

The PI System, an Industry 4.0 Integration Tool for Garant

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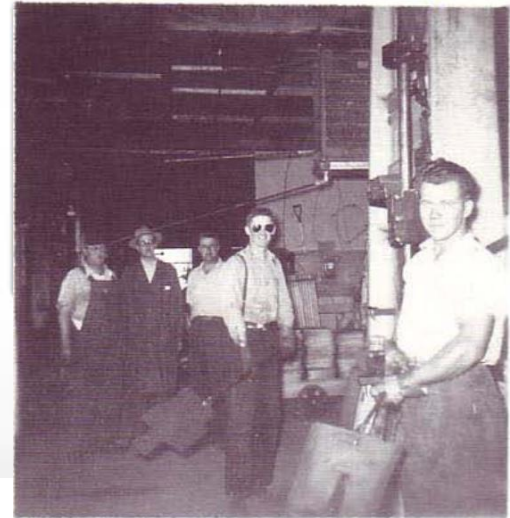


Agenda

- Introduction to Garant
- Introduction to Hulix
- Industry 4.0 Solution
 - IT Infrastructure
 - Plant department
- Benefits
- Summary and conclusion

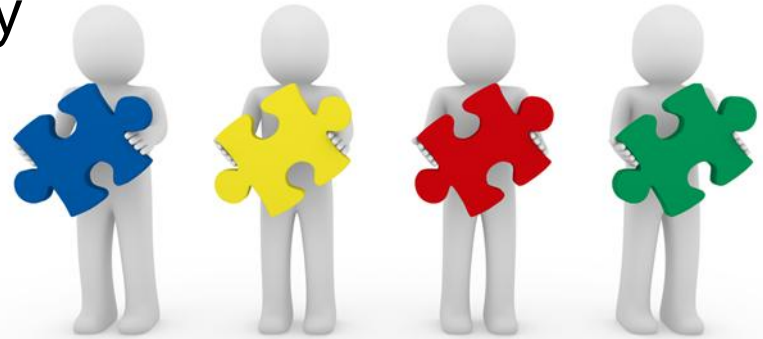
Garant History to 4.0

- 1895 Birth of Garant.
- Garant manufactures wheels for wagons.
- Cast iron production of a lathe to spoke wheel.
- 1934 Creation of a replacement handle for farmers.
- 1954 1st tools manufactured, a square steel snow shovel.
- 1960 Acquisition of 5 lathe for sleeves.
- 2008 OSIsoft PI System introduction at Garant.
- 2011 First attempt to commission a work station.
- 2013 Commissioning of a work station with success
- 2014 Commissioning of 4 work station with success.
- 2015 Commissioning of 10 work station with success.
- 2016 Commissioning of 12 work station with success.
- 2017 Commissioning of 16 work station with success.
- 2018 Planned to commission of 14 work station.



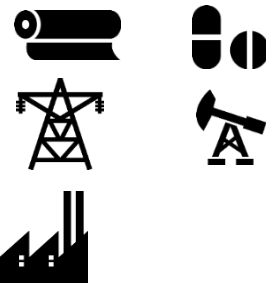
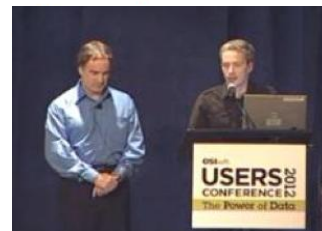
Garant business needs

- Better communication of objectives and results by department (KPI)
- Improve productivity
- Improve efficiency
- Better integrity of our inventory
- Centralization of digital data
- Stability of applications

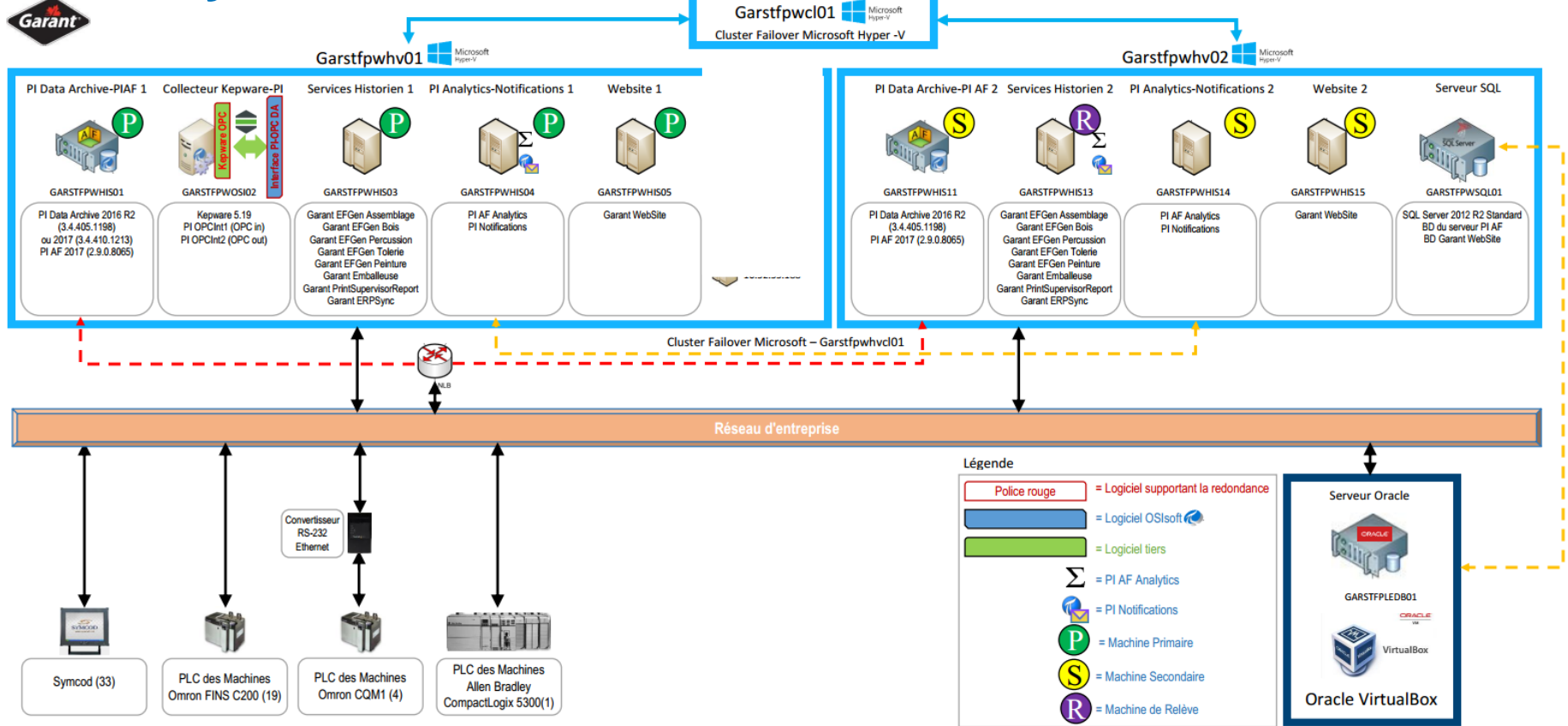


Introduction to Hulix

- Founded in 2008, OSIsoft partner since
- Speaker in OSIsoft regional conferences and PI World from 2010 to 2014
- Our contribution to the Garant project
 - Upgrading the use of PI AF
 - PLC connectivity (read and write)
 - Personalized visualization to fit Garant needs (Windows & web)
 - Personalized .Net development



Industry 4.0



Industry 4.0



Industry 4.0



Different applications by production department

- Assembly
- Wood
- Striking
- Painting and Sheet metal work
- Plastic
- Packaging line
- Public work station
- Scheduling

Basic functionality for all business department

- Reject management.
- Inventory management.
- Planning management.
- Production time management
- Employee time management.

Industry 4.0 - Assembly

PI Work
Station

Name	2017-10-11 07:00:00 [08:30:00]	2017-10-11 15:30:00	Duration	Start Time	End Time
2017-10-11 07:00:00 - JOUR			8:30:00	2017-10-11 07:00:00	2017-10-11 15:30:00
WO557391			6:25:54,64	2017-10-11 07:01:21,371	2017-10-11 13:27:16,011
Downtime			0:24:41	2017-10-11 07:01:25	2017-10-11 07:26:06
Downtime			0:02:48	2017-10-11 07:27:29	2017-10-11 07:30:17
Downtime			0:04:44	2017-10-11 07:47:05	2017-10-11 07:51:49
Downtime			0:10:24	2017-10-11 09:05:07	2017-10-11 09:15:31
Downtime			0:04:17	2017-10-11 09:18:17	2017-10-11 09:22:34
Pause1			0:14:59	2017-10-11 09:25:00	2017-10-11 09:39:59
Downtime			0:02:37	2017-10-11 09:50:32	2017-10-11 09:53:09
Downtime			0:02:01	2017-10-11 10:08:34	2017-10-11 10:10:35
Downtime			0:02:09	2017-10-11 11:09:05	2017-10-11 11:11:14
Hygiene1			0:04:59	2017-10-11 11:55:00	2017-10-11 11:59:59
Lunch			0:29:59	2017-10-11 12:00:00	2017-10-11 12:29:59
WO559306			1:42:40,884	2017-10-11 13:27:19,116	2017-10-11 15:10:00
Downtime			0:28:30	2017-10-11 13:27:23	2017-10-11 13:55:53
Downtime			0:03:26	2017-10-11 14:08:26	2017-10-11 14:11:52
Downtime			0:02:17	2017-10-11 14:26:32	2017-10-11 14:28:49
Downtime			0:03:48	2017-10-11 14:34:30	2017-10-11 14:38:18
Downtime			0:03:07	2017-10-11 15:06:53	2017-10-11 15:10:00
Hygiene2			0:05:00	2017-10-11 15:10:00	2017-10-11 15:15:00
Pause2			0:15:00	2017-10-11 15:15:00	2017-10-11 15:30:00

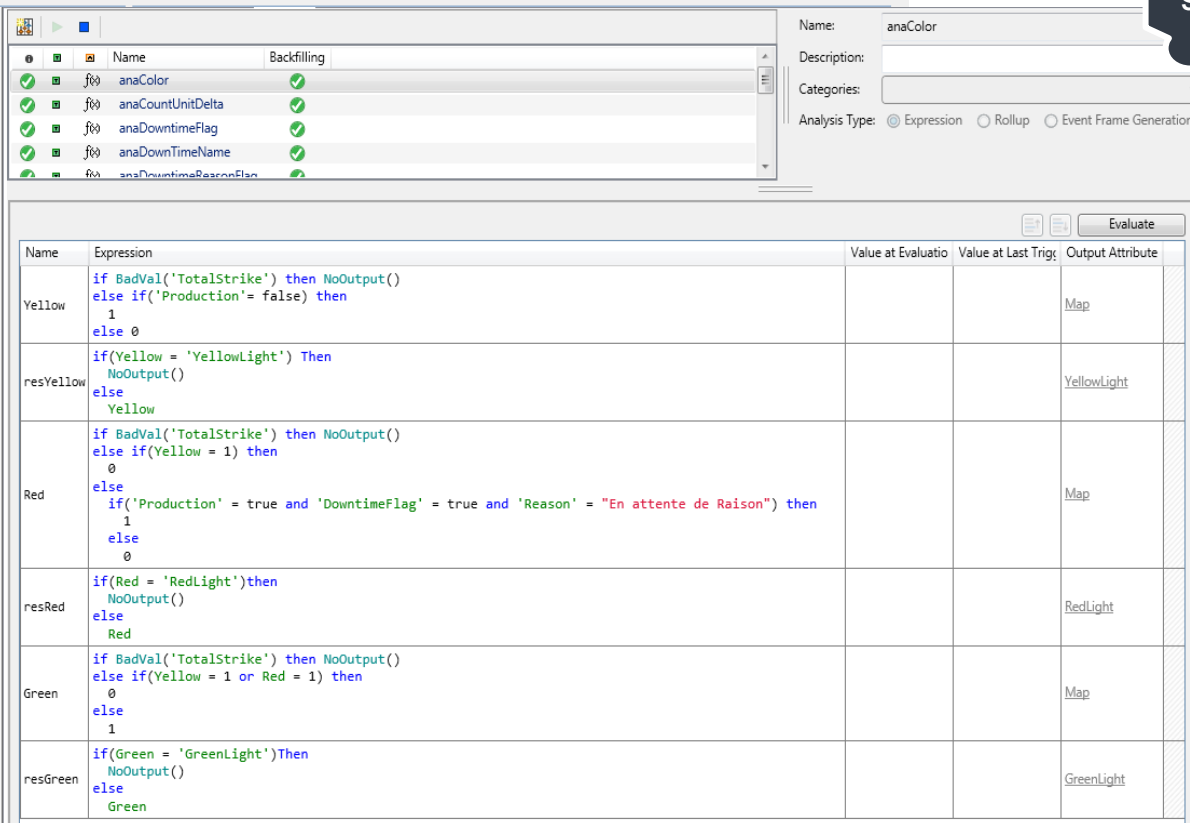
Sortir

Industry 4.0 - Wood

PI Work
Station

+	2017-10-09 15:10:00 - SOIR		8:10:00	2017-10-09 15:10:00	2017-10-09 23:20:00
+	2017-10-09 23:20:00 - NUIT		8:00:00	2017-10-09 23:20:00	2017-10-10 07:20:00
+	2017-10-10 07:00:00 - JOUR		8:30:00	2017-10-10 07:00:00	2017-10-10 15:30:00
+	ART88275		7:19:02	2017-10-10 07:17:45	2017-10-10 14:36:47
+	WO560798		0:33:03	2017-10-10 14:36:57	2017-10-10 15:10:00
+	2017-10-10 15:10:00 - SOIR		8:10:00	2017-10-10 15:10:00	2017-10-10 23:20:00
+	WO560798		5:12:14	2017-10-10 15:14:46	2017-10-10 20:27:00
+	WO560800		0:06:33	2017-10-10 21:46:46	2017-10-10 21:53:19
+	WO560800		0:31:42	2017-10-10 22:01:31	2017-10-10 22:33:13
+	2017-10-10 23:20:00 - NUIT		8:00:00	2017-10-10 23:20:00	2017-10-11 07:20:00
+	2017-10-11 07:00:00 - JOUR		8:30:00	2017-10-11 07:00:00	2017-10-11 15:30:00
+	2017-10-09 23:20:00 - NUIT				
+	2017-10-10 07:00:00 - JOUR				
+	ART88275				
+	WO560798				
+	2017-10-10 15:10:00 - SOIR				
+	2017-10-10 23:20:00 - NUIT				
+	2017-10-11 07:00:00 - JOUR				
+	WO560800				
+	WO560943				
+	Event Frame Quick Search Results 1				
+	Event Frame Search 1				
+	Event Frame Search 2				
+	Event Frame Search 3				
+	Event Frame Search 4				
+	Transfer Searches				
+	Transfer Search 1				
+	PartialUnHooked	0		2017-10-10 07:17:45	
+	Product	88275		2017-10-10 14:36:47	
+	ProductByBracket	1		2017-10-10 14:36:47	
+	ProductDescription	88275		2017-10-10 14:36:47	
+	ProductionType	1		2017-10-10 14:36:47	
+	Productivity	1.1691095282426551		2017-10-10 14:36:47	
+	ProductivityTime	21933 s		2017-10-10 07:17:45	
+	QteAjout	0 count		2017-10-10 07:17:45	
+	Quantity	4350		2017-10-10 14:36:47	
+	QuantityByHrs	713.99261386951173		2017-10-10 14:36:47	

PI Work Station



Industry 4.0 – Painting and Sheet metal work

PI Work
Station

Pièces : 506798

Modèle : Tube Acier 1.190 504577

Couleur : Gris PMS11C # 504443

Zone Accrochage

LUNDI 2
OCTOBRE 16:11

Pièces : 559644

Zone Peinture

LUNDI 2
OCTOBRE 16:12

	Name	2017-10-02 07:00:00 [08:30:00]	2017-10-02 15:30:00	Duration	Start Time	End Time	Primary Element
+	2017-10-02 07:00:00 - JOUR			8:30:00	2017-10-02 07:00:00	2017-10-02 15:30:00	2312P
-	2017-10-02 07:00:00 - JOUR			8:30:00	2017-10-02 07:00:00	2017-10-02 15:30:00	2312A
+	ART502539			1:17:30,001	2017-10-02 07:03:51.785	2017-10-02 08:21:21.786	2312A
+	ART87761			3:05:54,6	2017-10-02 08:21:23.88	2017-10-02 11:27:18.481	2312A
+	ART504342			1:33:02,183	2017-10-02 11:27:20.559	2017-10-02 13:00:22.742	2312A
+	ART88222			1:10:58,207	2017-10-02 13:00:24.867	2017-10-02 14:11:23.074	2312A
+	ART502797			0:13:20,473	2017-10-02 14:11:25.152	2017-10-02 14:24:45.625	2312A
+	ART500494			0:05:25,472	2017-10-02 14:24:47.813	2017-10-02 14:30:13.285	2312A
+	WO559644			0:39:44,621	2017-10-02 14:30:15.378	2017-10-02 15:10:00	2312A
-	2017-10-02 07:00:00 - JOUR			8:30:00	2017-10-02 07:00:00	2017-10-02 15:30:00	2312
+	ART502539			1:44:07,028	2017-10-02 07:59:55.15	2017-10-02 09:44:02.178	2312
+	ART87761			3:22:46,362	2017-10-02 09:44:07.857	2017-10-02 13:06:54.219	2312
+	ART504342			0:57:53,846	2017-10-02 13:06:58.447	2017-10-02 14:04:52.293	2312
+	ART88222			1:04:57,114	2017-10-02 14:05:02.885	2017-10-02 15:10:00	2312

Tableau de bord

506798	624	Vigoro	crochet
506798	624	Manche Acier Gris PMS11C	Tube Acier 1.190 504577
506798	228	Manche Acier Gris PMS11C	Tube Acier 1.190 504577

0% 200%

V.43.04

Industry 4.0 - Plastic



Qté requise : 3744
 Qté Rejet : 0
 Qté Produite : 112
 Qté Restante : 3572

555770
 DC / STAGEPLAST

PRD : 99934
 MOD : LPRR24

Moule : MOUX020
 Cavité : 2
 Temps de Cycle : 60 / sec
 Std / hre : 120
 Std / équipe : 2 / min
 Ratio : 1 / 1

2501 - SOIR

LUNDI 2 OCTOBRE

✔	Convention	3X8h
✔	Early	False
✔	EmployeeNumber	00428
✔	IdChubb	513584
✔	InBreak	False
✔	Product	99934
✔	Role	Opérateur / Manoeuvre
✔	Substitute	False
✔	UserName	GAETAN BOUFFARD
✔	Workorder	555770
✔	Workstation	2501

MERCREDI 11 OCTOBRE

16:23

Cause

Mode

Cédule

Cause

V. 1.0.0.3

Industry 4.0 – Packaging line

PI Work
Station



Category: ZoneManagable				
InZone1	0	1970-01-01 00:00:00		
HasPallet	False	2017-10-11 16:34:36.218		
IdPallet	0	2017-10-11 16:34:36.218		
PalletManaged	Pt Created	2015-03-25 16:59:41		
WrappingCode	1	2017-10-11 16:34:28.746		
InZone2	0	1970-01-01 00:00:00		
DataReadyIn2	True	2017-10-11 16:34:28.746		
HasPallet	True	2017-10-11 16:34:28.746		
IdPallet	167961	2017-10-11 16:34:28.746		
PalletManaged	Pt Created	2015-03-25 16:59:13		
QRCodeRaw	GAREMB;001;80650U;36;559306;03...	2017-10-11 16:34:28.746		
WrappingCode	1	2017-10-11 16:34:28.746		
OutZone1	0	1970-01-01 00:00:00		
AutoPrint	False	2017-10-11 16:34:18.107		
HasPallet	False	2017-10-11 16:34:18.107		
IdPallet	0	2017-10-11 16:34:18.107		

Mode Test

Consommables

Pellicule ☐ Etiquette / Papier carbone ☐

ro de série Appliquer

Statut	Date	
accès	2017/10/06 11:28:06	●
accès	2017/10/06 11:28:06	●
accès	2017/10/06 11:28:06	●
accès	2017/10/06 11:28:06	●
appel du 'back-flush' a été ignoré, car il manque de l'information sur la palette	2017/10/06 11:20:43	●
accès	2017/10/06 11:02:49	●
accès	2017/10/06 11:01:43	●
accès	2017/10/06 11:00:07	●

Industry 4.0 – Public Work Station



Secteur ToleriePeinture

Poste public #1

11:33:00

En Production


Id	Nom	Début	Poste	Raison	Fin	Durée
631555	MARCEL TALBOT	11:30:06	2399	MOCC: 403 - Démêler lame/tête	En COURS	
722563	MARCEL BOISSONNEAULT	11:00:45	2304	MOCC: 300 - Setup / Rèqlage	En COURS	
631555	MARCEL TALBOT	10:57:36	2306	MOCC: 501 - Renflouage	11:00:00	00:02:23
723003	HUGUETTE LAPOINTE	10:52:39	2305	MOCC: Temps Direct	En COURS	
631555	MARCEL TALBOT	10:31:22	2399	MOCC: 403 - Démêler lame/tête	10:57:32	00:26:10
824235	DANIEL DENAULT	10:17:07	2322	MOCC: 807 - Projet / Amélioration continue	10:18:07	00:00:59
722563	MARCEL BOISSONNEAULT	10:00:11	2304	MOCC: 300 - Setup / Rèqlage	10:30:09	00:29:58
631555	MARCEL TALBOT	09:54:58	2306	MOCC: 402 - Test qualité	09:59:46	00:04:48
631555	MARCEL TALBOT	09:45:28	2399	MOCC: 403 - Démêler lame/tête	09:54:55	00:09:27
722563	MARCEL BOISSONNEAULT	09:00:28	2304	MOCC: 300 - Setup / Rèqlage	09:29:55	00:29:26
631555	MARCEL TALBOT	08:38:27	2399	MOCC: 403 - Démêler lame/tête	08:59:57	00:21:30
631555	MARCEL TALBOT	08:32:04	2306	MOCC: 402 - Test qualité	08:38:24	00:06:19
722563	MARCEL BOISSONNEAULT	08:25:06	2304	MOCC: 300 - Setup / Rèqlage	08:31:02	00:05:56
631555	MARCEL TALBOT	08:07:18	2306	MOCC: 601 - TPM	08:15:38	00:08:20
631555	MARCEL TALBOT	07:33:00	2310	MOCC: 300 - Setup / Rèqlage	07:50:11	00:17:11
631555	MARCEL TALBOT	07:16:05	2310	MOCC: 300 - Setup / Rèqlage	07:22:32	00:06:27
722563	MARCEL BOISSONNEAULT	07:03:47	2304	MOCC: 807 - Projet / Amélioration continue	08:25:02	01:21:14

V.22.02

V.2202

Industry 4.0 – Scheduling

PI Work
Station

 Statut Machine

[Retour à la gestion des postes de travail](#)

Poste de travail 221201 - Ligne Affutage #1














☒ Affichage par défaut ☐ Filtré

Statut

Actif ou En cours

Appliquer

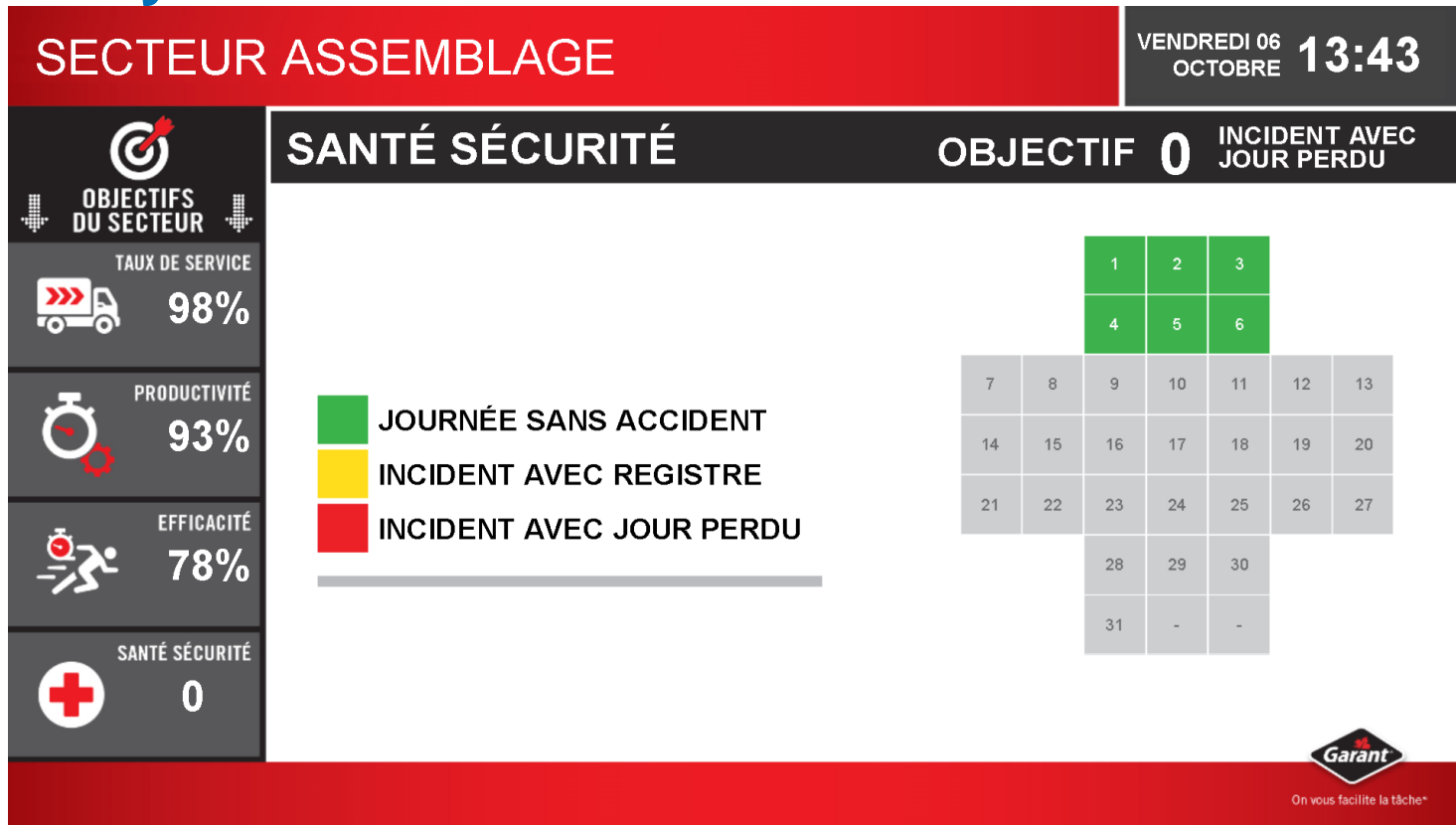
+ Ajouter

Bon de travail	Article	Description	Matière Première	Remarque	Qté Originale	Qté Produite	Qté Restante	Statut	Temps requis (min)	Heure	Séquence	
	87661	Manche frêne 1 3/8" x 24" verni	85308 - Vernis UV, scelleur maxi cure	7 truck prendre 24" frene	7000	4713	2287	En cours	213	03:33	1	
	89354	Manche frêne 1 3/8" x 24", charcoal	89479 - Vernis UV, spray charcoal	comp truck prendre 24" frene	1000	0	1000	Actif	93	05:06	2	 
	504662	Manche frêne 1 3/8" x 28" charcoal	502155 - Dowel mixte sec 1 5/8 x 28"	1 truck prendre 28" bois dur	1000	0	1000	Actif	93	06:39	3	 
	500288	Manche frêne 1 3/8 x 28", charcoal	89479 - Vernis UV, spray charcoal	comp + 2 truck prendre 28" bois dur	2300	0	2300	Actif	214	10:13	4	 
	500292	Manche frêne 1 3/8 x 28", charcoal	89479 - Vernis UV, spray charcoal	comp + 1 truck prendre 28" bois dur	1700	0	1700	Actif	158	12:51	5	 
	500291	Manche frêne 1 3/8 x 36", charcoal	88816 - Dowel mixte sec 1 5/8 x 36"	comp + 3 truck prendre 36" frene	3500	0	3500	Actif	326	18:17	6	 
	504343	Manche frêne 1 3/8" x 36", gris PMS11C	88816 - Dowel mixte sec 1 5/8 x 36"	3 truck prendre 36" frene	3000	0	3000	Actif	279	22:56	7	 

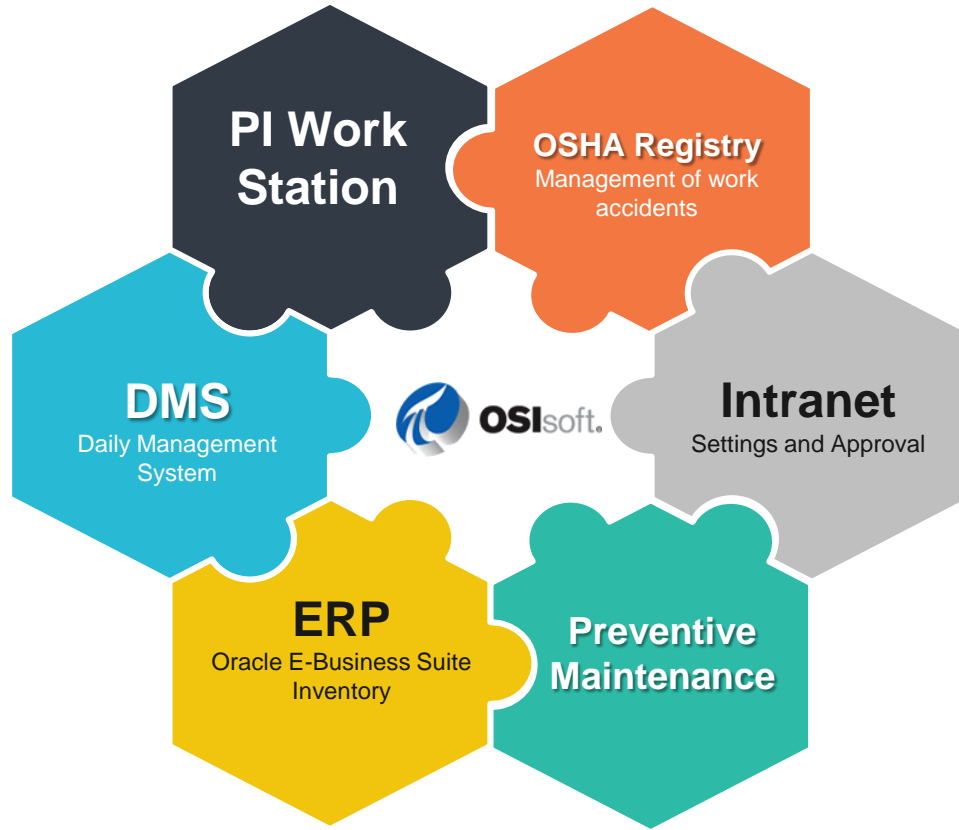
Industry 4.0



Industry 4.0



Industry 4.0



Industry 4.0

Intranet

Garant Statut Machine

[Retour à la liste des départements](#)

Gestion des approbations

Nombre d'approbation en attente: 932
Nombre d'erreurs sous Oracle pour les rejets: 21
Nombre d'erreurs sous Oracle pour les temps: 26

Gestion des utilisateurs

Interface pour la gestion des utilisateurs afin de

Gestion des tâches par poste de travail

Interface pour le chef d'équipe afin d'ajouter les L'information entré sous cette interface sera affi
ATTENTION: Seulement les postes configurés à

Gestion des bons de travail mensuels

Mensuellement, un employé du département de les différent bons de travail par département.

Gestion des messages systèmes

Application de la gestion des messages d'erreur

Gestion des informations des articles

Application pour configurer les informations relat

Gestion des accidents de travail

Application pour configurer les informations relat

Garant Statut Machine

[Retour à la gestion des postes de travail](#)

Dernière mise à jour : 16h54

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Bon de travail

Assemblage Bois_Affutage Emballage Percussion

BT / Article	Quart de travail	Heure début	He
560405	JOUR	2017/10/11 14:11:47	20
560171	JOUR	2017/10/11 14:16:53	20
560076	SOIR	2017/10/11 16:19:11	20
559984	SOIR	2017/10/10 22:16:13	20
559711	JOUR	2017/10/11 09:48:26	20
559306	JOUR	2017/10/11 13:27:19	20
559306	SOIR	2017/10/11 15:10:19	20
557055	JOUR	2017/10/11 15:04:48	20
555665	SOIR	2017/10/10 23:06:55	20
555665	SOIR	2017/10/11 15:10:16	20
555438	SOIR	2017/10/10 22:13:36	20

Garant Statut Machine

[Retour à la liste des machines](#)

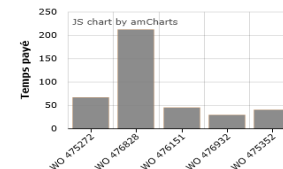
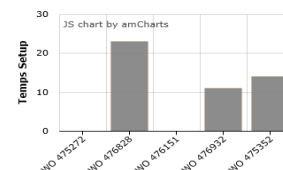
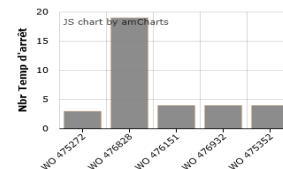
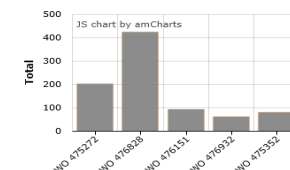
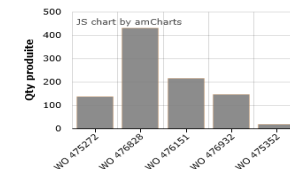
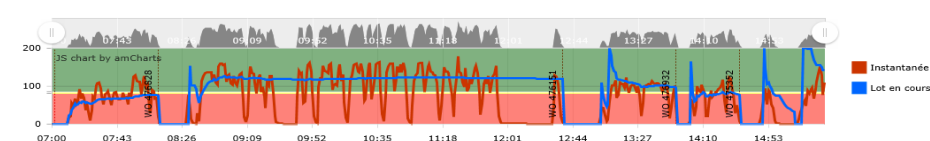
hulsup3

Rafraîchir automatiquement

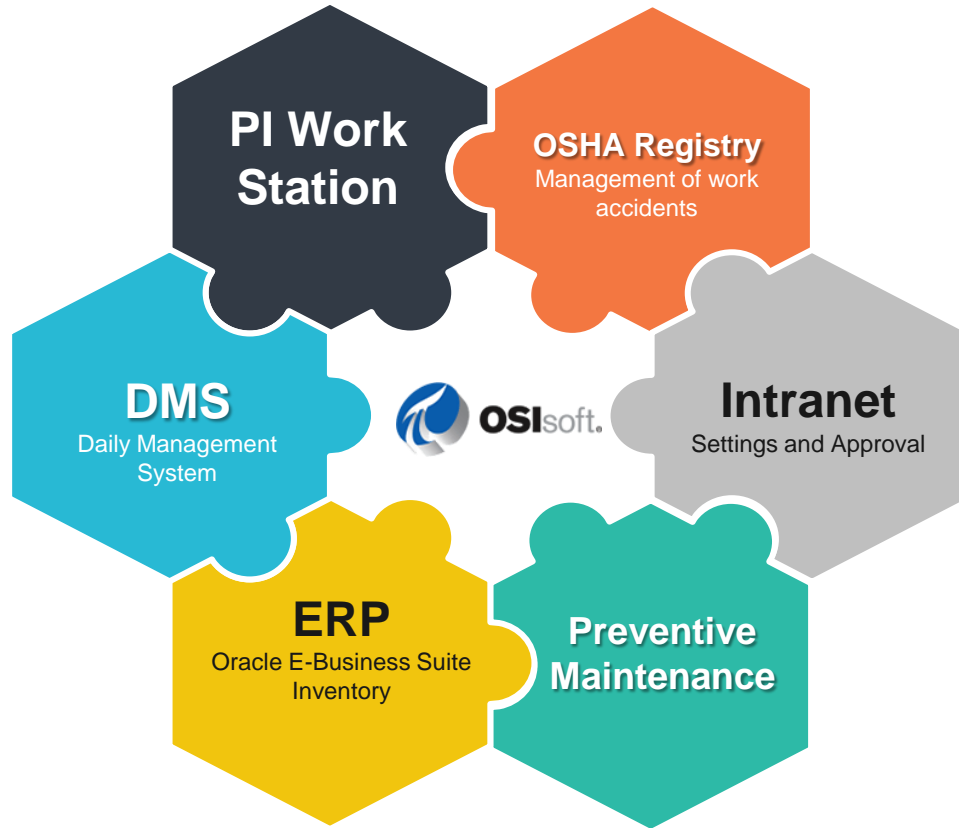
Dernière mise à jour : 15h48

2406

Quart : 2015-04-15 07:00:00 - JOUR



Industry 4.0



Industry 4.0



Time of Use
Number of Actions



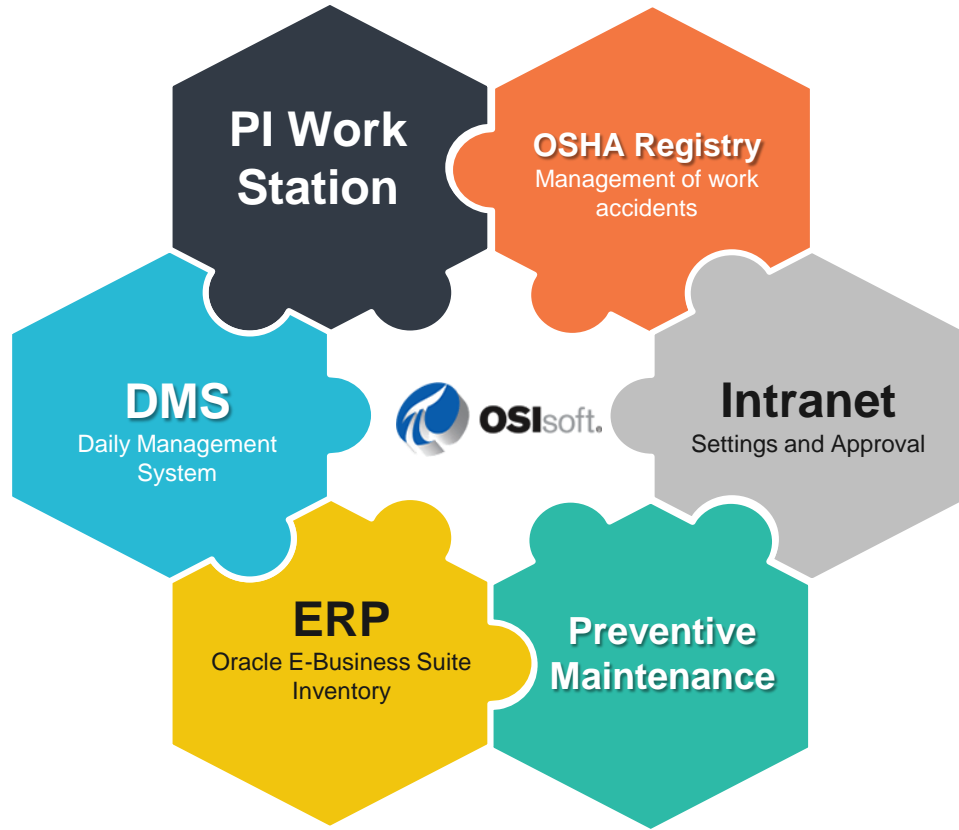
Preventive
Maintenance
Software



Work Orders



Industry 4.0



Industry 4.0



Production Order / Article

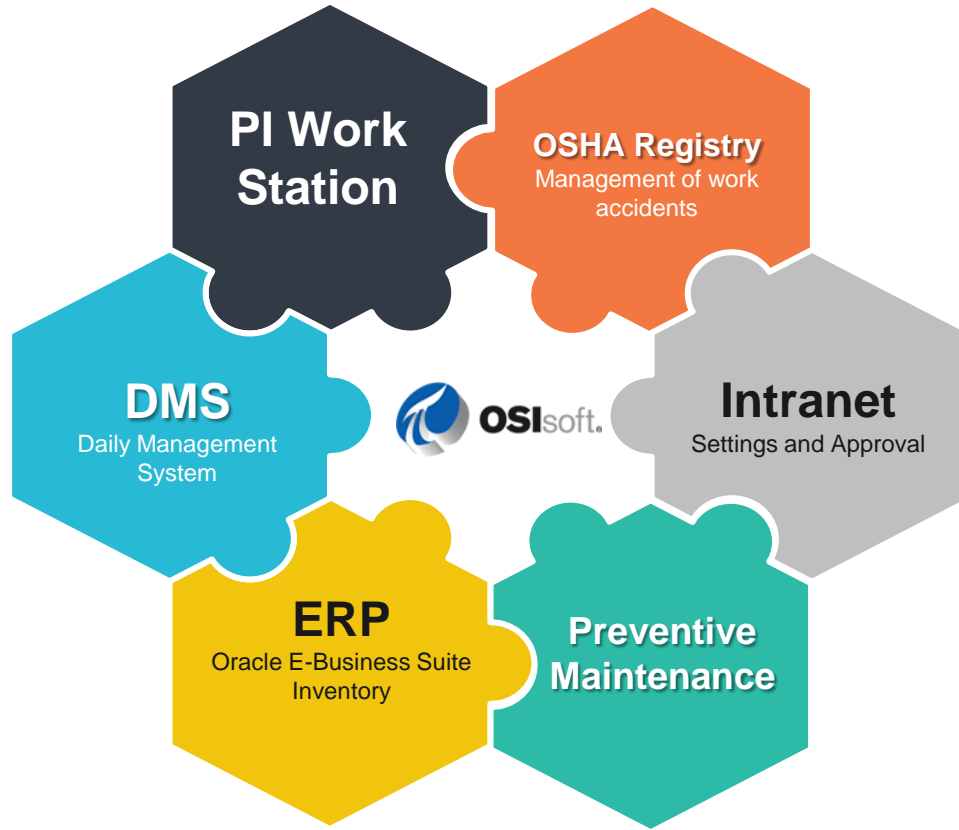
- Standard / target
- Ratio
- Description
- Location



Production time
Downtime
Finished product - inventory
Component rejects
Finished product rejects

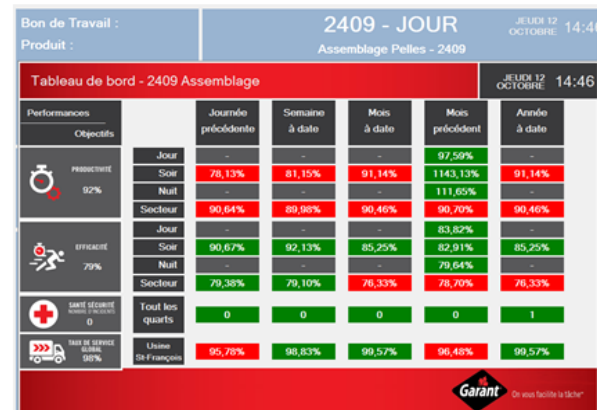
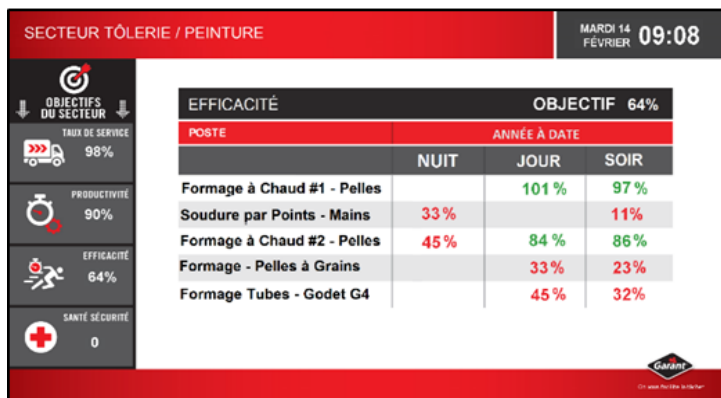
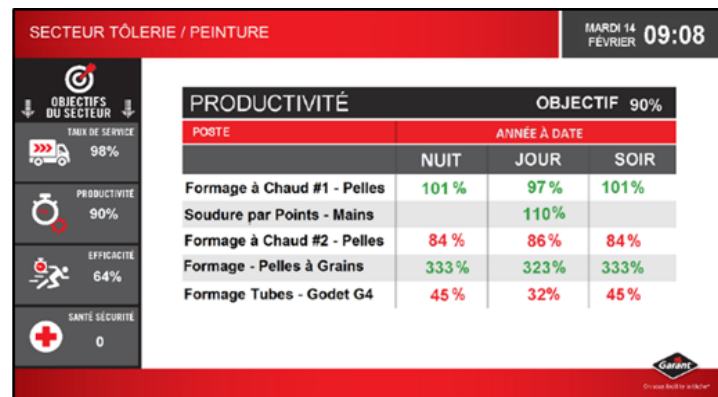
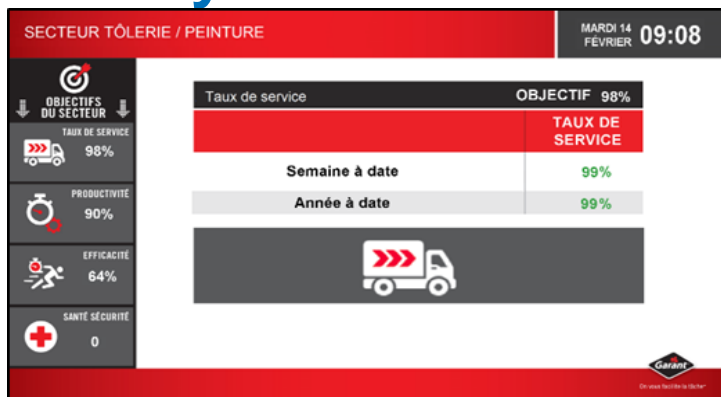


Industry 4.0



Industry 4.0

DMS



Benefits

- **12%** increase in productivity
- **6%** increase in efficiency
- Return on investment within **2 years**
- Creating **healthy competitiveness** between shifts
- Inventory of components and finished products **up to date**

The PI System, an Industry 4.0 Integration Tool for Garant



Company and Goal:

Garant is a major manufacturer of tools and wants to take a **digital turn** in order to have, in particular, **better control over its productivity**.



CHALLENGE

No computerized production monitoring system and a "Human Driven" process

- Employee changes department on a regular basis.
- Lack of connectivity between systems.
- Change management

SOLUTION

Production monitoring system based on the PI System and customized to the needs of Garant

- Teamwork between Garant production and Hulix
- Seamless operation screen between department

RESULTS

Productivity increase by 12%

- Increase in efficiency by 6%
- ROI within 2 years
- Inventory of component and finish product up to date



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Questions

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Merci

谢谢

Спасибо

Danke

Gracias

Thank You

감사합니다

ありがとう

Grazie

Obrigado