

x402 Direct: an agent-initiated commerce layer above x402

x402 settles one signed payment for one resource. Real commerce needs a cart, an identified buyer, and a way to send money back. This paper specifies the three primitives Facet built to close that gap without touching the x402 spec itself, why the gap is real and not already closed by an existing scheme, and how the whole loop was proven end to end on Base mainnet with real USDC.

 PROVEN ON BASE MAINNET

NON-CUSTODIAL

RFC 9421 SIGNED

COMPOSES WITH X402 AND UCP

 SETTLED IN PRODUCTION 2026-07-23

00 ABSTRACT

x402 is an open standard for internet-native payments: a resource server responds `402 Payment Required`, the client resubmits with a signed payment payload, and a facilitator verifies and settles it. Its most widely deployed scheme, `exact`, moves one authorized amount for one resource, once, and by the specification's own account has no built-in mechanism for returning funds. A second scheme, `auth-capture`, does support a refund, but as a scalar amount on one payment, gated by whichever facilitator or contract holds a capture-authorizer role, inside a fixed time window. Neither scheme, nor any other in the spec, defines a multi-item cart, a stateful checkout session, or an identity bound to the payment distinct from the signing wallet. This paper specifies x402 Direct, three primitives layered on top of x402's settlement leg rather than inside it: a signed checkout session that prices a real multi-line cart before any money moves, an agent-facing initiation route that expresses a partial refund, a damaged-goods return, and a full-order cancellation as one primitive with different inputs, and a non-custodial reverse settlement signed by the merchant's own wallet. The full loop, checkout through cancellation, is proven end to end on Base mainnet against a live commerce backend with real USDC, and every claim resolves to a transaction hash or a signature independently verifiable against a published key. The specification anticipated the need for a reverse leg: an `auth-capture` scheme was merged on 2026-05-13, and its reference TypeScript package shipped a client on 2026-05-29. That package states, as of this writing, that it "currently ships the client only" and that "server and facilitator support follow in a later change." The loop documented here settles real value on Base mainnet today, on the `exact` rail, without escrow infrastructure and without any party but the merchant able to sign a refund.

01 WHAT X402 SOLVES, PRECISELY

The x402 flow is short by design. A client requests a resource; the server returns `402` with the terms it accepts; the client signs a payment payload against one of those terms and resubmits; a facilitator verifies the payload and settles it on-chain; the server serves the resource. Four schemes govern how settlement itself behaves: `exact` transfers the stated amount immediately. `upto` transfers up to a client-authorized maximum, settled for actual usage. `batch-settlement` accepts a commitment now and settles it later, in bulk, through a channel, voucher store, or billing cycle, built for volume where per-request on-chain settlement does not make sense. `auth-capture` holds funds in escrow or sends them direct, with a capture-authorizer able to void, capture, or refund inside a deadline.

Every one of the four is a payment scheme: it governs how value moves for a single authorized amount. None defines a cart, an authorization spanning more than one priced line. None defines a checkout session, a stateful object that survives across a quote, a line-item selection, and a settlement. None binds an identity to the request beyond the wallet whose signature the scheme verifies. That is not a gap in the engineering; it is the correct scope for a payment protocol, the same way a card network's authorization message is not supposed to know what is in a shopping cart or who is buying, a merchant's own checkout stack sits on top of the rail for that.

Agent commerce needs that stack too, and it needs the identity to mean something specific: a KYA-equivalent credential the merchant's own server can verify, not just recover a wallet address from a signature.

02 THREE PRIMITIVES, LAYERED ON THE SETTLEMENT LEG

x402 Direct adds three things above x402's settlement leg. None require a change to the x402 spec; each is a layer a resource server and its client agree to speak before the 402 challenge fires.

1. CHECKOUT SESSION

a stateful object, created and completed under RFC 9421 HTTP Message Signatures, that prices an arbitrary number of line items from a live commerce backend (goods, shipping, and jurisdiction-correct tax) before advertising the one exact-scheme payment requirement the client ultimately signs. The cart is negotiated above x402; the money still moves through it, once, for the summed total.

2. AGENT-FACING REFUND AND CANCELLATION INITIATION

one route, signed the same way the checkout was, that a buyer's agent calls to open a ticket against a specific, already-settled order. An optional line-item selection makes it a partial refund; omitting the selection makes it a full-order cancellation; the reason is a string the agent supplies and the merchant reviews, so the same primitive covers a pre-shipping change of mind and a post-delivery damage claim without a separate code path for either.

3. NON-CUSTODIAL REVERSE SETTLEMENT

the merchant's own wallet, the same account that received the original payment, signs the ERC-3009 send-back client-side. The protocol layer verifies the signature, checks it against the order it claims to settle, and relays it through a facilitator. It never holds a key that could sign one.

Order #138 details

Payment via facet. Paid on July 23, 2026 @ 9:53 pm

General

Date created:

2026-07-2321:53

Status:

Processing

Customer:

Guest

Billing

Address:

No billing address set.

Email address:

Shipping

Test Buyer
123 S Lamar Blvd
Austin, TX 78701

Customer provided note:
Facet order a6443a37-ee3e-4d64-b25a-50fa971237d6

Item	Price	Qty	Total	TX Sales Tax
 Birthday & Anniversary Card SKU: HCF-CARD	\$3.00	x 1	\$3.00	\$0.25
Local delivery			\$9.00	-
Items Subtotal:			\$3.00	
Shipping:			\$9.00	
TX Sales Tax:			\$0.25	
Order Total:			\$12.25	
Paid:			\$12.25	
July 23, 2026 via Facet agent settlement				

Facet Refunds

buyer cancelled the order before fulfillment (full refund)Status: requested (2026-07-23T21:57:31.276Z)

Approve

Order actions

Choose an action...

Move to TrashUpdate

Order attribution

OriginUnknown

Customer history

Total orders0

Total revenue\$0.00

Average order value\$0.00

Order notes

Add note

The second primitive, in a real merchant backend. An agent cancelled a settled order over the RFC 9421-signed route, supplying no line selection, so the server derives the entire captured total. It appears in the merchant's own WooCommerce admin as a pending decision with an Approve button. Nothing moves until a human acts, and when they do, the signature comes from the merchant's own wallet, not from Facet. The appended validation report carries the full sequence and the on-chain settlements.

Composition, not a fork. x402 Direct does not modify the exact scheme, does not compete with auth-capture, and does not reimplement the checkout-session or agent-identity concepts that the Universal Commerce Protocol (UCP) already specifies. It is the specific arrangement of UCP checkout sessions, a KYA-equivalent identity credential, and a merchant-signed reverse leg, composed to sit above the exact scheme, the one scheme in the spec that has no reverse leg of its own to conflict with.

03 THE TECHNICAL SPECIFICATION

Every request below is drawn from the real, on-chain-settled run in the companion validation report appended after this paper; the shapes are exactly what shipped, not an illustrative simplification.

Create. POST /ucp/v1/checkout-sessions, RFC 9421 signed. Body: a line-item array (product_id, quantity) and a fulfillment destination. Response: a session id, status ready_for_complete, and a payment_handlers object naming every rail the site has configured, the x402 handler carrying the server-priced pay_to, amount_atomic, network, and EIP-712 domain the client must sign against. The session advertises every rail it has configured and privileges none; a Boson-escrow-only site and an x402-only site both create successfully.

Complete. POST /ucp/v1/checkout-sessions/{id}/complete, RFC 9421 signed, carrying the buyer's ERC-3009 TransferWithAuthorization for the exact amount and domain the create response advertised. Settlement moves the funds and creates the order in the merchant's own commerce backend, buyer wallet stamped on it, in the same call.

Refund or cancel, initiate. POST /ucp/v1/checkout-sessions/refund, RFC 9421 signed, body {order_id, reason, refund_line_items?}. Authorization is bound to the order's real site id server-side, never to the caller's self-asserted identity, so a forged claim of ownership cannot open a ticket on an order it does not own. Moves no money; opens a ticket the merchant can review.

Refund or cancel, approve. The merchant's own client signs an ERC-3009 send-back from its own pay_to to the order's stamped buyer address, for an amount the server derives from the merchant's own commerce order, never from the agent's request. The protocol layer checks signer equals pay_to, destination equals the stamped buyer, and amount equals the derived total, before relaying it to a facilitator.

04 WHERE THIS SITS RELATIVE TO WHAT ALREADY EXISTS

X402 AUTH-CAPTURE

Refund is exercised by a capture-authorizer, a facilitator EOA or an escrow contract, inside a fixed capture and refund deadline. The amount is a scalar tied to one payment. There is no line-item selection, because there is no cart; there is no agent identity distinct from the signing wallet, because the scheme does not define one. Spec merged 2026-05-13. Its reference package ships the client only, with server and facilitator support deferred to a later change, so no settlement path exists in the reference implementation as of 2026-07-23.

X402 DIRECT

Refund and cancellation are opened by an identified agent under a signature bound to a specific site and a specific already-settled order. The amount is derived line by line from the merchant's own commerce backend. Approval is a human merchant decision, signed by the merchant's own wallet, not an automated capture-authorizer acting inside a deadline.

The two are not competing implementations of the same idea. auth-capture is a payment-processor primitive: escrow, timers, a single authorizer role, useful for buyer protection on a payment that has no commerce system behind it. x402 Direct is a commerce-system primitive: it exists because there is a real order, a real merchant backend, and a real reason a human is reviewing. A site could use both, auth-capture for the payment guarantee, x402 Direct for the agent-facing request and the itemized reversal into its own books. The practical difference today is availability: a merchant who wants to give money back on x402 right now cannot wait for escrow settlement to land, and does not have to.

05 SECURITY MODEL

Non-custodial by construction, not by policy. The only two keys that ever sign a money leg are the buyer's, at checkout, and the merchant's own, at refund. The protocol layer verifies signatures; it produces none.

Ownership is bound server-side. A refund ticket is opened against the site the settled order actually belongs to, resolved from the order record, never from a claim the caller's request makes about itself.

The amount is never agent-set. A line-item selection is advisory input, validated against what was actually ordered; the number that gets signed is read from the merchant's own commerce order at approval time.

A shared ledger caps every refund path together. A partial refund, a second partial refund, and a full cancellation on the same order are checked against one running total, so no combination of agent-initiated requests can exceed what was captured.

Replay-proof. Every ERC-3009 authorization carries a single-use nonce consumed on-chain; a facilitator independently re-verifies a signature before broadcasting it.

Reviewed adversarially before shipping. The merchant-signed reverse-settlement path was reviewed across independent attack lenses before its mainnet run, each finding checked by independent review passes; the one real functional gap found (a dead end for a merchant with no managed signer configured) was fixed before merge, not disclosed as a residual risk.

06 WHY THIS BELONGS IN THE OPEN, NOT IN ONE COMPANY'S STACK

x402 Direct is deliberately not a fork, a competing payment scheme, or a reason to leave the spec. It is evidence for a specific, narrow claim: that `exact` plus a checkout-session layer plus an agent-facing initiation route plus a non-custodial reverse leg is enough to run real commerce, cart through cancellation, without a merchant ever handing custody of a refund key to anyone. That claim is falsifiable by exactly the same tools that verify the rest of x402: a transaction hash, a signature, a published key.

The open question worth the Foundation's attention is narrower than a whole new scheme: whether an identity credential distinct from the signing wallet, and a line-item-aware refund initiation bound to a real commerce order, belong as a documented extension pattern above `exact`, the way `auth-capture` documents a different, escrow-based answer to a related but distinct problem. This paper and the validation report it precedes are offered as the worked example.

On precedence, stated carefully because it is checkable. We are not claiming to have invented refunds on x402; the specification's own `auth-capture` scheme describes an escrow-based answer, and it was merged before this work was proven. What we can document is narrower and, we think, more useful: as of 2026-07-23, the reference implementation of that scheme ships a client with server and facilitator support explicitly deferred, and we are not aware of another agent-initiated refund and cancellation loop settling real value on x402 in production. The loop in the appended report did that on Base mainnet, non-custodially, on the `exact` rail. If someone else got there first, the same standard of proof should settle it: a transaction hash, a signature, a published key.

WHAT THIS PAPER CLAIMS, AND WHAT BACKS IT

Every architectural claim above is proven, not asserted, in the companion validation report: a real 2-item cart settled on Base mainnet through a signed checkout session, a partial refund by line selection, a post-delivery damaged-goods return, and a full-order agent-initiated cancellation, each signed by the merchant's own wallet, each independently verifiable on-chain.

07 REFERENCES

1. x402 Foundation. x402 protocol specification. github.com/x402-foundation/x402-specs/.
2. x402 Foundation. Scheme: `exact`. [specs/schemes/exact/](https://github.com/x402-foundation/x402-specs/blob/main/specs/schemes/exact/).
3. x402 Foundation. Scheme: `auth-capture`. [specs/schemes/auth-capture/scheme_auth_capture.md](https://github.com/x402-foundation/x402-specs/blob/main/specs/schemes/auth-capture/scheme_auth_capture.md) and [scheme_auth_capture_evm.md](https://github.com/x402-foundation/x402-specs/blob/main/specs/schemes/auth-capture/scheme_auth_capture_evm.md).
4. x402 Foundation. Scheme: `upto`. [specs/schemes/upto/scheme_upto.md](https://github.com/x402-foundation/x402-specs/blob/main/specs/schemes/upto/scheme_upto.md).
5. x402 Foundation. Scheme: `batch-settlement`. [specs/schemes/batch-settlement/scheme_batch_settlement.md](https://github.com/x402-foundation/x402-specs/blob/main/specs/schemes/batch-settlement/scheme_batch_settlement.md).
6. Base. commerce-payments contract stack (AuthCaptureEscrow). [github.com/base-commerce-payments](https://github.com/base-commerce/payments).
7. Universal Commerce Protocol. Specification and documentation. github.com/Universal-Commerce-Protocol/ucp.
8. Circle. USDC EIP-3009 `transferWithAuthorization` / `receiveWithAuthorization`.
9. IETF. RFC 9421, HTTP Message Signatures.
10. Facet, LLC. x402 Direct mainnet validation: UCP-signed checkout, merchant-approved refund, and agent-initiated cancellation on Base mainnet. Appended after this paper.



x402-direct, UCP-signed, USDC on
Base

REFUND AND CANCELLATION VALIDATION, BASE
MAINNET
2026-07-23

Facet x402-direct: UCP-signed checkout, merchant-approved refund, and agent-initiated cancellation on Base mainnet

A real 2-item cart settles over x402, and every money-return path an agent can invoke on it (a partial refund by line selection, a post-delivery damaged-goods return, and a full-order cancellation) runs through one RFC 9421-signed agent-facing primitive and one merchant-signed send-back. Every claim below resolves to a transaction hash on Base mainnet or a signature you can verify against the published key.

3 OF 3 MONEY-RETURN LEGS PROVEN

BASE MAINNET, CHAIN 8453

RFC 9421 SIGNED

NON-CUSTODIAL

GASLESS

SETTLED 2026-07-23

00 SETUP: ALL PUBLIC, ALL ON-CHAIN

Merchant: Pecan and Petal, a live WooCommerce store on the Facet Terminal at `pecanandpetal.facet.llc`. Rail: `coin/usdc-base` (x402-direct). Network: Base mainnet, chain 8453, real USDC at `0x833589fCD6eDb6E08f4c7C32D4f71b54bdA02913`. Merchant receiving wallet (the x402 `pay_to`): `0x0BE0574bD5Fbd20E6187e6f3B6A889791699CcC3`, a plain externally owned account the merchant controls directly, not a Facet-operated key. Buyer wallet: `0xC0D344C8D10F5f9C64Cb96148FcF176BA170D21E`.

Gasless throughout. The buyer signs to buy; the merchant signs to refund. Neither ever holds ETH or pays gas. A facilitator relayer submits every ERC-3009 `transferWithAuthorization` on-chain and pays the gas, on the purchase leg and on every refund leg below.

01 WHAT BASE X402 IS, AND WHAT SITS ON TOP OF IT

x402 is an open, HTTP-native payment protocol: a server responds `402 Payment Required` with the terms of a single resource, the client resubmits with a signed `X-PAYMENT` header carrying an ERC-3009 authorization, and a facilitator verifies and settles it on-chain. That primitive is exactly what it needs to be: one payment, for one resource, at request time.

No scheme in the spec (`exact`, `upto`, `batch-settlement`, or `auth-capture`) defines a cart, more than one line item under one authorization, or a checkout session, a stateful negotiation between quote and settlement. None binds an agent identity distinct from the wallet that signs.

The rail this report settles on is `exact`, and by the spec's own account it "has no built-in mechanism for returning funds" once settled. A separate scheme, `auth-capture`, does support a refund, but as a scalar amount on one payment, exercised by whichever facilitator or escrow contract holds the `captureAuthorizer` role, inside a fixed capture and refund deadline. It has no concept of a line-item selection against a real commerce order, and no concept of an agent distinct from the signer. Its reference implementation also ships the client only as of this writing, with server and facilitator support deferred to a later change, so it offers no settlement path today.

Every leg below is x402 settlement underneath. What sits on top, and what this report proves end to end, is four additions: a real multi-item cart negotiated through a signed checkout session (UCP `checkout-sessions`); an agent identity bound to a specific site by that same signature, not a forgeable claim; one agent-facing initiation route that expresses a partial refund, a damaged-goods return, and a full-order cancellation as the same primitive with different inputs; and a reverse settlement signed by the merchant's own wallet that Facet only relays, never holds.

02 THE CHECKOUT: A REAL 2-ITEM CART, UCP-SIGNED, REAL USDC

An autonomous agent creates a checkout session for two SKUs (a \$3 card and a \$15 flower arrangement), the Terminal prices the landed total from a live quote (goods, shipping, and Texas sales tax), and the agent completes it with the buyer's own payment authorization. The `CREATE` and `COMPLETE` requests are each independently signed by Facet's platform key under RFC 9421; the money authorization is the buyer's own ERC-3009 signature, never Facet's.

CART
HCF-CARD x 1 (\$3.00) + HCF-BDAY x 1 (\$15.00) = \$18.00 goods + \$9.00 delivery + \$1.49 Texas sales tax =
\$28.49 LANDED
, advertised by the checkout session and matched exactly by the on-chain charge.

CHECKOUT SESSION
941f29a3-712f-4055-b60a-31594cd2251b, status ready_for_complete, advertised pay_to 0x0be0574b..., advertised amount 28490000 atomic USDC.

SETTLE
tx 0x20d5e6084ea6c3798057d2139dd392fe5aaa01462f48e843dbc197cb4b763d6c, block 48999141, \$28.49 USDC buyer to merchant, status success. Creates a real WooCommerce order (order 135), buyer wallet stamped on the order for the refund legs below.

BUYER IDENTITY
a single-use Facet KYA (ES256 JWT, type kya+jwt, issuer issuer.facet.llc), fresh per call, expired minutes after issuance.

Item	Price	Qty	Total	TX Sales Tax
 Birthday & Anniversary Card SKU: HCF-CARD	\$3.00	x 1	\$3.00	\$0.25
 Birthday Flower Arrangement SKU: HCF-BDAY	\$15.00	x 1	\$15.00	\$1.24
 Local delivery			\$9.00	—

Items Subtotal:

\$18.00

Shipping:

\$9.00

TX Sales Tax:

\$1.49

Order Total:

\$28.49

Paid:

\$28.49

July 23, 2026 via Facet agent settlement

Refund

This order is no longer editable.

The settled cart in the merchant's own WooCommerce backend. Both SKUs on their own lines with per-line Texas tax (\$0.25 on the card, \$1.24 on the arrangement), Local delivery as a real shipping line at \$9.00, and an Order Total of \$28.49 that matches the on-chain charge to the cent. Paid via Facet agent settlement.

03 PARTIAL REFUND BY LINE SELECTION: THE CARD, PRE-SHIPPING

The agent requests a refund of exactly one line (product HCF-CARD, quantity 1) over the same RFC 9421-signed agent-facing route the checkout used. The Terminal derives the taxed line amount from the merchant's own order, the

merchant reviews and approves, and the merchant's own wallet, the same account that received the purchase, signs the send-back. Facet relays a signature it never held the key to.

TICKET

b7c7c94a-4d59-45ea-ba17-0ab7775f1764 , reason "buyer requested a partial refund (card line)".

SEND-BACK

tx 0x66e658fda738384f7f558e7428241e5e91457fb95e8a2eca0bc6f995d8b7efee , block 49024328, \$3.25 USDC (the \$3.00 line plus its \$0.25 tax) merchant to buyer, status success.

LEFT CAPTURED

the flower line and the \$9.00 delivery fee.

Order #135 details

Payment via facet. Paid on July 23, 2026 @ 6:20 am

General

Date created:

2026-07-23 @ 06 : 20

Status:

Processing

Customer:

Guest

Billing

Address:

No billing address set.

Email address:

Shipping

Test Buyer
123 S Lamar Blvd
Austin, TX 78701

Customer provided note:
Facet order 009c52db-2c12-4b9b-b28d-56484108062d

Facet Refunds

buyer requested a partial refund (card line)Status: requested (2026-07-23T14:49:22.148Z)

Approve

Order actions

Choose an action...

Move to TrashUpdate

Order attribution

Origin
Unknown

Customer history

Total orders 1

Total revenue \$28.49

Average order value \$28.49

Order notes

Add note

Visibility

Item	Price	Qty	Total	TX Sales Tax
 Birthday & Anniversary Card SKU: HCF-CARD	\$3.00	x 1	\$3.00	\$0.25
 Birthday Flower Arrangement SKU: HCF-BDAY	\$15.00	x 1	\$15.00	\$1.24
 Local delivery			\$9.00	-
			Items Subtotal:	\$18.00
			Shipping:	\$9.00
			TX Sales Tax:	\$1.49
			Order Total:	\$28.49
			Paid:	\$28.49

July 23, 2026 via Facet agent settlement

The agent's request, in the merchant's backend, awaiting a human decision. The Facet Refunds panel shows "buyer requested a partial refund (card line)", status requested, with an Approve button. This is the approval gate: the agent opened the ticket, and nothing moves until the merchant acts.

Item	Price	Qty	Total	TX Sales Tax
 Birthday & Anniversary Card SKU: HCF-CARD	\$3.00	× 1	\$3.00	\$0.25
			↪ -\$3.00	↪ -\$0.25
 Birthday Flower Arrangement SKU: HCF-BDAY	\$15.00	× 1	\$15.00	\$1.24
 Local delivery			\$9.00	-
 Refund #136 - July 23, 2026, 8:20 pm by facetadmin Facet refund b7c7c94a-4d59-45ea-ba17-0ab7775f1764: buyer requested a partial refund (card line)			- \$3.25	
Items Subtotal:				\$18.00
Shipping:				\$9.00
TX Sales Tax:				\$1.49
Order Total:				\$28.49
Paid:				\$28.49
July 23, 2026 via Facet agent settlement				
Refunded:				-\$3.25
Net Payment:				\$25.24
Refund	🔒 This order is no longer editable.			

After approval. Only the card line reverses, and its tax reverses with it (minus \$3.00 and minus \$0.25 in red). The arrangement and the \$9.00 delivery stay captured. Refund #136 records the Facet refund id. Net Payment \$25.24, matching the \$3.25 send-back on-chain.

04 POST-DELIVERY DAMAGED RETURN: THE ARRANGEMENT, AFTER SHIPPING

The identical route and the identical merchant wallet handle a second, independent reason on the same order: the flower arrangement arrived damaged. Nothing about the mechanism changes between a pre-shipping change of mind and a post-delivery damage claim. The reason is a string the agent supplies; the money path is the same primitive.

TICKET 327c3094-56ba-4b3c-a2ad-b2a516ed38b6 , reason "delivered damaged: arrangement arrived wilted".
SEND-BACK tx 0x63b0660bf0e828d78198b0c9dad31634b6329cbdec327278ce59df65a3f3c1 , block 49026760, \$16.24 USDC (the \$15.00 line plus its \$1.24 tax) merchant to buyer, status success.
SIGNATURE CAPTURE issued over the same RFC 9421-signed route, from the same platform key, as the other two requests in this report. The raw request bytes for this specific call were not retained in this run; the ticket record and the on-chain settlement above are independently verifiable without them.

Order #135 details

Payment via facet. Paid on July 23, 2026 @ 6:20 am

General

Date created:

2026-07-23

@

06

:

20

Status:

Processing

Customer:

Guest

Billing

Address:

No billing address set.

Email address:

Shipping

Test Buyer
123 S Lamar Blvd
Austin, TX 78701

Customer provided note:
Facet order 009c52db-2c12-4b9b-b28d-56484108062d

Facet Refunds

delivered damaged: arrangement arrived wiltedStatus: requested (2026-07-23T21:04:39.027Z)

Approve

Order actions

Choose an action...

Move to Trash

Update

Order attribution

Origin
Unknown

Customer history

Total orders 1

Total revenue \$28.49

Average order value \$28.49

Order notes

Add note

Visibility

Item	Price	Qty	Total	TX Sales Tax
 Birthday & Anniversary Card SKU: HCF-CARD	\$3.00	x 1	\$3.00	\$0.25
			- \$3.00	- \$0.25
 Birthday Flower Arrangement SKU: HCF-BDAY	\$15.00	x 1	\$15.00	\$1.24
 Local delivery			\$9.00	-
 Refund #136 - July 23, 2026, 8:20 pm by facetadmin Facet refund b7c7c94a-4d59-45ea-ba17-0ab7775f1764: buyer requested a partial refund (card line)			- \$3.25	
				Items Subtotal: \$18.00
				Shipping: \$9.00
				TX Sales Tax: \$1.49
				Order Total: \$28.49

The second, independent request on the same order. "delivered damaged: arrangement arrived wilted", status requested, awaiting approval, with the earlier card refund already recorded below it. Same route, same primitive, different reason, and a second open ticket on an order that already had one.

Item	Price	Qty	Total	TX Sales Tax
 Birthday & Anniversary Card SKU: HCF-CARD	\$3.00	× 1	\$3.00	\$0.25
			↪ -\$3.00	↪ -\$0.25
 Birthday Flower Arrangement SKU: HCF-BDAY	\$15.00	× 1	\$15.00	\$1.24
			↪ -\$15.00	↪ -\$1.24
 Local delivery			\$9.00	-
 Refund #137 - July 23, 2026, 9:41 pm by facetadmin Facet refund 327c3094-56ba-4b3c-a2ad-b2a516ed38b6: delivered damaged: arrangement arrived wilted			-\$16.24	
 Refund #136 - July 23, 2026, 8:20 pm by facetadmin Facet refund b7c7c94a-4d59-45ea-ba17-0ab7775f1764: buyer requested a partial refund (card line)			-\$3.25	
Items Subtotal:				\$18.00
Shipping:				\$9.00
TX Sales Tax:				\$1.49
Order Total:				\$28.49
Paid:				\$28.49
July 23, 2026 via Facet agent settlement				
Refunded:				-\$19.49
Net Payment:				\$9.00
Refund				🔒 This order is no longer editable.

Both lines reversed, shipping retained. Card minus \$3.00 / minus \$0.25 and arrangement minus \$15.00 / minus \$1.24, each with its own tax. Refund #137 and Refund #136 both carry their Facet refund ids and reasons. Refunded \$19.49, Net Payment \$9.00, exactly the delivery fee.

Order 135, fully reconciled. Settled \$28.49. Refunded \$3.25 plus \$16.24 equals \$19.49, across two independent, agent-initiated requests. Net kept by the merchant: \$9.00, exactly the delivery fee, because both refunds excluded the shipping line by construction.

05 AGENT-INITIATED CANCELLATION: A FULL ORDER, BEFORE FULFILLMENT

A cancellation is the same route with the line selection omitted rather than populated: no line items at all, so the Terminal derives the entire captured total, shipping included, rather than one line. This is a second, freshly settled order, cancelled by the buyer's agent before fulfillment and approved by the same merchant wallet.

ORDER

Woo order 138, a single-item purchase (HCF-CARD x 1, \$3.00 goods + \$9.00 delivery + \$0.25 tax = \$12.25 landed), settled the same way as section 02.

TICKET

180b65b3-2808-4489-8cf5-f44932596b1a, reason "buyer cancelled the order before fulfillment (full refund)", no line selection supplied.

SEND-BACK

tx 0x0370b28b629336725be8f72f7657ae3955262365442be57127fd06408e6731e9, block 49027308, \$12.25 USDC, the full captured total including delivery, merchant to buyer, status success.

Order #138 details

Payment via facet. Paid on July 23, 2026 @ 9:53 pm

General

Date created:

2026-07-23

@

21

:

53

Status:

Processing

Customer:

Guest

Billing

Address:

No billing address set.

Email address:

Shipping

Test Buyer
123 S Lamar Blvd
Austin, TX 78701

Customer provided note:
Facet order a6443a37-ee3e-4d64-b25a-50fa971237d6

Item	Price	Qty	Total	TX Sales Tax
 Birthday & Anniversary Card SKU: HCF-CARD	\$3.00	x 1	\$3.00	\$0.25
 Local delivery			\$9.00	-
			Items Subtotal:	\$3.00
			Shipping:	\$9.00
			TX Sales Tax:	\$0.25
			Order Total:	\$12.25
			Paid:	\$12.25
July 23, 2026 via Facet agent settlement				

Facet Refunds

buyer cancelled the order before fulfillment (full refund)Status: requested (2026-07-23T21:57:31.276Z)

Approve

Order actions

Choose an action...

Move to TrashUpdate

Order attribution

OriginUnknown

Customer history

Total orders0

Total revenue\$0.00

Average order value\$0.00

Order notes

Add note

The cancellation request. "buyer cancelled the order before fulfillment (full refund)", status requested, on a separate order settled minutes earlier. No line selection was supplied, so the server derives the entire captured total.

Item	Price	Qty	Total	TX Sales Tax
 Birthday & Anniversary Card SKU: HCF-CARD	\$3.00	× 1	\$3.00	\$0.25
			↪ -\$3.00	↪ -\$0.25
 Local delivery			\$9.00	-
			↪ -\$9.00	
 Refund #143 - July 23, 2026, 11:33 pm by facetadmin Facet refund 180b65b3-2808-4489-8cf5-144932596b1a: buyer cancelled the order before fulfillment (full refund)			-\$12.25	
Items Subtotal:				\$3.00
Shipping:				\$9.00
TX Sales Tax:				\$0.25
Order Total:				\$12.25
Paid:				\$12.25
July 23, 2026 via Facet agent settlement				
Refunded:				-\$12.25
Net Payment:				\$0.00
Refund				 This order is no longer editable.

A full cancellation returns the shipping line too. Card minus \$3.00 / minus \$0.25 and Local delivery minus \$9.00, which the partial refunds above deliberately left captured. Refund #143, Refunded \$12.25, Net Payment \$0.00.

Order 138, fully reconciled. Settled \$12.25. Refunded \$12.25. Net kept by the merchant: \$0.00. A cancellation returns everything a partial refund does not, because there is no line selection to exclude the shipping line.

06 THE SIGNATURE INVENTORY: NOTHING IS UNSIGNED

Every leg below carries a real signature, quoted verbatim from the actual request or transaction. The RFC 9421 signatures verify against Facet's published platform key for this run (P-256, ES256), reproduced at the end of this section; the money-leg signatures are embedded in the on-chain transactions and independently verifiable on BaseScan.

LEG	ORDER	PLATFORM SIGNATURE, RFC 9421, ES256	MONEY AUTHORIZATION, SECP256K1, ON-CHAIN
Checkout CREATE	135	created=1784787625; keyid="facet-ucp-platf orm-validation-2026" sig1=:8UBB3txg9L/fK+nDMzgWqp6Y5zz5kEq+NPAc pyaP0id+awGNtt+MyEkqfEL5Si2pLLuYanm+MgeEbV 9JLx0hIQ==:	none, cart pricing only, no money leg
Checkout COMPLETE	135	created=1784787627; keyid="facet-ucp-platf orm-validation-2026" sig1=:iQaRx1ekcJM/iaHS7iNPtePlyZ/0jcGG2d86 pTe46me+1ebD+LymPhgzSLgXoLx4l8cR6qhkipqDmu QBC0PKXw==:	buyer ERC-3009: 0x2097f259bf4be44a404c695c180fce4b80 b815c0c9603e29dc34d54510f9e8084c5be9726f22874579cd6af4 11313bbca55281cdd9c7f6d947909e9dadbad6381b , settled tx 0x20d5e608...
Refund request, card	135	created=1784818161; keyid="facet-ucp-platf orm-validation-2026" sig1=:8mgHzh0zM3z30KmAAnNUdeMR4ZgCzNIR1EKK/ UZ8mLr/fLMyl60LMhv9dNxsBVQNCvNis0AwYfJ7Ex CZI5DWsg==:	merchant ERC-3009 send-back, tx 0x66e658fd...d8b7e fee

Refund request, flowers	135	same route, same platform key as above (bytes not retained for this call)	merchant ERC-3009 send-back, tx 0x63b0660b...5a3f3c1
Refund request, full cancel	138	created=1784843850; keyid="facet-ucp-platform-validation-2026" sig1=:oMccbYAGAsGc0XMhg6m6yBTuHjux+US6pDffVCzqh0NzTbgq2Fx2SB4o9sbtfterGPKhNdMou4uKCCl01/FYIg=:	merchant ERC-3009 send-back, tx 0x0370b28b...6731e9

Independently verifiable. Platform public key for this run, EC P-256, published alongside every signed request: kid facet-ucp-platform-validation-2026, x=iinBe3_n_wSECRxyawkm04ufk90scc58Ka4cK3vLLM, y=i68drm5xsC21PZ7_7zplfJKRpta0sB6w8lu_XHbDKU . Every ERC-3009 signature above recovers to its stated signer under standard ecrecover; every transaction hash resolves on basescan.org.

07 GUARANTEES: WHY THE AGENT CONTROLS NO MONEY

The refund signer must equal the merchant's own pay_to. Checked before anything is signed, so a send-back can only ever move funds out of the wallet that received the original purchase. It cannot be pointed at a different wallet, and Facet holds no key that could sign one anyway.

The destination is the order's stamped buyer wallet. Never a field in the agent's request. An agent can propose which line to refund; it cannot propose where the money goes.

The amount is server-derived, never agent-set. The taxed total is read from the merchant's own commerce order at approval time. A partial selection is advisory input, validated against the ordered line items; the number that gets signed comes from the merchant's own books.

A shared budget ledger caps every refund path together, per order. A card partial, a flowers partial, and a would-be third claim on the same order are all checked against one running total, so no combination of requests can ever exceed what was captured.

The ERC-3009 nonce is single-use on-chain. A captured send-back signature cannot be replayed; the facilitator independently re-verifies the signature before broadcasting.

Gasless on every leg. The buyer signs to buy, the merchant signs to refund, and a relayer broadcasts and pays gas both ways.

08 SUMMARY AND HOW TO VERIFY

Three independent money-return requests, one mechanism: a partial refund by line selection, a post-delivery damaged-goods return, and a full-order agent-initiated cancellation, each opened by the buyer's agent under an RFC 9421-signed request bound to the real site, each approved and signed by the merchant's own wallet, each settled gaslessly on Base mainnet with real USDC. To verify independently: look up each transaction hash above on basescan.org and confirm sender, recipient, and amount; recompute each RFC 9421 signature against the published platform key; confirm 0x0BE0574bD5Fbd20E6187e6f3B6A889791699CcC3 is a plain externally owned account (empty eth_getCode) and not a contract Facet or anyone else controls.

WHAT THIS PROVES

Non-custodial. The buyer's wallet and the merchant's own receiving wallet are the only parties that ever hold funds or sign a money leg; Facet relays signatures it verifies but never produces. **One primitive, three capabilities.** Partial refund, damaged-goods return, and full-order cancellation are the same agent-facing route with a different line selection, not three separate code paths. **Real money, real merchant, real agent.** Every leg above ran on Base mainnet against a live WooCommerce store with production inventory, not a simulated environment.