REFERENSI CEPAT SOCKET.IO

Event, room, namespace, middleware, pola real-time

Setup

Setup Server (Node.js)

```
import { Server } from "socket.io";
const io = new Server(3000, {
  cors: { origin: "http://localhost:5173" }
});
```

Setup Client

```
import { io } from "socket.io-client";
const socket = io("http://localhost:3000");
```

Dengan Express

```
import express from "express";
import { createServer } from "http";
import { Server } from "socket.io";
const app = express();
const server = createServer(app);
const io = new Server(server);
```

Opsi Server

`cors`	Konfigurasi CORS untuk cross-origin
`path`	Path kustom (default: /socket.io)
`pingInterval`	Interval heartbeat (ms, default 25000)
`pingTimeout`	Timeout sebelum disconnect (default 20000)
`maxHttpBufferSize`	Ukuran pesan maksimum dalam bytes (default 1MB)

Event

Event Bawaan (Server)

`connection`	Client terhubung
`disconnect`	Client terputus
`disconnecting`	Client sedang terputus (masih di room)
`error`	Event error

Event Bawaan (Client)

`connect`	Terhubung ke server
`disconnect`	Terputus dari server
`connect_error`	Koneksi gagal
`reconnect`	Berhasil terhubung kembali
`reconnect_attempt`	Sedang mencoba reconnect

Siklus Hidup Koneksi

```
io.on("connection", (socket) => {
  console.log(`connected: ${socket.id}`);
  socket.on("disconnect", (reason) => {
    console.log(`disconnected: ${reason}`);
  });
});
```

Emit

Emit dari Server

```
socket.emit("hello", { msg: "world" });
socket.emit("data", arg1, arg2);
io.emit("broadcast", data);
```

Emit dari Client

```
socket.emit("chat:message", { text });
socket.emit("update", data, (res) => {
  console.log("ack:", res);
});
```

Pola Emit

`socket.emit(ev, data)`	Kirim hanya ke socket ini
`io.emit(ev, data)`	Kirim ke semua client yang terhubung
`socket.broadcast.emit()`	Semua client kecuali pengirim
`io.to(room).emit()`	Semua client dalam room
`socket.to(room).emit()`	Anggota room kecuali pengirim

Broadcasting

Metode Broadcast

```
io.emit("msg", data);
socket.broadcast.emit("msg", data);
io.to("room1").emit("msg", data);
io.except("room2").emit("msg", data);
```

Volatile & Compressed

`socket.volatile.emit()`	Lewati jika client belum siap (tanpa buffering)
`socket.compress(true).emit()`	Aktifkan kompresi per pesan
`io.local.emit()`	Broadcast ke server lokal saja (multi-node)
`socket.timeout(5000).emit()`	Emit dengan timeout untuk acknowledgement

Room

Operasi Room

```
socket.join("room-1");
socket.join(["room-1", "room-2"]);
socket.leave("room-1");
io.to("room-1").emit("msg", data);
```

Properti Room

`socket.rooms`	Set room yang diikuti socket ini
`socket.id`	Setiap socket otomatis bergabung ke room ID-nya sendiri
`io.sockets.adapter.rooms`	Map semua room dan anggotanya

Pola Room

```
socket.on("join:room", (room) => {
  socket.join(room);
  io.to(room).emit("user:joined", socket.id);
});
socket.on("disconnecting", () => {
  for (const room of socket.rooms) {
    socket.to(room).emit("user:left", socket.id);
  }
});
```

Namespace

Membuat Namespace

```
const chat = io.of("/chat");
const admin = io.of("/admin");
chat.on("connection", (socket) => {
  chat.emit("user:online", socket.id);
});
```

Client Terhubung ke Namespace

```
const chat = io("http://localhost:3000/chat");
const admin = io("http://localhost:3000/admin");
```

Namespace Dinamis

```
io.of(/^\/project-\d+$/).on("connection",
  (socket) => {
    const ns = socket.nsp.name;
    console.log(`joined namespace: ${ns}`);
  }
);
```

Middleware

Middleware Server

```
io.use((socket, next) => {
  const token = socket.handshake.auth.token;
  if (isValid(token)) return next();
  next(new Error("authentication failed"));
});
```

Middleware Namespace

```
const admin = io.of("/admin");
admin.use((socket, next) => {
  if (socket.handshake.auth.role === "admin")
    return next();
  next(new Error("not authorized"));
});
```

Properti Middleware

`socket.handshake.auth`	Data auth yang dikirim dari client
`socket.handshake.headers`	Header HTTP dari request awal
`socket.handshake.query`	Query parameter dari URL koneksi
`socket.data`	Data arbitrer yang dilampirkan di middleware

Penanganan Error

Error di Sisi Server

```
socket.on("action", (data, callback) => {
  try {
    const result = process(data);
    callback({ status: "ok", data: result });
  } catch (err) {
    callback({ status: "error", msg: err.message });
  }
});
```

Error di Sisi Client

```
socket.on("connect_error", (err) => {
  console.log("connection error:", err.message);
});
socket.io.on("reconnect_failed", () => {
  console.log("reconnection failed");
});
```

Opsi Reconnect Client

`reconnection`	Aktifkan auto-reconnect (default true)
`reconnectionAttempts`	Maksimum percobaan (default Infinity)
`reconnectionDelay`	Delay awal ms (default 1000)
`reconnectionDelayMax`	Delay maksimum ms (default 5000)

Acknowledgements

Client Kirim, Server Ack

```
// client
socket.emit("save", data, (response) => {
  console.log("server ack:", response);
});
// server
socket.on("save", (data, callback) => {
  callback({ saved: true, id: 42 });
});
```

Server Kirim, Client Ack

```
// server
socket.emit("ping", (response) => {
  console.log("client ack:", response);
});
// client
socket.on("ping", (callback) => {
  callback("pong");
});
```

Dengan Timeout

```
socket.timeout(5000).emit("save", data,
  (err, response) => {
    if (err) console.log("timeout!");
    else console.log("ack:", response);
  }
);
```

Pola Umum

Chat Room

```
io.on("connection", (socket) => {
  socket.on("chat:join", (room) => {
    socket.join(room);
    socket.to(room).emit("chat:joined",
      socket.id);
  });
  socket.on("chat:message", ({ room, text }) => {
    io.to(room).emit("chat:message", {
      from: socket.id, text
    });
  });
});
```

Kehadiran Online

```
const users = new Map();
io.on("connection", (socket) => {
  users.set(socket.id, socket.handshake.auth);
  io.emit("users:list", [...users.values()]);
  socket.on("disconnect", () => {
    users.delete(socket.id);
    io.emit("users:list", [...users.values()]);
  });
});
```

Rate Limiting

```
io.use((socket, next) => {
  const ip = socket.handshake.address;
  if (rateLimiter.consume(ip)) return next();
  next(new Error("rate limit exceeded"));
});
```