# WCS in Docker


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WCS can be used in Docker with official Docker image since build 5.2.458

## Docker deployment example

To deploy the simple WebRTC streaming server in Docker, do the followin steps:

1. Pull the latest WCS image from Docker Hub

```
sudo docker pull flashphoner/webcallserver
```

2. Set up docker bridge network

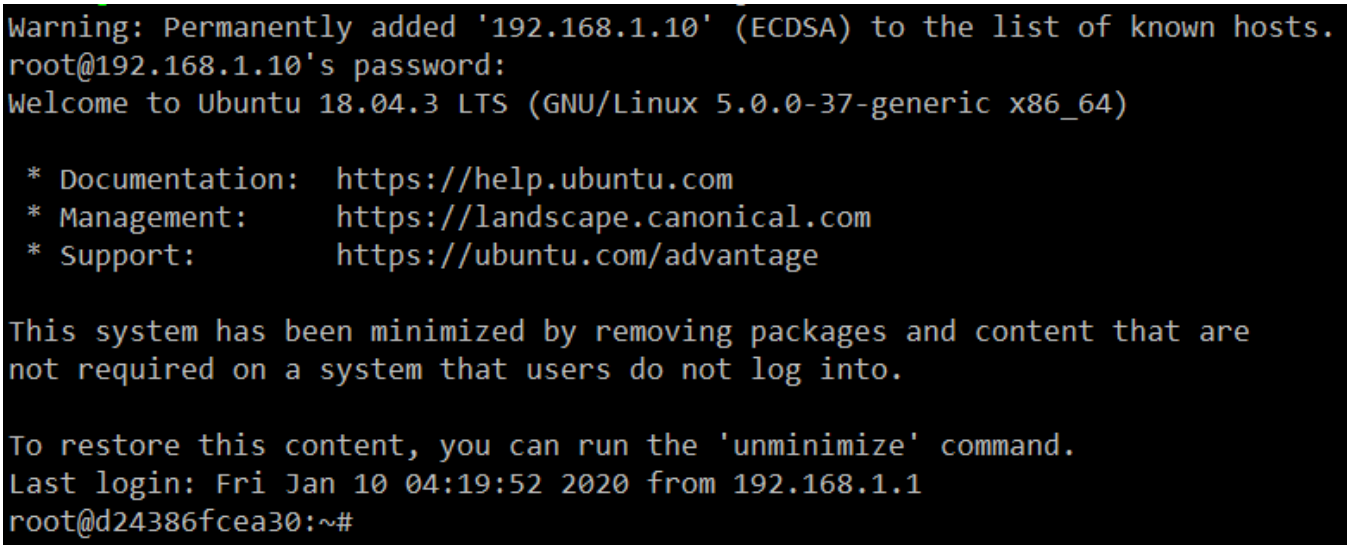
```
sudo docker network create \
 --subnet 192.168.1.1/24 \
 --gateway=192.168.1.1 \
 --driver=bridge \
 --opt com.docker.network.bridge.name=br-testnet testnet
```

3. Start WCS docker container with your own trial or commercial license number

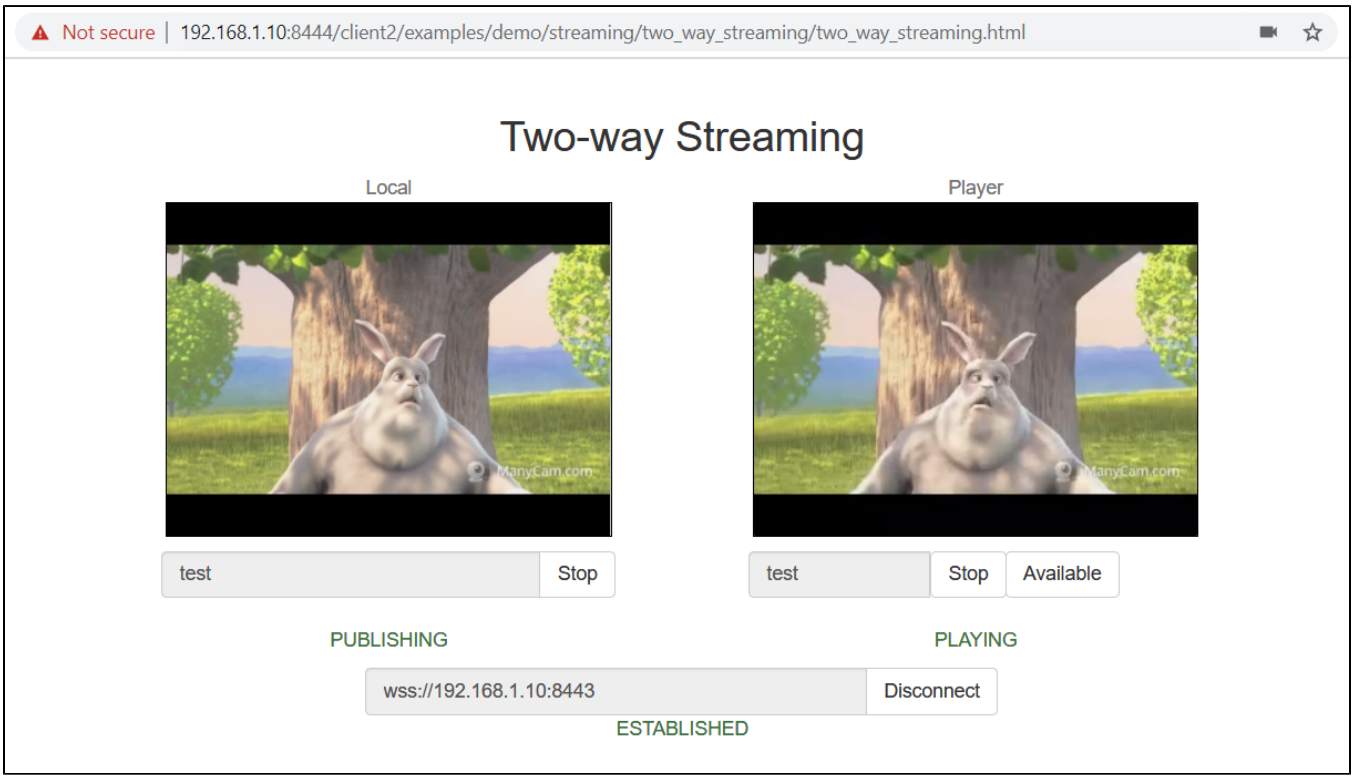
```
docker run \
-e PASSWORD=password \
-e LICENSE=license_number \
-e LOCAL_IP=192.168.1.10 \
--net testnet --ip 192.168.1.10 \
--name wcs-docker-test --rm -d flashphoner/webcallserver:latest
```

4. Check if the container available by SSH

```
ssh root@192.168.1.10
```



5. Open Two Way Streaming example in local browser, publish a stream




6. Close the page, stop the container

```
sudo docker stop wcs-docker-test
```

License will be deactivated on container stop to preventunnecessary billing.

# Docker container configuration

## Networking issues

By default, IP address will be set dynamically to the container. So if you suppose to use fixed IP address, you should set it with`docker run`options and pass to the container using`LOCAL_IP`variable:

```
docker run -e LICENSE=license_number -e PASSWORD=secret \
 -e LOCAL_IP=static_ip \
 --net your-docker-network \
 --ip static_ip \
 --name webcallserver-instance -d webcallserver:latest
```

If your docker host is behind NAT, and your WCS is supposed to be available from outside, you should set external IP address to`EXTERNAL_IP`variable:

```
docker run -e LICENSE=license_number -e PASSWORD=secret \
 -e LOCAL_IP=static_ip \
 -e EXTERNAL_IP=external_ip \
 --net your-docker-network \
 --ip static_ip \
 --name webcallserver-instance -d webcallserver:latest
```

### Dynamic IP address detection issues

When IP address should be set dynamically to the container, and the container has more than one network interface (this can happen for example when docker host interfaces are used), IP address to bind WCS server should be chosen manually while the container is launching. In this case, the container should be started in interacrive mode

```
docker run \
-e PASSWORD=password \
-e LICENSE=license_number \
--net host \
--name wcs-docker-test --rm -it flashphoner/webcallserver:latest
```

Container enrty point script detects all the IP addresses and asks to enter the address for WCS to bind to

```
192.168.0.195 192.168.1.1 172.17.0.1 172.16.0.158
We have found 4 IPs, what should be used for WCS: 192.168.0.195 192.168.1.1 172.17.0.1 172.16.0.158 ? 172.17.0.1
```

The address chosen will be written to `ip_local` parameter, for example

```
ip_local=172.17.0.1
```

# Environment variables reference

The following environment variables can be passed to the container:

- `PASSWORD`- SSH password to access the container. If this variable is not defined, container will not be accessible by SSH using password
- `LICENSE`- Web Call Server license number. If this variable is not defined, license can be entered on first web interface logon
- `LOCAL_IP`- local IP address to set to`ip_local`parameter in`flashphoner.properties`configuration file. If this variable is not defined, container IP address will be detected automatically.
- `EXTERNAL_IP`- external IP address to set to`ip`parameter in`flashphoner.properties`configuration file. If this variable is not defined**and**`LOCAL_IP`is not defined, external IP address will be detected automatically.
- `CDN_ROLE`- container role inCDN. If this variable is not defined, container will act as standalone server
- `CDN_ENTRY_POINT`- CDN entry point server address for the container. If this variable is not defined, CDN entry point will not be set
- `CDN_GROUPS`-CDN groupsto which the container should belong. If this variable is not defined, the container will not belong to any CDN group

## Volumes reference

The following docker volumes can be mounted to the container

- `/conf`- additional configuration files folder, the path starts from container root. This volume can be mounted as read-only
- `/usr/local/FlashphonerWebCallServer/hls`- HLS segments folder. This volume must be mounted with write access
- `/usr/local/FlashphonerWebCallServer/logs`- logging folder. This volume must be mounted with write access
- `/usr/local/FlashphonerWebCallServer/media`- media files for VOD playback folder. This volume can be mounted as read-only. This volume can be shared with another Web Call Server instances
- `/usr/local/FlashphonerWebCallServer/records`- stream recoding files folder. This volume must be mounted with write access. This volume can be shared with another Web Call Server instances

The container launch example with all the volumes mounted:

```
docker run -e LICENSE=license_number -e CDN_ROLE=origin \
 -v /opt/wcs/conf:/conf \
 -v /opt/wcs/logs:/usr/local/FlashphonerWebCallServer/logs \
 -v /opt/wcs/hls:/usr/local/FlashphonerWebCallServer/hls \
 -v /opt/wcs/media:/usr/local/FlashphonerWebCallServer/media \
 -v /opt/wcs/records:/usr/local/FlashphonerWebCallServer/records \
 --name webcallserver-instance -d webcallserver:latest
```

Do not mount whole folder /usr/local/FlashphonerWebCallServer/conf or separate files from this folder as volumes!

For example, this is not allowed:

```
docker run -e LICENSE=license_number -e PASSWORD=secret \
 -v /opt/wcs/conf:/usr/local/FlashphonerWebCallServer/conf \
 --name webcallserver-instance -d webcallserver:latest
```

and this too:

```
docker run -e LICENSE=license_number -e PASSWORD=secret \
 -v /opt/wcs/conf/flashphoner.properties:/usr/local/FlashphonerWebCallServer/conf/flashphoner.
properties \
 --name webcallserver-instance -d webcallserver:latest
```

# Additional instance configuration

The following additional configuration files can be placed to the host folder mounted as `/conf` volume:

- `id_rsa.pub` - public SSH access key. If this file is found during the container start, the container will be accessible with corresponding private key. Otherwise, if `PASSWORD` variable is defined, the container will be accesible by password. If neiher key, nor password are defined, SSH daemon will not be started.
- `flashphoner.properties` - main server configuration file. It can be used for detailed Web Call Server instance configuration
- `wcs-core.properties` - Java configuration file. It can be used for memory tuning and JMC connection configuration
- `log4j.properties` - logging configuration file
- `wss.jks` - SSL certificates key storage file. This file can be prepared with keytool
- `cdn_profiles.yml` - CDN transcoding profiles configuration file
- `database.yml` - user accounts and REST hook applications configuration
- `*.sdp` - SDP settings files

All those files can be used for example to restore Web Call Server instance configuration from backup and automatic deployment. The files will be copied to the container 'as is', except `flashphoner.properties`:

- `ip` and `ip_local` parameters will be changed (see `IP_LOCAL` variable description above)
- if `CDN_ROLE` variable is set, but the file contains no CDN settings, the default settings will be added

## Container ports

The following ports are available by default:

- `22/tcp` - SSH (this port is active only if password or key access is set)
- `554/tcp` - RTSP server port
- `1935/tcp` - RTMP server port
- `1935/udp` - RTMFP server port
- `2001/tcp` - server CLI port
- `7777/tcp` - server monitoring port
- `8080-8084/tcp` - WS, HTTP, CDN ports
- `8443-8445/tcp` - WSS, HTTPS ports
- `8888/tcp` - HTTPS port (for older versions compatibility)
- `9091/tcp` - HTTP port (for older versions compatibility)
- `30000-35000/tcp` - TCP media ports
- `30000-35000/udp` - UDP media ports
- `50999/tcp` - JMX port

The ports can be changed using `docker run --expose` parameters if necessary. In this case, the actual port values should be set to `flashphoner.properties` and `wcs-core.properties` files, see description above

# Known issues

1. Open files limit cannot be changed from inside container

Symptoms: the following message is displaing when container starts in interactive mode

```
ulimit: open files: cannot modify limit: Operation not permitted
```

Solution: set open files limit in container parameters when launching it

```
docker run --ulimit nofile=100000:100000 \
 -e LICENSE=license_number -e PASSWORD=secret \
 --name webcallserver-instance --rm webcallserver:latest
```

2. It is not recommended to use Docker on Windows due to port forwarding issues

Symptoms: WCS container is running but not available via SSH, HTTP/HTTPS, or WebRTC connection is not establishing when container is deployed in Docker on Windows

Solution: use Docker on Linux, or launch WCS in WSL 2