

— **AUTOMATISATION
DE L'IRRIGATION**

Par Emmanuel Coutlee et
Noé Alcantar

 **HORTAU**®

— Les présentateurs

Noé Alcantar

- Développeur backend
- 10 mois chez Hortau, 5 ans auparavant chez Ubéo
- Baccalauréat en technologies de l'information à l'Université Technologique de León (UTL)
- Passionné du code, de l'innovation et de l'optimisation des services à travers de la technologie.
- Aime transmettre ses connaissances à tous ceux qui s'intéressent à en savoir plus.



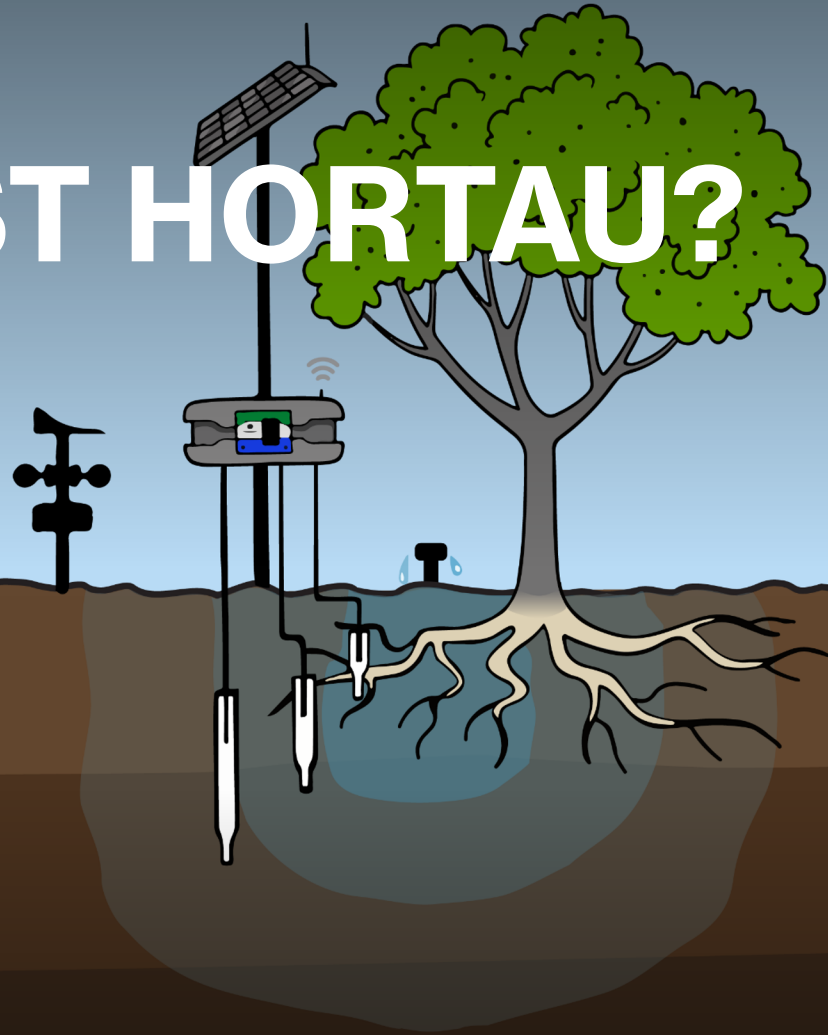
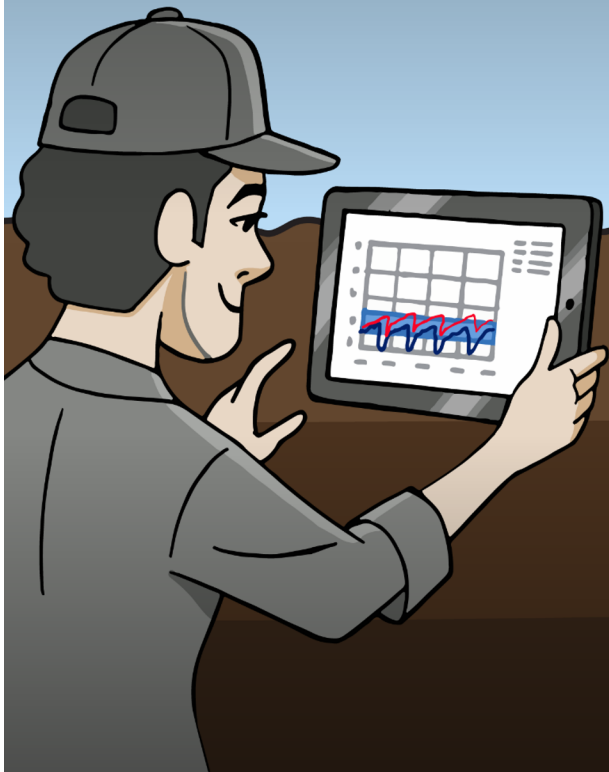
— Les présentateurs

Emmanuel Coullée:

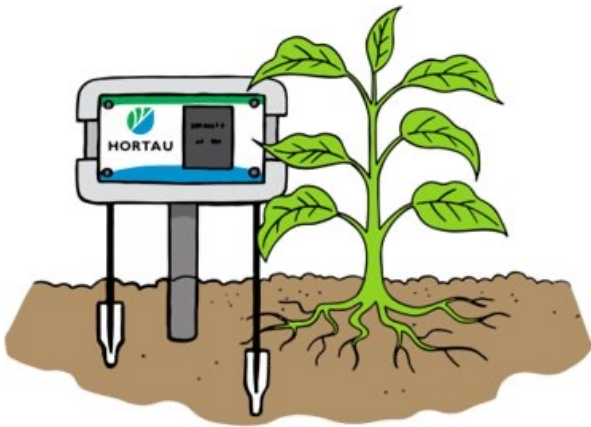
- Développeur full-stack, 5 ans chez Hortau
- Baccalauréat en informatique (IFT) à l'Université Laval
- Maîtrise en informatique – Intelligence Artificielle à l'Université Laval
- Aime en apprendre toujours plus sur les nouvelles technologies



QUI EST HORTAU?



Spécialiste de l'internet des objets en agriculture





 HORTAU

Une flotte importante d'appareils

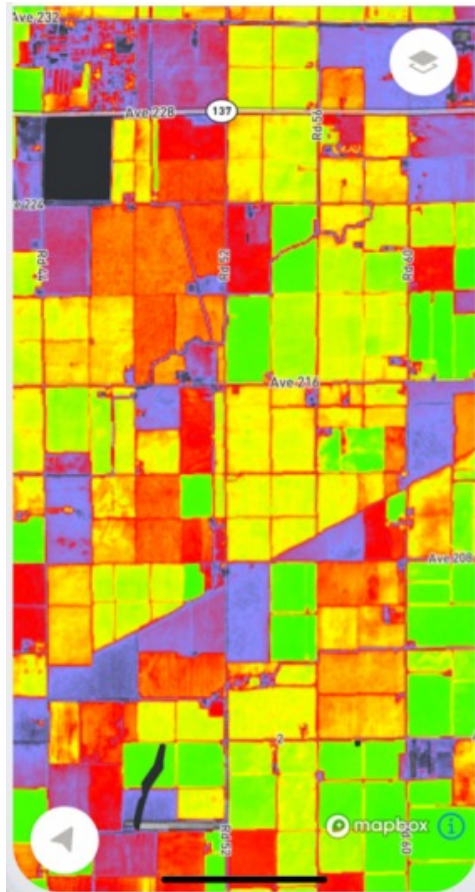


1300+
FERMES

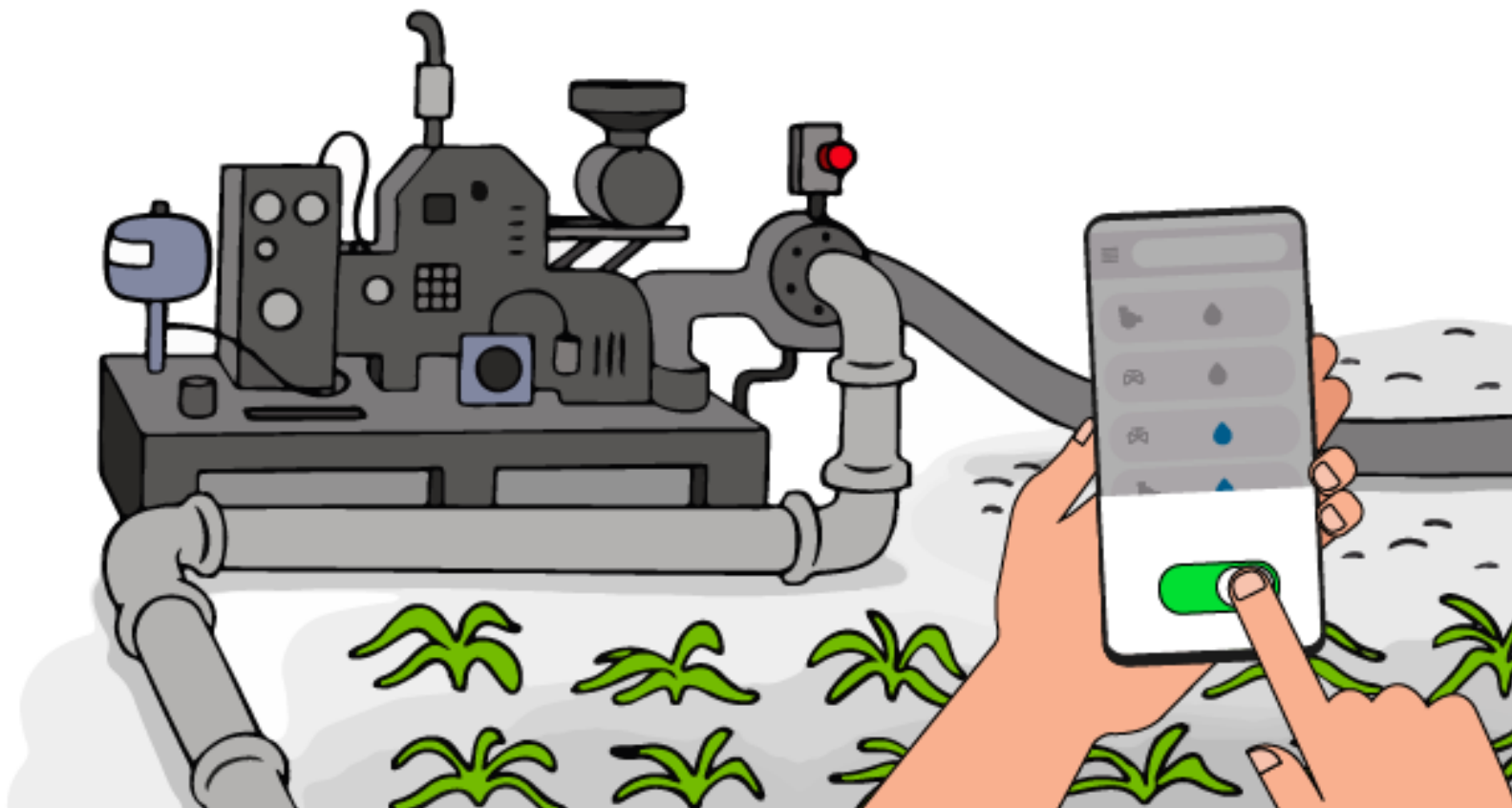


7000+
STATIONS

Objectif: des données et outils utiles à l'agriculteur

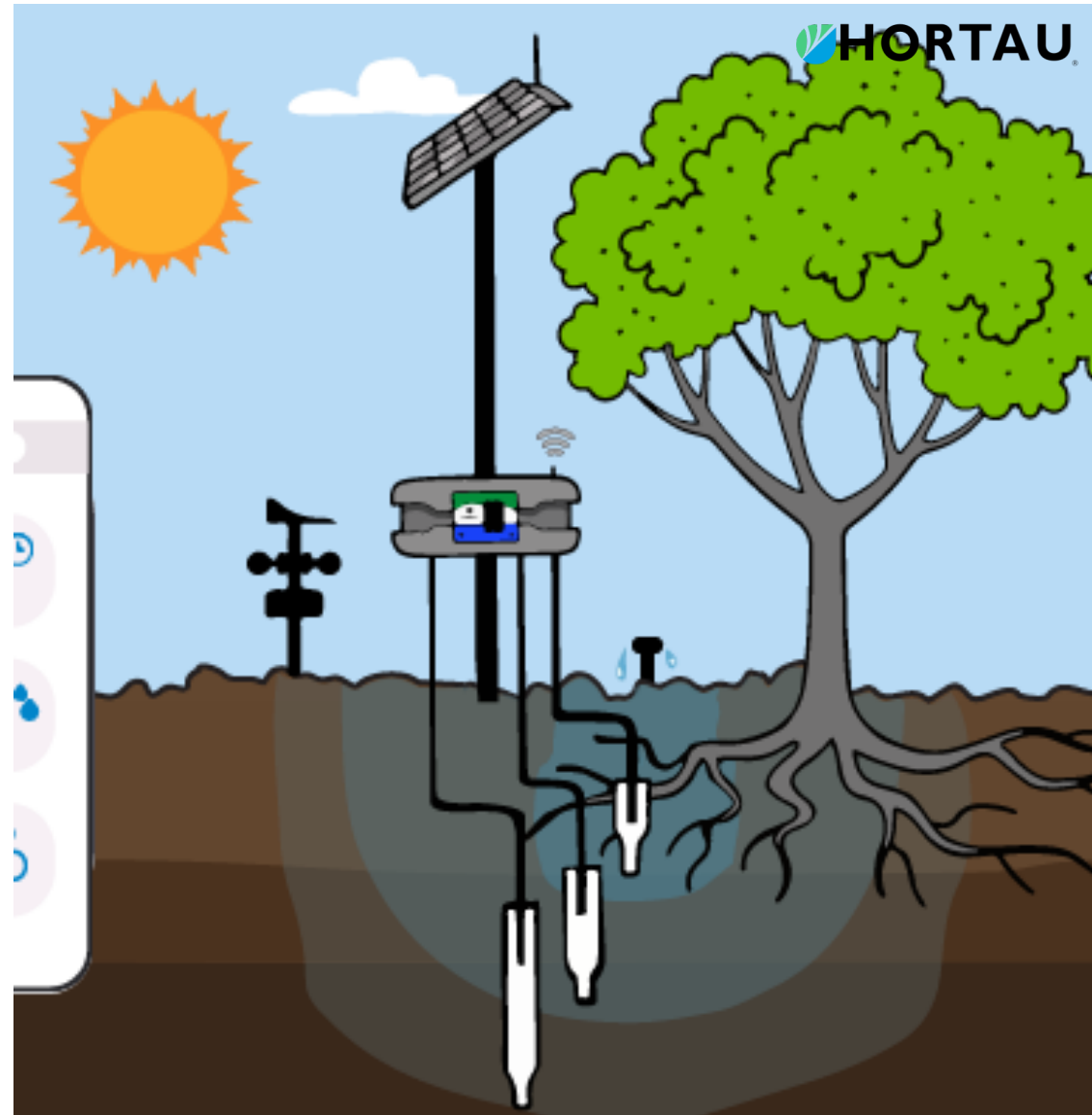


L'automatisation: l'idée



L'automatisation: pas si facile

- Connexion réseau
- Gestion de plusieurs champs
- Beaucoup d'équipements à gérer
- Bris matériels
- Contraintes clients

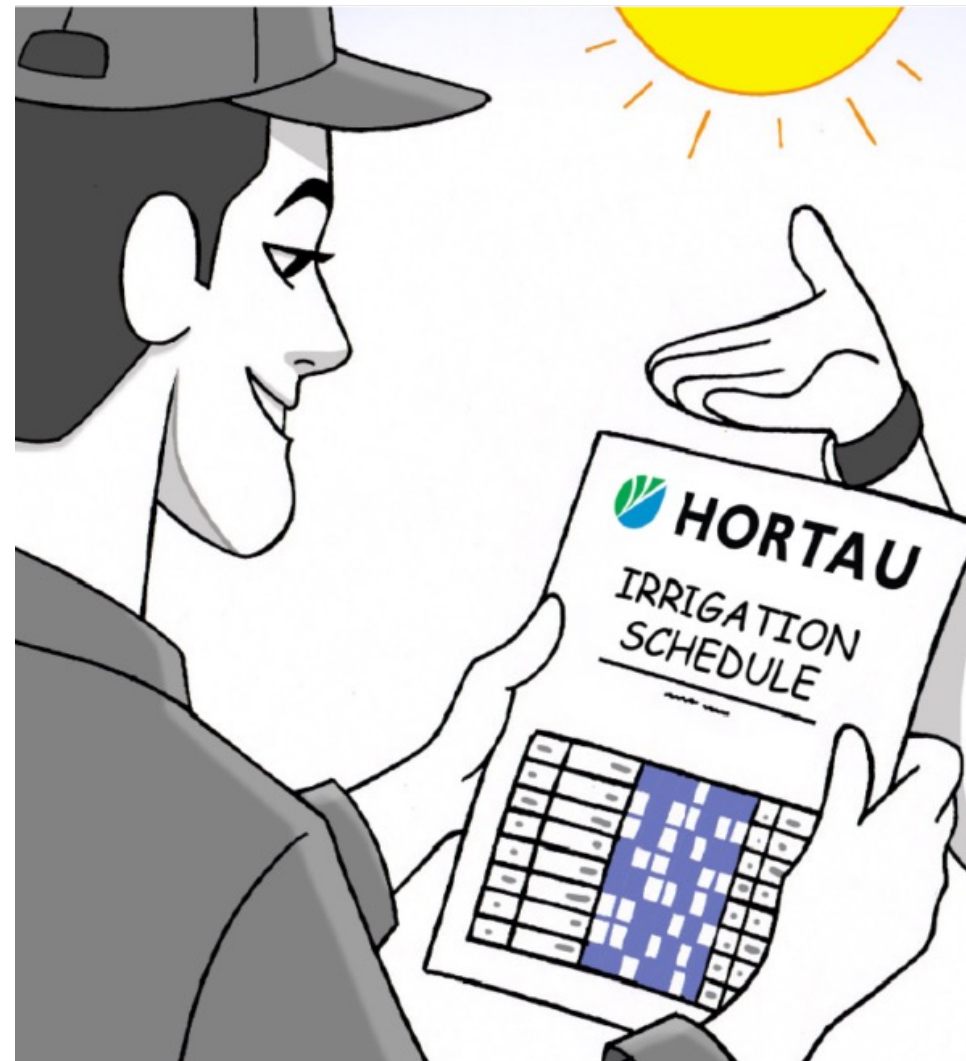


Cycle d'automatisation de l'irrigation



Automatisation: différents cas d'utilisation

- Planification de l'irrigation
- Protection contre les températures extrêmes
- Gestion par l'application
- Gestion de système complexe



Automatisation par calendrier

Schedule

SCHEDULE VIEW DAY VIEW Advance Mode

SCHEDULE 13-19 sept GO TO TODAY

	M 13	T 14	W 15	T 16	F 17	S 18	S 19
Weather Forecast					39°F 60°F Rain: 0.3" Wind: 1 mph	39°F 60°F Rain: 0" Wind: 1 mph	39°F 60°F Rain: 0" Wind: 1 mph
Group pump A							
Chardonnay Second Valley A1	8h 8h						
Chardonnay Second Valley A2	8h 8h				4h		
Sauvignon Blanc White Revolution A3		8h 6h30					
Group pump B							
Semillion Beringer B1	2h15 4h20				8h		





*16 days weather forecast data is provided by [OpenWeather](#)

Automatisation par senseur

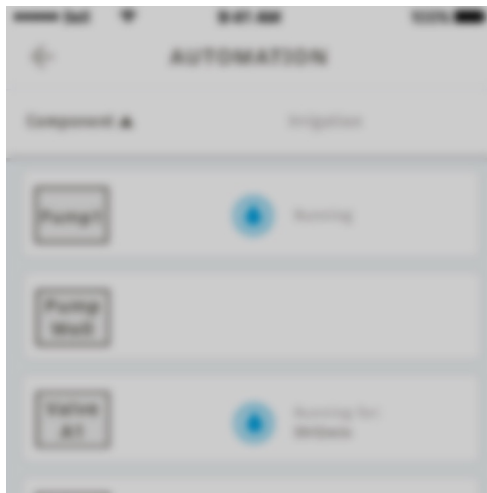
Dashboard > Settings

Settings

ALERTS BLOCKS **AUTOMATION** EXPORT SYSTEM HEALTH

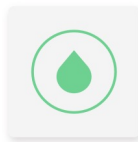
Type	Name	Components	Stop Start	Status
 Frost	Spring Frost	5	4°C 2°C	Enabled
 Heat	Summer Rules	2	28°C 32°C	Enabled
 Empty	Overflow rules	1	1.9m 2.0m	Disabled
 Fill	Empty reservoir rules	1	1.9m 1.1m	Enabled

Automatisation Manuelle

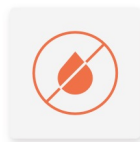


Pump1 Pump1 *Last update: 1 minute ago*

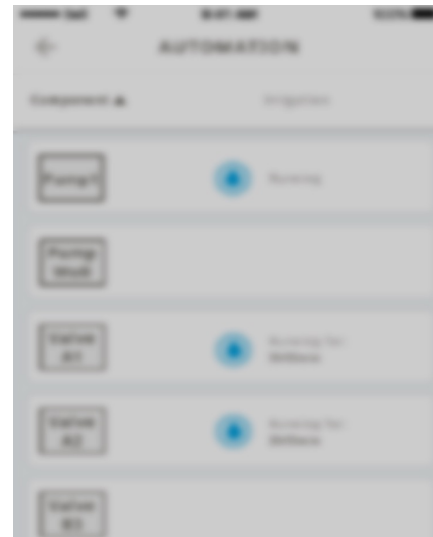
Start or stop an irrigation



START



STOP

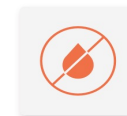


Pump1 Pump1 *Last update: 1 minute ago*

Modify or stop an irrigation

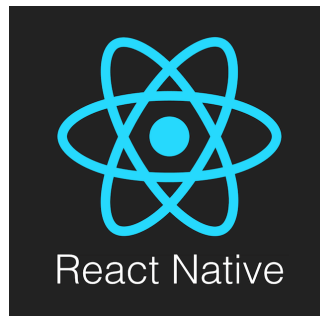


MODIFY

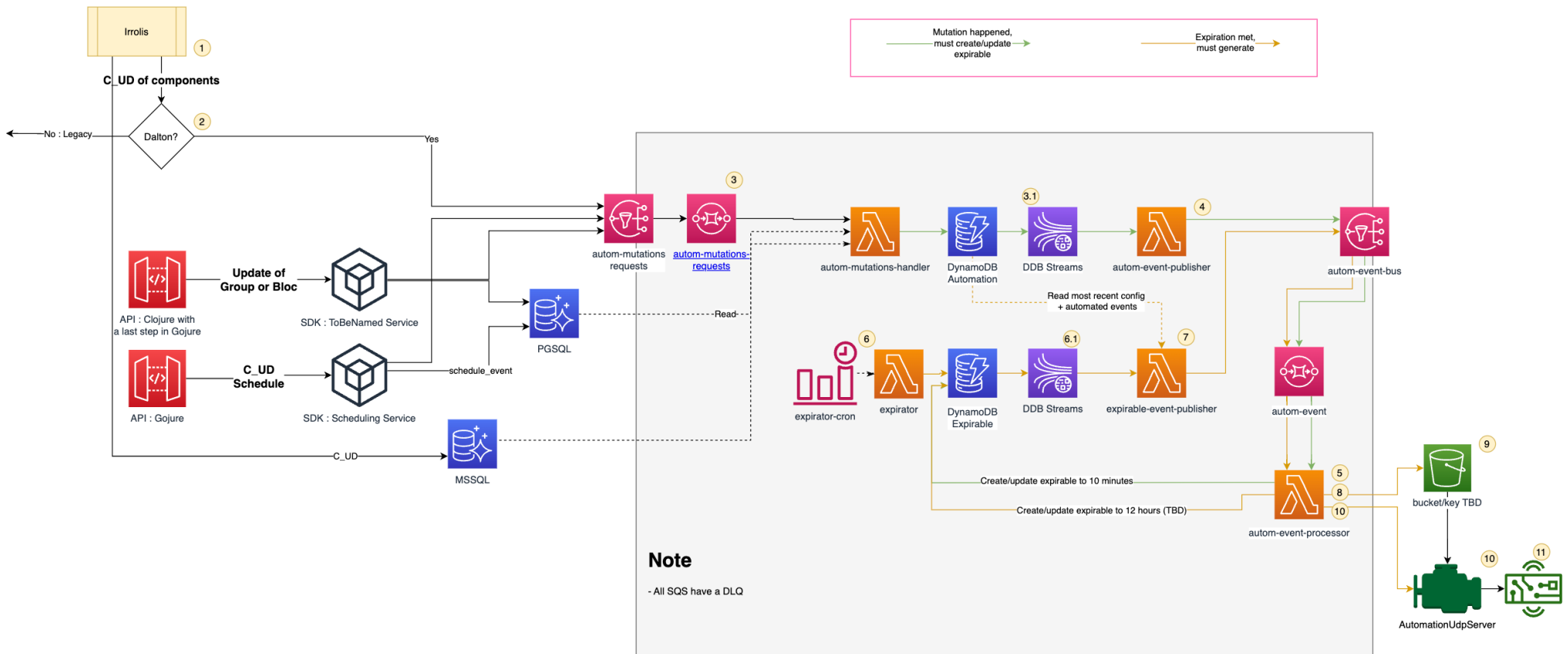


STOP

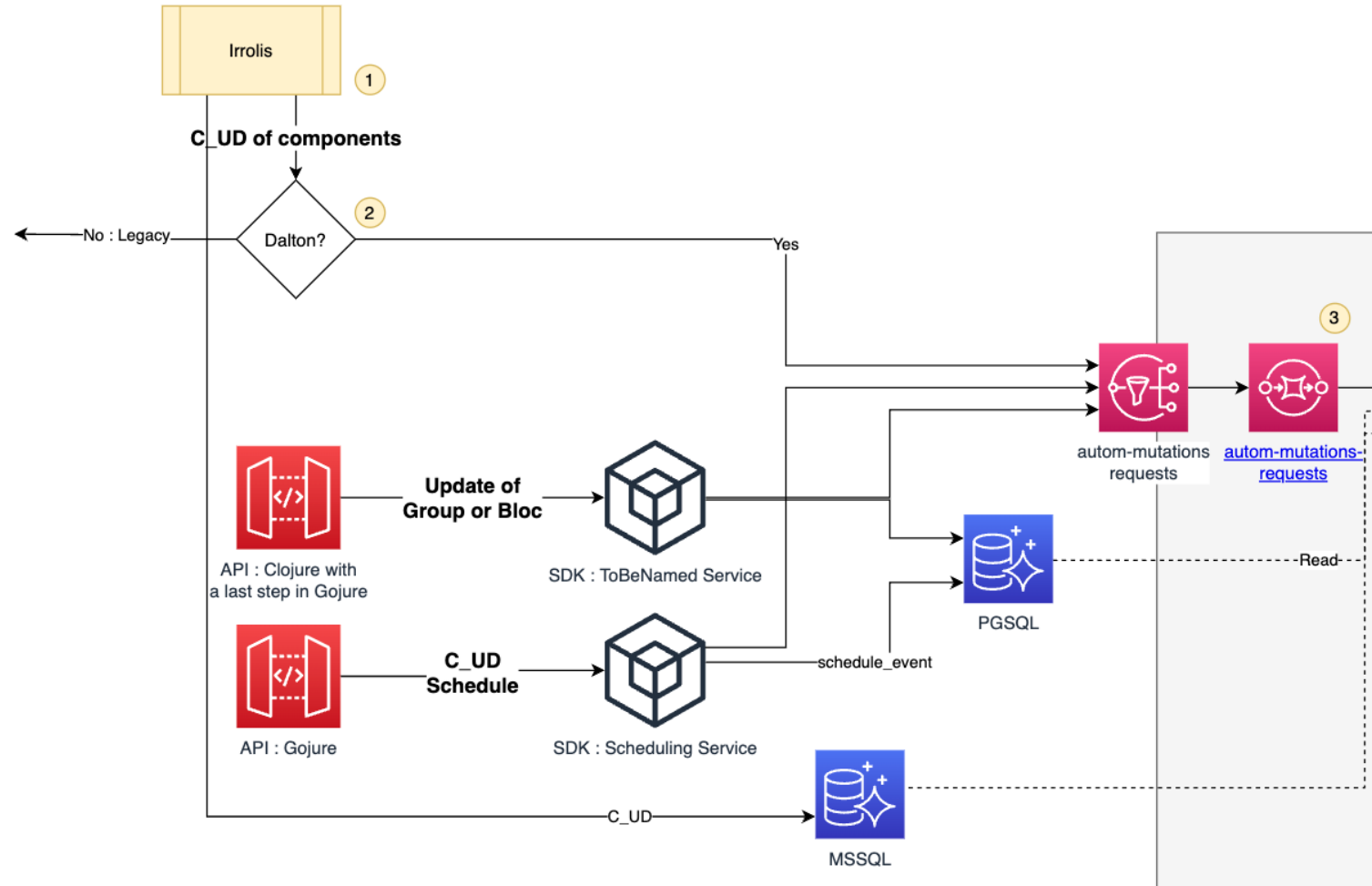
Nos technologies



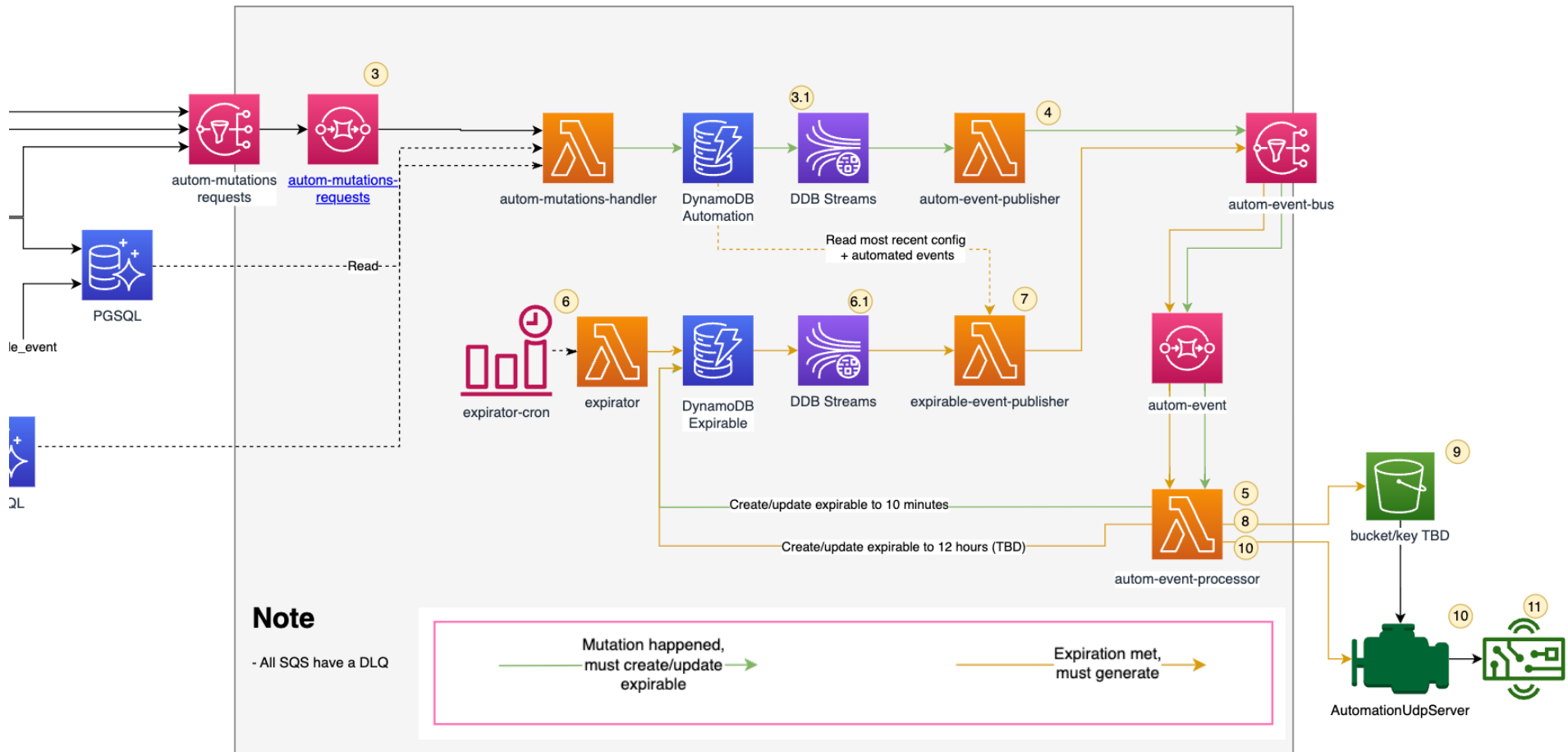
Architecture AWS



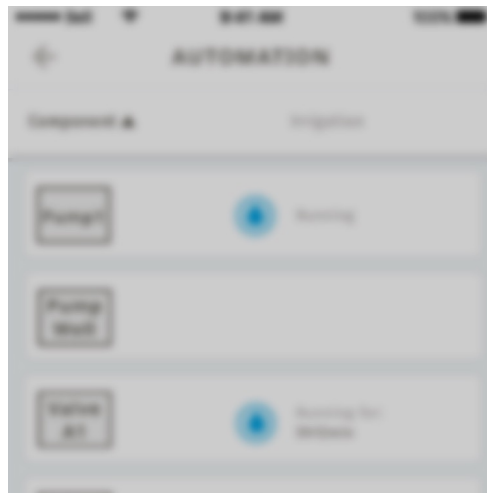
Architecture AWS



Architecture AWS

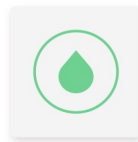


Un peu de code: force start

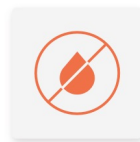


Pump1 Pump1 *Last update: 1 minute ago*

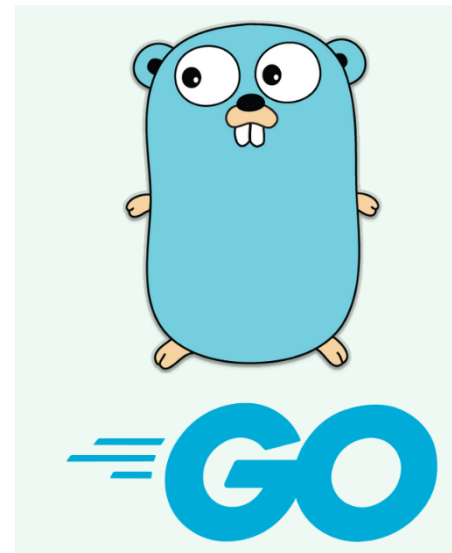
Start or stop an irrigation



START



STOP



Le code

```
func (e *executor) forceStartGen6(ctx context.Context, identityID, automID, trackingID string, serialNumber deviceModel.SerialNumber, options model.Options) error {
    now := e.time.Now().UTC()

    triggerID, err := repository.AutomationIDToTriggerID(automID)
    if err != nil : errors.Errorf("failed to get trigger ID from automID: '%s'", automID) ↵

    trigStatus, err := e.repository.TriggerStatus(triggerID)
    if err != nil : err ↵

    if len(trigStatus.ActuatorStatuses) == 0 {
        return errors.Errorf("no actuator available: #{trigStatus}")
    }

    actuatorID := trigStatus.ActuatorStatuses[0].ActuatorID

    cmd := model.ForceStartGen6Cmd{
        ActuatorID: actuatorID,
        StartTime:  now,
        EndTime:    now.Add(*options.RunFor),
    }

    err = cmd.IsValid()
    if err != nil {
        return err
    }

    return e.deviceMessaging.Enqueue(ctx, deviceModel.Message{
        Publisher: deviceModel.Publisher{
            ID: identityID,
        },
        Consumer: deviceModel.Consumer{
            ID: serialNumber.String(),
        },
        Type:      "H",
        Value:     cmd.ToString(),
        TrackingID: trackingID,
        Timestamp: now,
        Expiration: now.Add(model.CommandForceExpirationTimeGen6),
    }, serialNumber)
}
```

— La commande

```
func (f *ForceStartGen6Cmd) ToString() string {  
    // override 1234 1 1637625319  
    return fmt.Sprintf(format: "%s %s %d %d", OverrideCmd, f.ActuatorID, OverrideStart, f.EndTime.Unix())  
}
```

Test unitaire

```
t.Run(name: "Happy path - Gen6 - V4", func(t *testing.T) {
    service, m := createService()

    m.deviceInfo.On(methodName: "SerialNumber", mock.Anything, deviceID).Return(deviceSerialGen6, nil)
    m.time.On(methodName: "Now").Return(now)

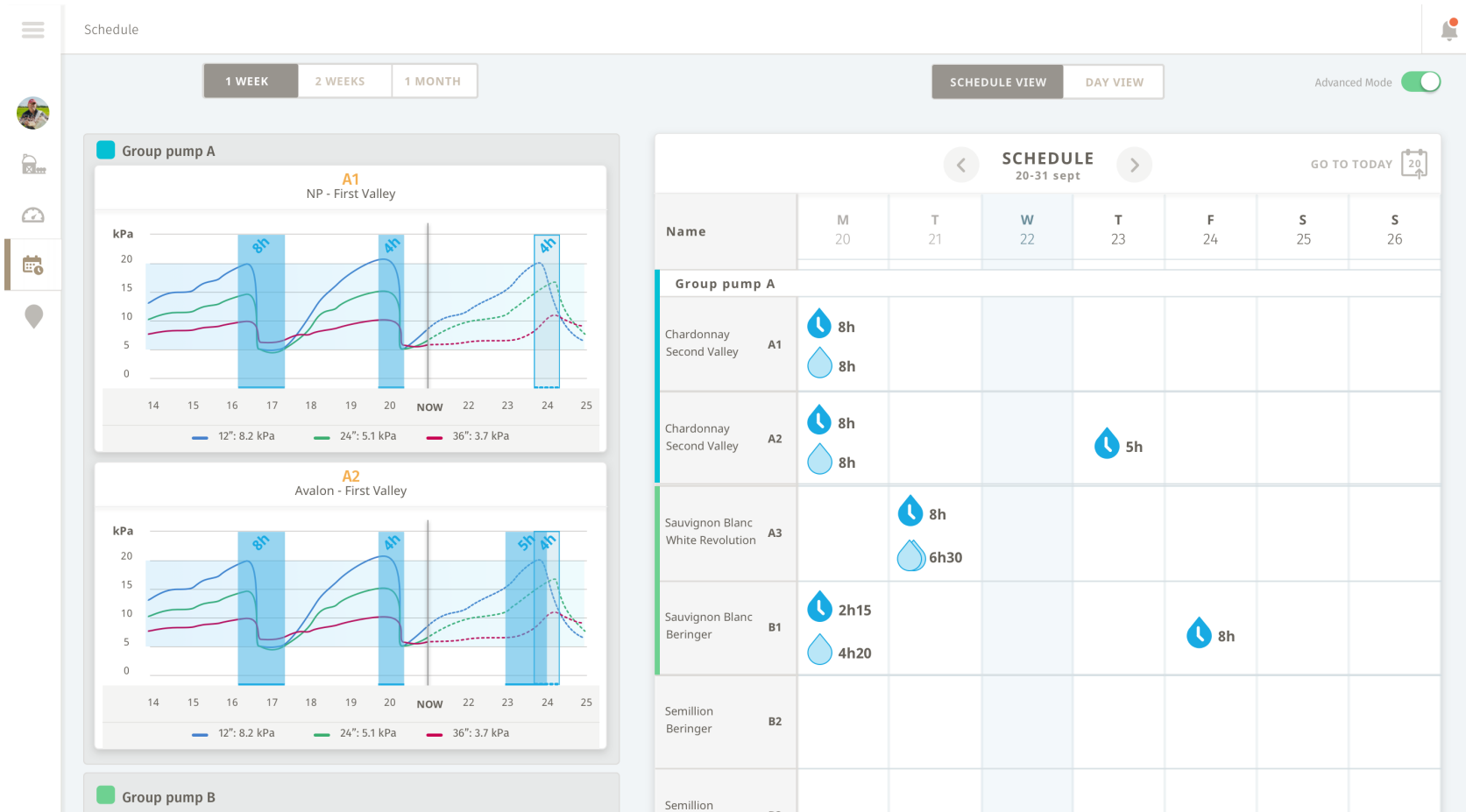
    trigStatus := &irrolis.TriggerStatus{
        ActuatorStatuses: []*irrolis.ActuatorStatus{
            {ActuatorID: actuaID},
        },
    }
}
m.irrolis.On(methodName: "TriggerStatus", automID).Return(trigStatus, nil)
m.deviceMsg.On(methodName: "EnQueue", mock.Anything, deviceModel.Message{
    Publisher: deviceModel.Publisher{ID: "344"},
    Consumer: deviceModel.Consumer{ID: string(deviceSerialGen6)},
    Type:      "M",
    Value:     fmt.Sprintf(format: "%s 4321 %d 1672563600", model.OverrideCmd, model.OverrideStart),
    TrackingID: trackingID,
    Timestamp: now,
    Expiration: now.Add(cmdForceExp),
}, deviceSerialGen6).Return(returnArguments...: nil)
m.irrolis.
    On(methodName: "OverrideSetIrrigationTime", trackingID, identityID, automID, time.Hour).
    Return(returnArguments...: nil)

summary := &model.AutomationSummary{ID: "v4-1234", DeviceID: deviceID, Status: model.Status{}, Ongoing: false}

err := service.forceStart(context.TODO(), model.V4, trackingID: "123", identityID: "344", summary, model.Options{RunFor: &runFor})

assert.Nil(t, err)
m.AssertExpectations(t)
})
```

L'avenir de l'automatisation de l'irrigation





QUESTIONS?

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MERCI

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