^IXIC	2014-01-03	4148.560059	4152.959961	4124.959961	4131.910156	4131.910156	1667480000
^IXIC	2014-01-06	4137.029785	4139.779785	4103.750000	4113.680176	4113.680176	2292840000
^IXIC	2014-01-07	4128.569824	4158.180176	4126.479980	4153.180176	4153.180176	2278220000
^IXIC	2014-01-08	4154.279785	4171.750000	4145.000000	4165.609863	4165.609863	2345220000
^IXIC	2014-01-09	4179.040039	4182.740234	4142.700195	4156.189941	4156.189941	2214770000
^IXIC	2014-01-10	4168.939941	4174.680176	4142.209961	4174.669922	4174.669922	2143070000
^IXIC	2014-01-13	4167.410156	4179.470215	4097.990234	4113.299805	4113.299805	2322240000
^IXIC	2014-01-14	4129.600098	4183.839844	4125.810059	4183.020020	4183.020020	2034180000
^IXIC	2014-01-15	4196.529785	4218.790039	4195.979980	4214.879883	4214.879883	2101870000
^IXIC	2014-01-16	4209.589844	4219.279785	4204.160156	4218.689941	4218.689941	2005850000
^IXIC	2014-01-17	4207.819824	4217.240234	4187.310059	4197.580078	4197.580078	2150370000
^IXIC	2014-01-21	4222.979980	4227.930176	4193.169922	4225.759766	4225.759766	2034030000
^IXIC	2014-01-22	4234.580078	4246.549805	4225.520020	4243.000000	4243.000000	2026910000
^IXIC	2014-01-23	4224.359863	4224.439941	4192.279785	4218.879883	4218.879883	2191980000
^IXIC	2014-01-24	4194.970215	4197.930176	4128.169922	4128.169922	4128.169922	2489470000
^IXIC	2014-01-27	4132.220215	4136.459961	4052.629883	4083.610107	4083.610107	2398280000
^IXIC	2014-01-28	4067.860107	4099.810059	4067.689941	4097.959961	4097.959961	2091180000
^IXIC	2014-01-29	4060.610107	4091.270020	4044.760010	4051.429932	4051.429932	2231850000
^IXIC	2014-01-30	4098.810059	4135.839844	4094.169922	4123.129883	4123.129883	2168410000
^IXIC	2014-01-31	4068.629883	4124.919922	4067.610107	4103.879883	4103.879883	2300570000

CSV & TSV (comma- & tab-separated values)

› Space efficiency

› Speed

› Data types

› Splittable

› Extensibility

Ticker,Date,Open,High,Low,Close,Adj Close,Volume

```
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^IXIC,2014-01-13,4167.410156,4179.470215,4097.990234,4113.299805,4113.299805,2322240000
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^IXIC,2014-01-21,4222.979980,4227.930176,4193.169922,4225.759766,4225.759766,2034030000
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^IXIC,2014-01-31,4068.629883,4124.919922,4067.610107,4103.879883,4103.879883,2300570000
```

CSV & TSV (comma- & tab-separated values)

- › Space efficiency

BAD

- › Speed

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Ticker,Date,Open,High,Low,Close,Adj Close,Volume								
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^IXIC	2014-01-06,	4137.029785,	4139.779785,	4103.750000,	4113.680176,	4113.680176,	2292840000	
^IXIC	2014-01-07,	4128.569824,	4158.180176,	4126.479980,	4153.180176,	4153.180176,	2278220000	
^IXIC	2014-01-08,	4154.279785,	4171.750000,	4145.000000,	4165.609863,	4165.609863,	2345220000	
^IXIC	2014-01-09,	4179.040039,	4182.740234,	4142.700195,	4156.189941,	4156.189941,	2214770000	
^IXIC	2014-01-10,	4168.939941,	4174.680176,	4142.209961,	4174.669922,	4174.669922,	2143070000	
^IXIC	2014-01-13,	4167.410156,	4179.470215,	4097.990234,	4113.299805,	4113.299805,	2322240000	
^IXIC	2014-01-14,	4129.600098,	4183.839844,	4125.810059,	4183.020020,	4183.020020,	2034180000	
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^IXIC	2014-01-28,	4067.860107,	4099.810059,	4067.689941,	4097.959961,	4097.959961,	2091180000	
^IXIC	2014-01-29,	4060.610107,	4091.270020,	4044.760010,	4051.429932,	4051.429932,	2231850000	
^IXIC	2014-01-30,	4098.810059,	4135.839844,	4094.169922,	4123.129883,	4123.129883,	2168410000	
^IXIC	2014-01-31,	4068.629883,	4124.919922,	4067.610107,	4103.879883,	4103.879883,	2300570000	

CSV & TSV (comma- & tab-separated values)

› Space efficiency

BAD

› Speed

GOOD

› Data types

› Splittable

› Extensibility

Ticker,Date,Open,High,Low,Close,Adj Close,Volume

```
^IXIC,2014-01-02,4160.029785,4160.959961,4131.790039,4143.069824,4143.069824,1738820000
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```


CSV & TSV (comma- & tab-separated values)

› Space efficiency

BAD

› Speed

GOOD

› Data types

ONLY STRINGS

› Splittable

› Extensibility

Ticker,Date,Open,High,Low,Close,Adj Close,Volume

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```

CSV & TSV (comma- & tab-separated values)

› Space efficiency

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› Speed

GOOD

› Data types

ONLY STRINGS

› Splittable

SPLITTABLE
W/O HEADER

› Extensibility

Ticker,Date,Open,High,Low,Close,Adj Close,Volume

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CSV & TSV (comma- & tab-separated values)

› Space efficiency

BAD

› Speed

GOOD

› Data types

ONLY STRINGS

› Splittable

SPLITTABLE
W/O HEADER

› Extensibility

BAD

Ticker,Date,Open,High,Low,Close,Adj Close,Volume

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```

Example: JSON

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{"Ticker": "^IXIC", "Date": "2014-01-09", "Adj Close": 4156.189941, "Volume": 2214770000},
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{"Ticker": "^IXIC", "Date": "2014-01-29", "Adj Close": 4051.429932, "Volume": 2231850000},
{"Ticker": "^IXIC", "Date": "2014-01-30", "Adj Close": 4123.129883, "Volume": 2168410000},
{"Ticker": "^IXIC", "Date": "2014-01-31", "Adj Close": 4103.879883, "Volume": 2300570000}
]
```


JSON (JavaScript Object Notation)

- › Space efficiency

- › Speed

- › Data types

- › Splittable

- › Extensibility

```
[
{"Ticker": "^IXIC", "Date": "2014-01-02", "Adj Close": 4143.069824, "Volume": 1738820000},
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{"Ticker": "^IXIC", "Date": "2014-01-31", "Adj Close": 4103.879883, "Volume": 2300570000}
]
```

JSON (JavaScript Object Notation)

- › Space efficiency

BAD (WORSE THAN CSV)

- › Speed

- › Data types

- › Splittable

- › Extensibility

```
[{"Ticker": "^IXIC", "Date": "2014-01-02", "Adj Close": 4143.069824, "Volume": 1738820000}, {"Ticker": "^IXIC", "Date": "2014-01-03", "Adj Close": 4131.910156, "Volume": 1667480000}, {"Ticker": "^IXIC", "Date": "2014-01-06", "Adj Close": 4113.680176, "Volume": 2292840000}, {"Ticker": "^IXIC", "Date": "2014-01-07", "Adj Close": 4153.180176, "Volume": 2278220000}, {"Ticker": "^IXIC", "Date": "2014-01-08", "Adj Close": 4165.609863, "Volume": 2345220000}, {"Ticker": "^IXIC", "Date": "2014-01-09", "Adj Close": 4156.189941, "Volume": 2214770000}, {"Ticker": "^IXIC", "Date": "2014-01-10", "Adj Close": 4174.669922, "Volume": 2143070000}, {"Ticker": "^IXIC", "Date": "2014-01-13", "Adj Close": 4113.299805, "Volume": 2322240000}, {"Ticker": "^IXIC", "Date": "2014-01-14", "Adj Close": 4183.020020, "Volume": 2034180000}, {"Ticker": "^IXIC", "Date": "2014-01-15", "Adj Close": 4214.879883, "Volume": 2101870000}, {"Ticker": "^IXIC", "Date": "2014-01-16", "Adj Close": 4218.689941, "Volume": 2005850000}, {"Ticker": "^IXIC", "Date": "2014-01-17", "Adj Close": 4197.580078, "Volume": 2150370000}, {"Ticker": "^IXIC", "Date": "2014-01-21", "Adj Close": 4225.759766, "Volume": 2034030000}, {"Ticker": "^IXIC", "Date": "2014-01-22", "Adj Close": 4243.000000, "Volume": 2026910000}, {"Ticker": "^IXIC", "Date": "2014-01-23", "Adj Close": 4218.879883, "Volume": 2191980000}, {"Ticker": "^IXIC", "Date": "2014-01-24", "Adj Close": 4128.169922, "Volume": 2489470000}, {"Ticker": "^IXIC", "Date": "2014-01-27", "Adj Close": 4083.610107, "Volume": 2398280000}, {"Ticker": "^IXIC", "Date": "2014-01-28", "Adj Close": 4097.959961, "Volume": 2091180000}, {"Ticker": "^IXIC", "Date": "2014-01-29", "Adj Close": 4051.429932, "Volume": 2231850000}, {"Ticker": "^IXIC", "Date": "2014-01-30", "Adj Close": 4123.129883, "Volume": 2168410000}, {"Ticker": "^IXIC", "Date": "2014-01-31", "Adj Close": 4103.879883, "Volume": 2300570000}]
```

JSON (JavaScript Object Notation)

- › Space efficiency

BAD (WORSE THAN CSV)

- › Speed

GOOD ENOUGH

- › Data types

- › Splittable

- › Extensibility

```
[
{"Ticker": "^IXIC", "Date": "2014-01-02", "Adj Close": 4143.069824, "Volume": 1738820000},
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{"Ticker": "^IXIC", "Date": "2014-01-30", "Adj Close": 4123.129883, "Volume": 2168410000},
{"Ticker": "^IXIC", "Date": "2014-01-31", "Adj Close": 4103.879883, "Volume": 2300570000}
]
```


JSON (JavaScript Object Notation)

- › Space efficiency

BAD (WORSE THAN CSV)

- › Speed

GOOD ENOUGH

- › Data types

STRINGS, NUMBERS,
BOOLEANS, MAPS, LISTS

- › Splittable

- › Extensibility

```
[
{"Ticker": "^IXIC", "Date": "2014-01-02", "Adj Close": 4143.069824, "Volume": 1738820000},
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{"Ticker": "^IXIC", "Date": "2014-01-31", "Adj Close": 4103.879883, "Volume": 2300570000}
]
```


JSON (JavaScript Object Notation)

› Space efficiency

BAD (WORSE THAN CSV)

› Speed

GOOD ENOUGH

› Data types

STRINGS, NUMBERS,
BOOLEANS, MAPS, LISTS

› Splittable

SPLITTABLE IF 1
DOCUMENT PER LINE

› Extensibility

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{"Ticker": "^IXIC", "Date": "2014-01-31", "Adj Close": 4103.879883, "Volume": 2300570000}  
]
```

JSON (JavaScript Object Notation)

› Space efficiency

BAD (WORSE THAN CSV)

› Speed

GOOD ENOUGH

› Data types

STRINGS, NUMBERS,
BOOLEANS, MAPS, LISTS

› Splittable

SPLITTABLE IF 1
DOCUMENT PER LINE

› Extensibility

YES

```
[
{"Ticker": "^IXIC", "Date": "2014-01-02", "Adj Close": 4143.069824, "Volume": 1738820000},
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{"Ticker": "^IXIC", "Date": "2014-01-28", "Adj Close": 4097.959961, "Volume": 2091180000},
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{"Ticker": "^IXIC", "Date": "2014-01-30", "Adj Close": 4123.129883, "Volume": 2168410000},
{"Ticker": "^IXIC", "Date": "2014-01-31", "Adj Close": 4103.879883, "Volume": 2300570000}
]
```

Example: XML

```
<?xml version="1.0" encoding="utf-8"?>
<Item>
  <Ticker>^IXIC</Ticker>
  <Date>2014-01-02</Date>
  <Open>4160.029785</Open>
  <High>4160.959961</High>
  <Low>4131.790039</Low>
  <Close>4143.069824</Close>
  <Adj Close>4143.069824</Adj Close>
  <Volume>1738820000</Volume>
</Item>
<Item>
  <Ticker>^IXIC</Ticker>
  <Date>2014-01-03</Date>
  <Open>4148.560059</Open>
  <High>4152.959961</High>
```

```
  <Low>4124.959961</Low>
  <Close>4131.910156</Close>
  <Adj Close>4131.910156</Adj Close>
  <Volume>1667480000</Volume>
</Item>
<Item>
  <Ticker>^IXIC</Ticker>
  <Date>2014-01-06</Date>
  <Open>4137.029785</Open>
  <High>4139.779785</High>
  <Low>4103.75</Low>
  <Close>4113.680176</Close>
  <Adj Close>4113.680176</Adj Close>
  <Volume>2292840000</Volume>
</Item>
```

Conclusion

- › Text formats
 - › are popular, human-readable, easy to generate, easy to parse (with libraries)
 - › occupy a lot of disk space because of readability and redundancy
- › CSV, TSV, JSON, XML are examples of text formats
- › Next videos
 - › Binary formats
 - › Compression

BigDATAteam