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# Uma Introdução ao Mongoose OS no ESP8266

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[github.com/fkuhne/tdc17](https://github.com/fkuhne/tdc17)



# Agenda



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- Introdução
- Arquitetura
- Instalação
- Codificação e Compilação
- Exemplo: Hello World
- Exemplo: Blink com configuração remota
- Exemplo: Cliente MQTT
- Referências

# Introdução



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Over-The-Air updates and remote management	OTA firmware updates with rollback on failures RPC infrastructure for the full remote control
Security	Built in: flash encryption, crypto chip support ARM mbedTLS optimized for small memory footprint
Device management dashboard service	A device management dashboard for tracking your fleet. On-prem option is available

# Introdução



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- SO para devices IoT a nível comercial
- Suporta alguns hardwares: STM32, ESP, Texas, Nordic
- Compatível com AWS, Google e outros serviços de núvem
- Open source (licença comercial disponível)
- Criptografia de mensagens (TLS) e do conteúdo da flash
- Inúmeros protocolos de comunicação (HTTP, WebSockets, MQTT, CoAP, ...)
- JavaScript e C/C++
- Sistema de arquivos (POSIX API)
- Over-the-air update
- Sistema de gerenciamento remoto de dispositivos
- Sistema de chamadas remotas: RPC (*remote procedure calls*)

# Introdução

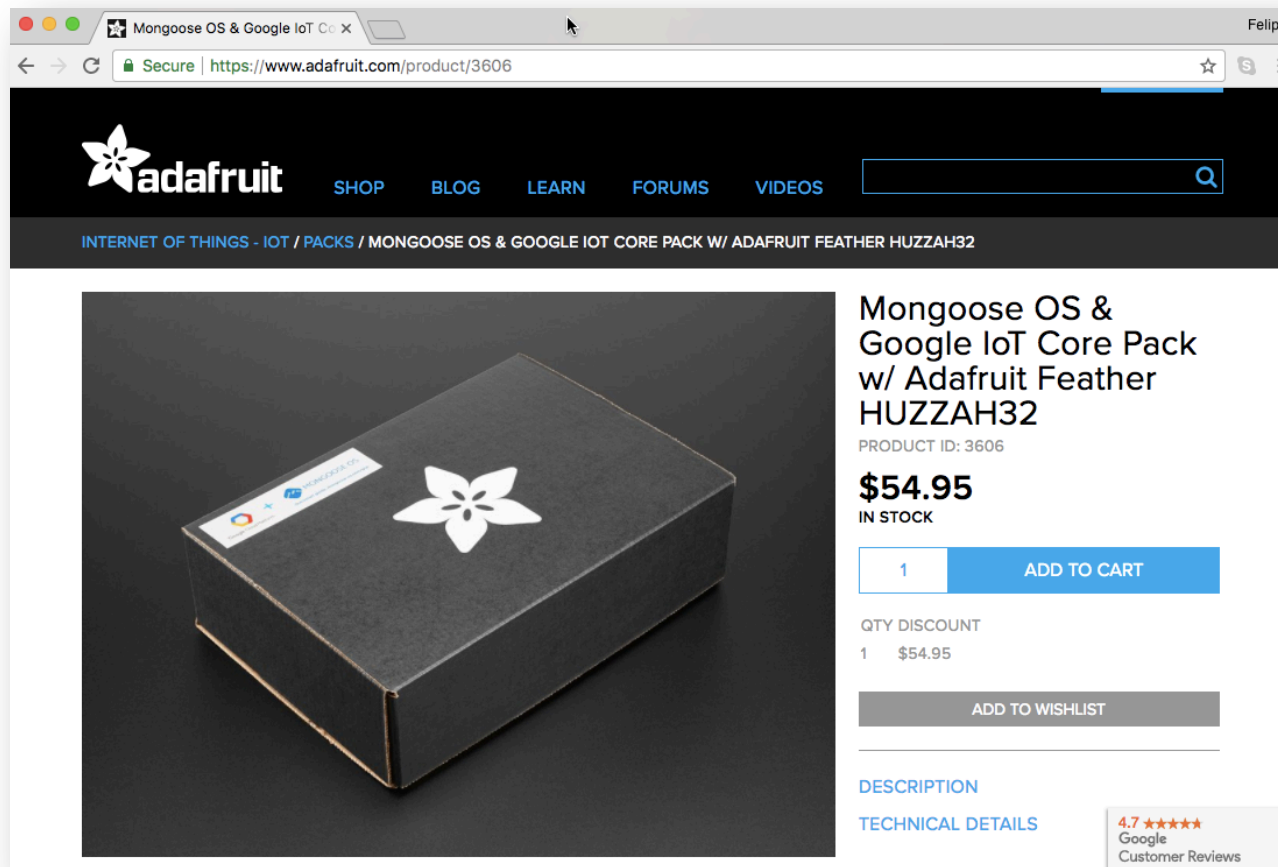


- Cesanta (Dublin)
- Criado a partir da biblioteca de rede Mongoose
  - Usada por NASA, Google, Broadcomm, Samsung, Bosch ...
- <https://cesanta.com/>
- <https://cesanta.com/download.html>

# Introdução



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➤ <https://www.adafruit.com/product/3606>

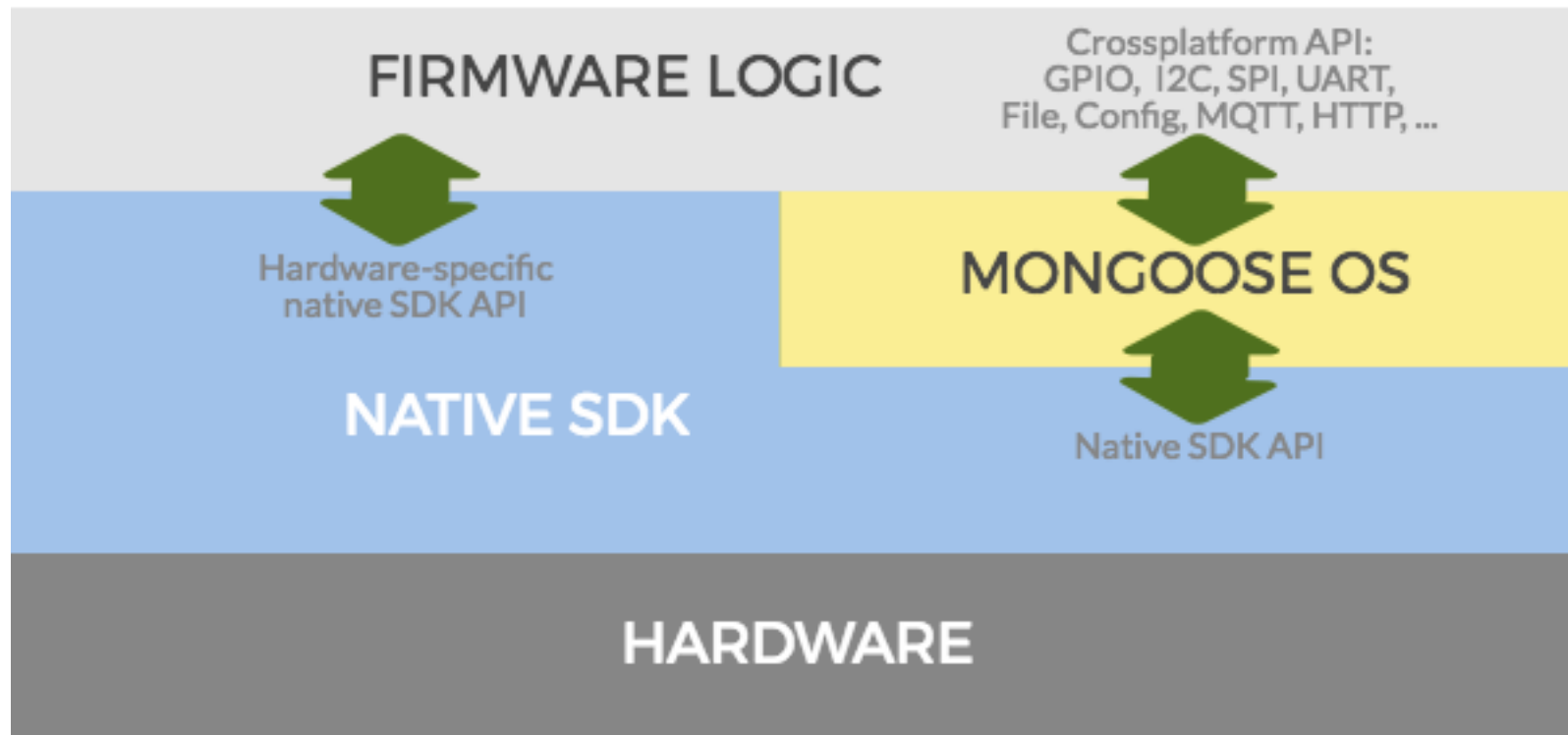
➤ <https://www.youtube.com/watch?v=zHeWNwUR2Sc>



# Arquitetura



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➤ <https://mongoose-os.com/docs/book/intro.html>



# Instalação



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➤ <https://mongoose-os.com/software.html>

## MacOS / Linux

```
curl -fsSL https://mongoose-os.com/downloads/mos/install.  
~/.mos/bin/mos --help  
~/.mos/bin/mos
```

For further steps, see [Quick Start Guide](#).

➤ `$> export PATH=$PATH:$HOME/.mos/bin`  
➤ `$> mos`

# Código



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```
> $> mos init --arch esp8266  
> $> mos build  
> $> mos flash  
> $> mos console
```

# Hello World (main.c)



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```
1  #include <stdio.h>
2  #include "mgos.h"
3  #include "mgos_gpio.h"
4
5  void timerCallback(void *args)
6  {
7      printf("ping!\n");
8
9      (void)args;
10 }
11
12 enum mgos_app_init_result mgos_app_init(void)
13 {
14     mgos_set_timer(1000, true, timerCallback, NULL);
15
16     return MGOS_APP_INIT_SUCCESS;
17 }
```

# Blink (main.c)



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```
1  #include <stdio.h>
2  #include "mgos.h"
3  #include "mgos_gpio.h"
4
5  void timerCallback(void *args)
6  {
7      printf("ping!\n");
8      mgos_gpio_toggle(2);
9
10     (void)args;
11 }
12
13 enum mgos_app_init_result mgos_app_init(void)
14 {
15     mgos_gpio_set_mode(2, MGOS_GPIO_MODE_OUTPUT);
16
17     mgos_set_timer(1000, true, timerCallback, NULL);
18
19     return MGOS_APP_INIT_SUCCESS;
20 }
```

# Blink (mos.yml)



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```
26 config_schema:
27   - ["configBlink", "o", {title: "My app custom settings"}]
28   - ["configBlink.ledInterval", "i", 1000, {title: "LED interval in miliseconds"}]
29
```



```
13 enum mgos_app_init_result mgos_app_init(void)
14 {
15     mgos_gpio_set_mode(2, MGOS_GPIO_MODE_OUTPUT);
16
17     int ledInterval = mgos_sys_config_get_configBlink_ledInterval();
18     mgos_set_timer(ledInterval, true, timerCallback, NULL);
19
20     return MGOS_APP_INIT_SUCCESS;
21 }
```



- \$> mos config-get configBlink.ledInterval
- \$> mos config-set configBlink.ledInterval=500

# Cliente MQTT (main.c)



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```
30 enum mgos_app_init_result mgos_app_init(void)
31 {
32     mgos_gpio_set_mode(2, MGOS_GPIO_MODE_OUTPUT);
33     mgos_set_timer(1000, true, timerCallback, NULL);
34
35     mgos_mqtt_sub("my/subscription", mqttDataReceivedCallback, NULL);
36
37     return MGOS_APP_INIT_SUCCESS;
38 }
```

# Cliente MQTT (main.c)



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```
14 void timerCallback(void *args)
15 {
16     static int messageCounter = 1;
17     char msg[20] = {};
18
19     snprintf(msg, sizeof(msg), "MENSAGEM %d", messageCounter++);
20     printf("Enviando: [%.*s] para o topico: [my/topic]\n", strlen(msg), msg);
21     fflush(0);
22
23     mgos_gpio_toggle(2);
24
25     mgos_mqtt_pub("my/topic", msg, strlen(msg), 2, 0);
26
27     (void)args;
28 }
```

# Cliente MQTT (main.c)



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```
4 static void mqttDataReceivedCallback(struct mg_connection *c, const char *topic,  
5   int topic_len, const char *msg, int msg_len, void *userdata)  
6 {  
7   printf("Recebendo: [%.s] no topico: [%.s]\n", msg_len, msg, topic_len, topic);  
8   fflush(0);  
9  
10  (void)c;  
11  (void)userdata;  
12 }
```



# Cliente MQTT (mos.yml)



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```
25  config_schema:
26      - ["wifi.sta.enable", true]
27      - ["wifi.sta.ssid", "TDC_Poa_Vip"]
28      - ["wifi.sta.pass", "spe@kersPOA"]
29      - ["mqtt.enable", true]
30      - ["mqtt.server", "iot.eclipse.org:1883"]
31      - ["mqtt.client_id", "esp8266-tdcpoa17"]
32
33
34  # List of libraries used by this app, in order of initialisation
35  libs:
36      - origin: https://github.com/mongoose-os-libs/rpc-service-config
37      - origin: https://github.com/mongoose-os-libs/rpc-service-fs
38      - origin: https://github.com/mongoose-os-libs/rpc-uart
39      - origin: https://github.com/mongoose-os-libs/wifi
40      - origin: https://github.com/mongoose-os-libs/mqtt
```

**Obrigado! ;)**



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# Referências



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- <https://mongoose-os.com>
- <https://mongoose-os.com/docs/reference/api.html>
- <https://mongoose-os.com/apps.html>
- <https://github.com/mongoose-os-apps>
- <https://github.com/mongoose-os-libs>
- <https://www.youtube.com/channel/UCZ9lQ7b-4bDbL0LpKwjpsAw>