11

O‘N BIRINCHI AMALIY MASHG‘ULOT

Korxona ilovalarini dasturlash · 2 soat · 11-mavzu

Valyuta kurslari va to‘lov webhook integratsiyasi

Jamoa loyihasi bosqichi · 5 ta PHP topshiriq · o‘qituvchi bahosi

HTTP klient | Webhook | Payme / Click | 1C | Message broker

MASHG‘ULOT MAQSADI

Amaliy mashg‘ulot oxirida siz quyidagilarni bajara olasiz...

1. **Yozish** — CbuRateService ni: cbu.uz JSON API dan USD, EUR, RUB kurslarini exchange_rates ga yozish
2. **Rejalashtirish** — kurslarni ish kunlari avtomatik yuklaydigan `rates:fetch` buyrug‘ini
3. **Qo‘llash** — ko‘p valyutali narxlarni: UZS dagi narxni sanaga mos kurs bo‘yicha o‘tkazish va yaxlitlash
4. **Himoyalash** — test to‘lov webhookini HMAC imzo va timestamp bilan
5. **Ta’minlash** — to‘lovni payments.external_id bo‘yicha idempotent qayta ishlashni

Qanday bajariladi va qanday baholanadi?

Ish tartibi

1. Saytga login va parolingiz bilan kiring: **emro.uz/korxona/kirish.html**
2. **11-amaliy** sahifasini oching (oxirgi slayddagi QR kod).
3. Yo‘riqnoma bo‘yicha jamoa loyihasida bosqichni bajaring, **commit** va **push** qiling.
4. PHP topshiriqlarni yeching: ▶ **Sinab ko‘rish** → ✓ **Topshirish** (yashirin testlar).
5. Loyiha havolasini (GitHub repo, PR yoki tag) topshiring — o‘qituvchi **baho** qo‘yadi.

Baholash mezonlari

- **Natija** — loyiha bosqichi mezonlar ro‘yxati bo‘yicha bajarilgan.
- **Topshiriqlar** — PHP topshiriqlar testlardan o‘tgan.
- **Kod sifati** — tushunarli nomlar, PSR-12, kichik va mazmunli commitlar.
- **Jamoaviy hissa** — har bir a’zo o‘z qismini tushuntira oladi.
- **Muddat** — muddatdan keyin topshirilgan ish “kechikkan” deb belgilanadi.

01

CbuRateService va exchange_rates

API javobi · servis · upsert · rates:fetch · jadval

CbuRateService

upsert

rates:fetch

API JAVOBI

cbu.uz JSON elementi (namuna qiymatlar)


```
[
  {
    "id": 69,
    "Code": "840",
    "Ccy": "USD",
    "CcyNm_UZ": "AQSH dollari",
    "Nominal": "1",
    "Rate": "12850.45",
    "Diff": "-12.30",
    "Date": "27.10.2026"
  }
]
```


▶ NATIJA

Kerakli maydonlar: Ccy → currency, Rate / Nominal → rate, Date (dd.mm.yyyy) → date (Y-m-d)

"Rate": "12850.45"

satr ko‘rinishida — decimal sifatida ishlang

"Nominal"

ba’zi valyutalar uchun 10 yoki 100 — bo‘lish shart

"Date"

`dd.mm.yyyy` — `Y-m-d` ga o‘giriladi

SERVIS

CbuRateService::fetch()

```php
public function fetch(): int
{
    $rows = Http::connectTimeout(3)->timeout(10)->retry(3, 500)
        ->get(config('services.cbu.url'))
        ->throw()->collect()
        ->whereIn('Ccy', ['USD', 'EUR', 'RUB'])
        ->map(fn (array $r) => [
            'date' => Carbon::createFromFormat('d.m.Y', $r['Date'])
                ->toDateString(),
            'currency' => $r['Ccy'],
            'rate' => bcdiv($r['Rate'], $r['Nominal'], 4),
        ])->values()->all();

    ExchangeRate::upsert($rows, ['date', 'currency'], ['rate']);

    return count($rows);
}
```

▶ NATIJA

```
SQL: insert into exchange_rates (date, currency, rate) values
(...), (...), (...)
     on conflict (date, currency) do update set rate =
excluded.rate
→ 3
```

`retry(3, 500)`

vaqtinchalik uzilishlarga chidamli

`->throw()`

5xx da istisno — scheduler logida ko‘rinadi

`bcdiv(..., 4)`

bir birlik kursi, 4 xona, float siz

`upsert`

PostgreSQL `ON CONFLICT` — takroriy yuklash dublikat bermaydi

BUYRUQ VA JADVAL

routes/console.php: rates:fetch

```php
use App\Services\CbuRateService;
use Illuminate\Support\Facades\Artisan;
use Illuminate\Support\Facades\Schedule;

Artisan::command('rates:fetch', function (CbuRateService $cbu) {
    try {
        $this->info('Saqlandi: ' . $cbu->fetch() . ' ta kurs');
    } catch (Throwable $e) {
        Log::error('CBU kurslari yuklanmadi: ' . $e->getMessage());
        $this->error('Xato: ' . $e->getMessage());
        return 1;
    }
})->purpose('Markaziy bank kurslarini yuklash');

Schedule::command('rates:fetch')
    ->weekdays()->at('09:30')
    ->timezone('Asia/Tashkent')
    ->withoutOverlapping();
```

▶ NATIJA

```
$ php artisan rates:fetch
Saqlandi: 3 ta kurs
```

`function (CbuRateService $cbu)`

closure buyruqda ham konteyner in’ektsiyasi ishlaydi

`return 1`

xato chiqish kodi — scheduler `onFailure` uni ko‘radi

`withoutOverlapping`

sekin javobda ikki nusxa parallel ishlamaydi

02

Ko‘p valyutali narxlar

Sanaga mos kurs · yaxlitlash · API da valyuta parametri

ExchangeRate

bcmath

ProductResource

MODEL

ExchangeRate::rateFor() — eng yaqin oldingi kurs

```php
public static function rateFor(string $currency, string $date): string
{
    if ($currency === 'UZS') {
        return '1';
    }

    $rate = static::query()
        ->where('currency', $currency)
        ->where('date', '<=', $date)
        ->orderByDesc('date')
        ->value('rate');

    if ($rate === null) {
        throw new DomainException("Kurs topilmadi: $currency, $date");
    }

    return (string) $rate;
}
```

▶ NATIJA

```
ExchangeRate::rateFor('USD', '2026-11-01')   // yakshanba
→ "12850.4500"   (2026-10-30, juma kursi)
```

`date <= $date`

dam olish kunlari oxirgi ish kuni kursi

`orderByDesc + value`

bitta qiymat, bitta so‘rov

DomainException

kurs yo‘q — biznes xatosi, aniq xabar bilan

UZS → valyuta: bcmath bilan yaxlitlash

```php
function fromUzs(string $uzs, string $rate): string
{
    $q = bcdiv($uzs, $rate, 3);      // 3 xona: yaxlitlash uchun
    return bcadd($q, '0.005', 2);    // yarim-yuqoriga, 2 xona
}

echo fromUzs('150000.00', '12850.4500') . ' USD' . PHP_EOL;
echo fromUzs('150000.00', '14010.2200') . ' EUR' . PHP_EOL;
echo fromUzs('150000.00', '158.2700') . ' RUB' . PHP_EOL;
echo bcdiv('150000.00', '12850.4500', 2) . ' (faqat kesish)' . PHP_EOL;
echo 150000 / 12850.45 . ' (float)';
```

▶ NATIJA

```
11.67 USD
10.71 EUR
947.75 RUB
11.67 (faqat kesish)
11.672742977872 (float)
```

`bcdiv(..., 3)`

bitta qo‘shimcha xona bilan bo‘lish

`bcadd($q, '0.005', 2)`

0.005 qo‘shib 2 xonaga kesish = yarim-yuqoriga yaxlitlash

`float`

ko‘rinish chiroyli emas va yig‘indilarda xato to‘planadi

API

ProductController::index — valyuta parametri

```php
public function index(Request $request): AnonymousResourceCollection
{
    $currency = $request->validate([
        'currency' => ['nullable', Rule::in(self::CURRENCIES)],
    ])['currency'] ?? 'UZS';

    $rate = ExchangeRate::rateFor($currency, today()->toDateString());
    $request->attributes->set('fx', [$currency, $rate]);   // bir marta

    return ProductResource::collection(Product::paginate(20))
        ->additional(['meta' => compact('currency', 'rate')]);
}

// ProductResource::toArray() ichida:
// [$cur, $rate] = $request->attributes->get('fx', ['UZS', '1']);
// 'price' => ['amount' => Money::fromUzs($this->price, $rate), ...]
```

▶ NATIJA

```
GET /api/v1/products?currency=USD
{"data":[{"sku":"UN-
001","price":{"amount":"11.67","currency":"USD","uzs":"150000.00"}
}],
 "meta":{"currency":"USD","rate":"12850.4500", ...}}
```

`Rule::in(self::CURRENCIES)`

`UZS`, `USD`, `EUR`, `RUB` dan boshqa valyuta — 422

`attributes->set('fx', ...)`

kurs bir marta olinadi — N+1 yo‘q

`additional(['meta' => ...])`

qaysi kurs bo‘yicha hisoblangani javobda ko‘rinadi

03

Test to‘lov tizimi webhooki

Maxfiy kalit · middleware · marshrut · sinov buyrug‘i · ssenariylar

Webhook | HMAC | external_id

SINOV BUYRUG‘I

testpay:send — imzolangan webhook yuborish

```php
Artisan::command(
    'testpay:send {invoice} {amount} {--id=}',
    function (string $invoice, string $amount) {
        $body = json_encode([
            'id' => $this->option('id') ?: 'tp_' . Str::random(10),
            'event' => 'payment.succeeded', 'invoice' => $invoice,
            'amount' => (int) $amount * 100,          // so‘m → tiyin
        ]);
        $ts = (string) time();
        $key = config('services.testpay.secret');
        $sig = hash_hmac('sha256', "$ts.$body", $key);
        $res = Http::withHeaders([
            'X-TestPay-Timestamp' => $ts, 'X-TestPay-Signature' => $sig,
        ])->withBody($body, 'application/json')
            ->post('http://nginx/api/v1/webhooks/testpay');
        $this->info($res->status() . ' ' . $res->body());
    }
);
```

▶ NATIJA

```
$ php artisan testpay:send HF-2026-000045 1500000 --id=tp_demo1
200 {"status":"processed"}
$ php artisan testpay:send HF-2026-000045 1500000 --id=tp_demo1
200 {"status":"duplicate"}
```

{--id=}

bir xil id ni qayta yuborib idempotentlikni sinash

withBody($body, ...)

aynan imzolangan baytlar yuboriladi

http://nginx

Docker Compose tarmog‘idagi veb-server servisi

MARSHRUT

bootstrap/app.php va routes/api.php

```
// bootstrap/app.php
->withMiddleware(function (Middleware $middleware) {
    $middleware->alias([
        'testpay.signature' => VerifyTestPaySignature::class,
    ]);
})

// routes/api.php
Route::post('v1/webhooks/testpay', TestPayWebhookController::class)
    ->middleware(['testpay.signature', 'throttle:60,1']);
```

▶ NATIJA

```
$ php artisan route:list --path=webhooks
  POST  api/v1/webhooks/testpay ... TestPayWebhookController
```

`alias([...])`

Laravel 12: middleware lar `bootstrap/app.php` da

`routes/api.php`

CSRF va sessiyasiz `api` guruhi

`throttle:60,1`

daqiqasiga 60 so‘rov — endpointni ortiqcha yuklanishdan himoya

SSENARIYLAR

Webhookni sinash jadvali

Ssenariy	Kutilgan javob	Bazadagi natija
To‘g‘ri imzo, to‘liq summa	`200 processed`	1 ta `payments`, status `paid`
Xuddi shu `id` qayta	`200 duplicate`	O‘zgarish yo‘q
Boshqa `id`, qisman summa	`200 processed`	2 ta to‘lov, status `partial` → `paid`
Noto‘g‘ri kalit bilan imzo	`401`	O‘zgarish yo‘q
10 daqiqa oldingi timestamp	`401`	O‘zgarish yo‘q
Mavjud bo‘lmagan faktura	`422` (validatsiya)	O‘zgarish yo‘q
`event = payment.failed`	`200 ignored`	O‘zgarish yo‘q

LOYIHA BOSQICHI

Natija va topshirish

Natija: kurslar har ish kuni cbu.uz dan avtomatik yuklanadi, mahsulot narxlari tanlangan valyutada to‘g‘ri yaxlitlangan holda ko‘rsatiladi, test to‘lov webhooki imzo bilan himoyalangan va takroriy xabarlarni ikki marta hisoblamaydi.

Baholash mezonlari

- ✓ `CbuRateService::fetch()` timeout, retry va `->throw()` bilan; kurs `Rate / Nominal`, decimal ko‘rinishda.
- ✓ `exchange_rates` da `(date, currency)` unique; `rates:fetch` qayta ishga tushirilganda dublikat yo‘q.
- ✓ `rates:fetch` scheduler da ish kunlari, Asia/Tashkent vaqtida.
- ✓ `ExchangeRate::rateFor()` dam olish kunida oldingi kursni qaytaradi, kurs yo‘q bo‘lsa aniq xato.
- ✓ `GET /api/v1/products?currency=USD` to‘g‘ri yaxlitlangan narx va `meta` da kursni qaytaradi, N+1 yo‘q.
- ✓ Webhook middleware xom tana, timestamp va `hash_equals` bilan tekshiradi; kalit `.env` da.
- ✓ Bir xil `id` li webhook ikki marta yuborilganda bitta to‘lov yoziladi va 200 qaytadi.
- ✓ README da sinov ssenariylari jadvali natijalari bilan.

⬆ `feature/integrations` tarmog‘idan ochilgan Pull Request havolasini yuboring; PR tavsifida `rates:fetch` natijasi, `?currency=USD` javobi va webhook ssenariylari jadvalini ko‘rsating.

Telefon kamerasi bilan skanerlang

Loyiha havolasini amaliy sahifasidagi «Loyiha bosqichi» bo‘limida topshiring.

AMALIY TOPSHIRIQ

Kompyuterda mustaqil · Oson · 10 ball

4-topshiriq: CBU javobidan exchange_rates qatorlari

cbu.uz JSON javobi PHP massiviga aylantirilgan: har bir element kamida `Ccy`, `Rate` (satr), `Nominal` (satr) va `Date` (`dd.mm.yyyy`) kalitlariga ega. Faqat `$kerakli` dagi valyutalar uchun `exchange_rates` ga yoziladigan qatorlarni qaytaring: `date` — `Y-m-d`, `currency`, `rate` — **bir birlik** kursi (`Rate / Nominal`) 4 xonali satr ko‘rinishida (`number_format(..., 4, '.', '')`). Natija `currency` bo‘yicha o‘sish tartibida. Sana noto‘g‘ri bo‘lsa — `InvalidArgumentException`, `Nominal` ≤ 0 bo‘lsa — `DomainException`.

Imzo: `function cbu_qatorlar(array $rows, array $kerakli): array`

Qaytaradi: `list<array{date: string, currency: string, rate: string}>`.

MISOL · CHAQIRUV

```
cbu_qatorlar([['Ccy' => 'USD', 'Rate' => '12850.45', 'Nominal' => '1', 'Date' => '27.10.2026'], ['Ccy' => 'JPY', 'Rate' => '841.20', 'Nominal' => '10', 'Date' => '27.10.2026']], ['USD', 'JPY'])
```

MISOL · NATIJA

```
[{"date":"2026-10-27","currency":"JPY","rate":"84.1200"},{"date":"2026-10-27","currency":"USD","rate":"12850.4500"}]
```

Telefon kamerasi bilan skanerlang

1. Saytga kiring (login va parol)
2. PHP kodni yozing va sinab ko‘ring
3. ✓ Topshirish — natija o‘qituvchiga

AMALIY TOPSHIRIQ

Kompyuterda mustaqil · O‘rta · 20 ball

5-topshiriq: Narxni valyutada ko‘rsatish

UZS dagi narx (`$narx`, satr: butun yoki 1–2 kasr xonali, masalan `150000.00`) ni `$valyuta` da ko‘rsating. `$kurslar — valyuta => bir birlik kursi` (satr, 0–4 kasr xona). Natija = narx / kurs, 2 xonagacha **yarim-yuqoriga** yaxlitlanadi; float ishlatmang — summalarni tiyin va kursni 1/10000 birlikda butun songa o‘tkazing. Format: minglik ajratgich — bo‘sh joy, kasr — nuqta, oxirida valyuta kodi: `150 000.00 UZS`, `11.67 USD`. `UZS` uchun narx o‘zi formatlanadi. Narx formati noto‘g‘ri yoki valyuta `$kurslar` da yo‘q (va UZS emas) — `InvalidArgumentException`; kurs formati noto‘g‘ri yoki 0 — `DomainException`.

Imzo: `function narx_valyutada(string $narx, string $valyuta, array $kurslar): string`

Qaytaradi: Formatlangan satr, masalan `11.67 USD`.

MISOL · CHAQIRUV

```
narx_valyutada('150000.00', 'USD', ['USD' => '12850.4500'])
```

MISOL · NATIJA

```
"11.67 USD"
```

Telefon kamerasi bilan skanerlang

1. Saytga kiring (login va parol)
2. PHP kodni yozing va sinab ko‘ring
3. ✓ Topshirish — natija o‘qituvchiga

AMALIY TOPSHIRIQ

Kompyuterda mustaqil · O‘rta · 20 ball

6-topshiriq: Sanaga mos kurs (dam olish kunlari bilan)

CBU dam olish va bayram kunlari kurs e’lon qilmaydi, shuning uchun berilgan sanadagi yoki **undan oldingi eng yaqin** sanadagi kurs olinadi. `$kurslar` — tartiblanmagan ro‘yxat: `['date' => 'Y-m-d', 'currency' => string, 'rate' => string]`. `UZS` uchun har doim `1.0000`. `$sana` `Y-m-d` formatida bo‘lmasa yoki mavjud sana bo‘lmasa (`2026-02-30`) — `InvalidArgumentException`; mos kurs topilmasa — `DomainException`.

Imzo: `function kurs_sanaga(array $kurslar, string $valyuta, string $sana): string`

Qaytaradi: Kurs satri (`rate` qiymati o‘zgarishsiz).

MISOL · CHAQIRUV

```
kurs_sanaga([['date' => '2026-10-30', 'currency' => 'USD', 'rate' => '12850.4500'], ['date' => '2026-10-29', 'currency' => 'USD', 'rate' => '12840.0000']], 'USD', '2026-11-01')
```

MISOL · NATIJA

```
"12850.4500"
```

Telefon kamerasi bilan skanerlang

1. Saytga kiring (login va parol)
2. PHP kodni yozing va sinab ko‘ring
3. ✓ Topshirish — natija o‘qituvchiga

AMALIY TOPSHIRIQ

Kompyuterda mustaqil · Qiyin · 30 ball

7-topshiriq: TestPay webhook protsessori

`WebhookProcessor` to‘lov webhooklarini idempotent qayta ishlaydi. Konstruktor: `$secret` va `$invoices` (`raqam => jami summa tiyinda`). `static sign($body, $secret)` — `hash_hmac('sha256', $body, $secret)`. `handle($body, $signature)` tartib bilan: imzo mos emas — `invalid_signature`; JSON yaroqsiz yoki `id` (bo‘sh bo‘lmagan satr), `event` (satr), `invoice` (satr), `amount` (musbat butun son) noto‘g‘ri — `bad_request`; `event` `payment.succeeded` emas — `ignored`; faktura yo‘q — `unknown_invoice`; shu `id` avval qayta ishlangan — `duplicate`; to‘lov qoldiqdan katta — `overpaid` (yozilmaydi); aks holda summa qo‘shiladi — `processed`. `invoice($raqam)` — `['total', 'paid', 'status']`, status `unpaid` / `partial` / `paid`; faktura yo‘q — `DomainException`.

Imzo: `final class WebhookProcessor`

Qaytaradi: `handle` — holat satri; `invoice` — `['total' => int, 'paid' => int, 'status' => string]`.

MISOL · CHAQIRUV

```
(function () { $p = new WebhookProcessor('k', ['HF-1' => 1000]); $b = '{"id":"a","event":"payment.succeeded","invoice":"HF-1","amount":600}'; $s = WebhookProcessor::sign($b, 'k'); return [$p->handle($b, $s), $p->handle($b, $s), $p->invoice('HF-1')]; })()
```

MISOL · NATIJA

```
["processed","duplicate",{"total":1000,"paid":600,"status":"partial"}]
```

Telefon kamerasi bilan skanerlang

1. Saytga kiring (login va parol)
2. PHP kodni yozing va sinab ko‘ring
3. ✓ Topshirish — natija o‘qituvchiga

AMALIY TOPSHIRIQ

Kompyuterda mustaqil · Qiyin · 30 ball

8-topshiriq: 1C katalogi bilan sinxronlash farqi

1C dan kelgan katalog (`$tashqi: sku => ['name' => string, 'price' => string]`) va OmborPro dagi mahsulotlar (`$mahalliy: sku => ['name' => string, 'price' => string, 'active' => bool]`) berilgan. Sinxronlash rejasini tuzing: `create` — 1C da bor, bizda yo‘q; `update` — ikkalasida bor va nomi farq qiladi, narxi **son sifatida** farq qiladi (`150000` va `150000.00` teng) yoki bizda faol emas (qayta faollashtirish); `deactivate` — bizda faol, 1C da yo‘q (o‘chirilmaydi!). Har bir ro‘yxat o‘sish tartibida. 1C elementida `name` yoki `price` yo‘q yoki narx formati noto‘g‘ri (manfiy, 2 tadan ortiq kasr xona) — `InvalidArgumentException`.

Imzo: `function sinx_farq(array $mahalliy, array $tashqi): array`

Qaytaradi: `['create' => list<string>, 'update' => list<string>, 'deactivate' => list<string>]`.

MISOL · CHAQIRUV

```
sinx_farq(['UN-001' => ['name' => 'Un', 'price' => '150000.00',
'active' => true], 'SH-002' => ['name' => 'Shakar', 'price' =>
'9000', 'active' => true]], ['UN-001' => ['name' => 'Un',
'price' => '150000'], 'YOG-003' => ['name' => 'Yog', 'price' =>
'12000']])
```

MISOL · NATIJA

```
{"create":["YOG-003"],"update":[],"deactivate":["SH-002"]}
```

Telefon kamerasi bilan skanerlang

1. Saytga kiring (login va parol)
2. PHP kodni yozing va sinab ko‘ring
3. ✓ Topshirish — natija o‘qituvchiga

TOPSHIRIQLAR VA TOPSHIRISH

11-amaliy: 8 ta PHP topshiriq

1. **Javobga qarab qaror: ok, retry yoki fail**
   Oson · 10 ball · ma’ruzada

2. **Webhook imzosini tekshirish**
   O‘rta · 20 ball · ma’ruzada

3. **JSON-RPC 2.0 so‘rovini tahlil qilish**
   O‘rta · 20 ball · ma’ruzada

4. **CBU javobidan exchange_rates qatorlari**
   Oson · 10 ball

5. **Narxni valyutada ko‘rsatish**
   O‘rta · 20 ball

6. **Sanaga mos kurs (dam olish kunlari bilan)**
   O‘rta · 20 ball

7. **TestPay webhook protsessori**
   Qiyin · 30 ball

8. **1C katalogi bilan sinxronlash farqi**
   Qiyin · 30 ball

Telefon kamerasi bilan skanerlang

PHP kod saytda yoziladi va server tomonidan avtomatik tekshiriladi.

Loyiha havolasini ham shu sahifada topshirasiz; o‘qituvchi baho qo‘yadi.